Australian Year 12 Mathematics Enrolments: Patterns And Trends – Past And Present

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Introduction

This report was commissioned by the International Centre for Excellence in Education in Mathematics [ICE-EM].

The main aim of the project was to determine patterns of enrolments in mathematics subjects offered in the final year of schooling (Year 12) across Australia over time, both nationally and within each state/territory. ICE-EM was particularly interested in identifying patterns and trends for the most challenging mathematics subjects offered at the Year 12 level, that is, those subjects which would provide students with the best start in tertiary level studies that have high mathematical demands.

A number of difficulties arose in trying to determine the patterns and trends in mathematics enrolments over time. The most critical of these were:

- changes in state curricula offerings over the years, and
- the lack of accurate data, particularly from earlier times.

Curricula changes meant that there was no consistency in mathematics subject offerings. Categorising the subjects in terms of their levels of challenge with respect to their mathematical content was therefore not possible. The early categorisations by John Dekkers, John Malone, and John De Laeter were useful. However, the categories they used were defined with respect to the post-secondary course options they offered, and not on mathematical content. Thus, any variations in enrolment numbers over time cannot be easily explained.

A minor difficulty which affected the most recent enrolment numbers to a small, but growing, degree resulted from the introduction of alternative Year 12 programs in recent years. Across Australia, some students are now completing the International Baccalaureate [IB] qualifications instead of their state-based Year 12 certification. Another alternative program is offered in Victoria. Some Year 12 students study tertiary level mathematics courses, having completed particular, pre-requisite, Year 12 mathematics subjects while enrolled in Year 11. While strenuous efforts were made to determine enrolment figures in these alternative programs, the lack of accurate data and unavailability of data for some years, precluded the inclusion of these data in this report. A summary of the data that were found is presented in Appendix 2.

Another difficulty arose because enrolment numbers can not be equated to student numbers. In some Australian states/territories, students can enrol in more than one mathematics subject while in Year 12. This can occur within a particular level of mathematics subjects (e.g., Tasmania: Elementary mathematics subjects) or across levels (e.g., Victoria: Advanced and Intermediate level mathematics subjects). Thus total enrolment numbers within mathematics subject levels and/or total enrolment numbers in all mathematics subjects across the levels in particular states/territories can be greater than the number of students studying mathematics In several cases, it was found that total enrolment numbers exceeded 100% of the Year 12 cohort.

In this report care is taken when discussing enrolment numbers not to equate them to student numbers. The report focuses on enrolment numbers, not participation rates. Participation rates are the proportions (or percentages) of Year 12 students taking

various combinations of Year 12 mathematics subjects, such as Intermediate and Advanced combined, Intermediate only, etc. In a companion report to this one, also released by the International Centre for Excellence in Education in Mathematics [ICE-EM], Barrington (2006) documents the proportions of Year 12 students taking (i) an Advanced mathematics subject; (ii) an Intermediate mathematics subject but not an Advanced subject; and (iii) an Elementary mathematics subject but not an Intermediate subject nor an Advanced subject, for the period 1995-2004.

Mathematics subject categorisations

It is thanks to the pioneering work of John Dekkers, John De Laeter, and John Malone, that aspects of the report could be compiled. This team of researchers developed two sets of categories for the classification of Year 12 mathematics which are described below.

Prior to 1990

Prior to 1990, Dekkers, De Laeter and Malone (1986) used a series of subject groupings based on earlier work by Rosier: "**Type 1**", "**Type 2**" and "**Type 3**" mathematics subjects. The definitions provided by Dekkers et al. (1986, p. 42) were:

Type 1: These are "described as *terminal* mathematics courses. They are not designed to provide a foundation for any future tertiary studies involving mathematics."
Type 2: These "involved a level of *mathematics competence* which provide a satisfactory background for tertiary studies in which the mathematics content is minimal – for example, in architecture, pharmacy or economics."
Type 3: These "involved *specialised mathematics* leading to tertiary studies in which mathematics is an integral part of the discipline, as in mathematics, physical science or engineering."

For each state/territory, a table which included the subjects found in each of these categories was provided by Dekkers et al. (1986, p. 43) and has been reproduced in Table I.1.

Table I.1. Range and function of Year 12 mathematics courses by course type

State	Type 1	Type 2	Type 3
Qld	Social Mathematics	Mathematics I	Mathematics I—Mathematics II
NSW	Two unit (2A) Mathematics	Two unit mathematics	Three unit mathematics Four unit mathematics
ACT	Minor Mathematics	Major Mathematics Major/Minor Mathematics	Double major mathematics
Vic	General Mathematics	General Mathematics	Applied Mathematics Pure Mathematics[1]
Tas	Mathematics Level II	Mathematics Level III	Mathematics 1 Mathematics 2[3]
SA[2]	Mathematics IS	Mathematics IS	Mathematics 1 Mathematics 2[3]
NT[2]	Mathematics IS	Mathematics IS	Mathematics 1 Mathematics 2[3]
WA	Mathematics IV	Mathematics I	Mathematics II Mathematics III[3]

Type 1: Terminal units—no expectation of further mathematics
Type 2: Some non-specialised mathematics expected
Type 3: Further specialised mathematics expected

[1] Co-requisite units
[2] Identical courses
[3] Units usually suited concurrently

Source: (adapted from: Dekkers, 1986, p. 43)

1990 - 1999

From 1990-1999, Dekkers, De Laeter and Malone (2000b) used the following categories for Year 12 mathematics subjects: "**High**", "**Intermediate**", and "**Low**" level. These categories were defined as follows (Dekkers et al, 2000b, p. viii):

High:	"Those subjects involving specialised or advanced level Mathematics leading to tertiary studies in which Mathematics is an integral part of the discipline, as in physical Science, engineering or Mathematics."
Intermediate:	"Those subjects which involved a level of mathematical competence which provides a satisfactory background for tertiary studies in which Mathematics content is minimal – for example in architecture, pharmacy or economics."
Low:	"Those subjects that do not provide a suitable mathematical foundation for any tertiary studies."

For each state/territory, a table which included the subjects found in each of these categories was provided by Dekkers et al. (2000b, p. ix) and has been reproduced in Table I.2.

The basis of the two sets of categories developed by Dekkers and his colleagues was on pathways to tertiary study. They are somewhat different from those developed by Barrington and Brown (2005) who focused on the mathematical content of the courses offered and then related them to preparation for tertiary study.

2000 - 2004

Frank Barrington and Peter Brown analysed the mathematical content of 2004 Year 12 mathematics offerings across Australia and developed categories based on levels of difficulty which they termed "**Advanced**", "**Intermediate**", and "**Elementary**" (Barrington & Brown, 2005).

The definitions of the categories were as follows (Barrington & Brown, 2005, pp. 1-2):

Advanced:	"These subjects are generally taken by students who wish to proceed to tertiary studies that require the strongest of mathematical preparations, such as engineering, actuarial studies, mathematics, statistics and physical sciences. Such students normally undertake an intermediate mathematics subject (see below) in conjunction with their Advanced mathematics subject."
Intermediate:	These subjects "are suitable for students who wish to proceed to tertiary studies that require significant but not extensive mathematical preparation, such as science, medicine, economics/commerce, dentistry and agricultural science."
Elementary:	These subjects "are suitable for students who wish to study mathematics in their final year at secondary school, but do not intend to enter tertiary courses that require intermediate or Advanced mathematics subjects. These subjects may contribute to students' tertiary entrance scores."

In consultation with Frank Barrington, all Year 12 mathematics subjects offered in each year from 2000-2003 in each Australian state/territory were also sorted into the

three levels. Time constraints precluded the categorisation of Year 12 mathematics subjects offered prior to 2000 into these categories. The subjects located within each of the three categories are found in Table I.3.

In Appendix 1 are listed the names of the subjects and their respective enrolment numbers for each state/territory for the period 2000 to 2004. The subjects in the three levels – Advanced, Intermediate, and Elementary – are clustered together and colour-coded to assist the reader.

At relevant points in the report, depending on the years of interest, the three different categorisations – Dekkers et al. (1986, 2000b) and Barrington and Brown (2005) are used. Care is taken throughout the report to treat quite separately the three eras in which the different subject categorisations were used.

The report

Data sources

Mathematics enrolment data for the years prior to 2000 reported here were derived from the data files provided to the project by John Dekkers and from the reports published by Dekkers and his colleagues John De Laeter and John Malone (Dekkers *et al*, 1986, Dekkers *et al*, 2000a; Dekkers *et al*, 2000b; Dekkers *et al*, 2000c).

The websites of the Boards of Study (or equivalent) in each state/territory were accessed for mathematics enrolment data. Relevant administrative officers were also contacted if clarification was required.

The website of the Australian Bureau of Statistics [ABS] was accessed for national and state/territory population data and for Year 12 student cohort sizes.

Various other organizations and individuals were contacted for advice, to seek information, and/or to clarify some of the data gathered.

A full list of the data sources used in the project can be found in the References section of the report.

Organisation of the report

This report is presented in four main sections:

Section 1: Year 12 mathematics enrolments in Australia and the states/territories of Australia: pre-1990 to 2004

Section 2: State/territory Year 12 mathematics enrolments in Advanced, Intermediate, and Elementary level subjects: 2000–2004

Section 3: State/territory comparisons of Year 12 mathematics enrolments

Section 4: Key findings

Following the presentation and discussion of the data and findings from the project, a full reference list is provided. Three appendices follow:

▪ As discussed above, Appendix 1 contains data for each state/territory for the period 2000-20004 that formed the basis of the analyses reported in this report: subject names and enrolments for Advanced, Intermediate, and Elementary level Year 12 mathematics subjects, state population data, and Year 12 cohort size data.

- Appendix 2 includes information on tertiary level mathematics programs for Year 12 students, and information and enrolment data for Australian Year 12 students studying the International Baccalaureate [IB].

- In Appendix 3 is found a justification for examining Year 12 mathematics enrolments as a percentages of Year 12 cohort sizes rather than as percentages of national/state/territory population figures.

Table I.2. Dekkers et al. (2000b) categorisation of Year 12 mathematics levels 1990 – 1999, with subjects by state

STATE	High	Intermediate	Low
Queensland	Mathematics 2 Mathematics C	Mathematics 2 Logic Mathematics B	All BRS[1] subjects Mathematics in Society
New South Wales	Mathematics 3U[4] Mathematics 4U	2 Unit Maths in Society Mathematics 2U	All BEC[2] subjects Mathematics in Practice
ACT	1011 Advanced Mathematics Extended 1012 Advanced Mathematics 1010 Mathematics 1	1020 Mathematics 2 1021 Mathematics	All Accredited subjects
Victoria	Mathematics - Specialist Mathematics Mathematics - R & D (extension) Mathematics - C & A (extension) Mathematics B Applied Mathematics - S & N (extension)	Mathematics - Further Mathematics Mathematics - Reasoning & Data Mathematics - Mathematical Methods Mathematics A - Pure Mathematics - Change & Approximation	All SAS[3] subjects Mathematics - Space & Number
Tasmania	C MT840 Mathematics Stage 2 C MT841 Mathematics Stage 2 C MT842 Mathematics Stage 3 C MT843 Mathematics Stage 3 Analysis and Statistics Applied Mathematics	C MT729 Mathematics Applied C MT730 Mathematics Applied Mathematics Algebra and Geometry	All SAS A & B subjects
South Australia	Mathematics 1 2U Mathematics 2 2U	Mathematics 1S 2U Mathematics 1D	All SAS subjects Quantitative Methods 2U
Western Australia	Applicable Mathematics Calculus Mathematics 2 Mathematics 3	Discrete Mathematics Mathematics 1	All SAS subjects
Northern Territory	Mathematics 2 2U	Mathematics 1D 2U Mathematics 1S 2U	All SAS subjects Quantitative Methods 2U

[1] BRS: Board Registered Subject   [2] BEC: Board Endorsed Course   [3] SAS: School Assessed Subject   [4] U: Unit

Table I.3. Level categorisations for state/territory Year 12 mathematics subjects 2000 to 2004 (Barrington & Brown, 2005)

STATE/TERRITORY	Advanced	Intermediate	Elementary
Queensland	Mathematics C (38)	Mathematics B (37) Logic (30)	Mathematics A (36) Applied Mathematics (227)* Business Mathematics* Career Linked Mathematics (999)* Commercial Mathematics (305)* Community Mathematics (391)* Consumer Mathematics* Essential Mathematics (544)* Everyday Mathematics (404)* Literacy & Numeracy (Consumer Mathematics)* Literacy & Numeracy (Consumer Mathematics) (Trial-Pilot)* Literacy & Numeracy (Practical Numeracy)* Mathematics (939)* Mathematics for Life* Mathematics for Living (152)* Mathematics Studies (625)* Personal and Business Mathematics (691)* Practical Mathematics (731)* Real Life Mathematics (519)* Trade & Business Mathematics (Practical) (6143)* Trade and Business Mathematics (Trial-Pilot)* Trade & Business Mathematics (Workplace) (6142)* Transitional Mathematics (281)* Vocational Mathematics (898)*
New South Wales	3 Unit Mathematics (20171) 4 Unit Mathematics (20172) Mathematics Extension 1 2-Unit (15250) Mathematics Extension 2 2-Unit (15260)	2 unit Mathematics (20170) Mathematics 2U (15240)	General Mathematics 2 unit (15230) Mathematics in Practice 2 unit (20150)* Mathematics Life Skills 2 unit (16610)* Mathematics in Society 2 unit (20160)
ACT	Advanced Mathematics Extended	1012 Advanced Mathematics	1021 Mathematics T 1019 Mathematics - status* 1031 Mathematics A* 1050 Study skills mathematics* 1010 Mathematics 1*
Victoria	Specialist Mathematics	Mathematics Methods Mathematics Methods CAS	Further Mathematics
Tasmania	MT843 Mathematics Stage 3 MSP5C Mathematics - Specialised	MT841 Mathematics Stage 2 MME5C Mathematics - Methods	MT730 Mathematics Applied MAP5C Mathematics - Applied A MT639 Mathematics Stage 1*

STATE/TERRITORY	Advanced	Intermediate	Elementary
Tasmania cont.			A MT640 Mathematics Stage1*
			B MT719 Mathematics*
			B MT720 Mathematics*
			B MT 721 Mathematics*
			B MT 722 Mathematics*
			C MT729 Mathematics Applied*
			C MT840 Mathematics Stage 2*
			C MT842 Mathematics Stage 3*
			MFL1B Mathematics for Living 1*
			MFL2B Mathematics for Living 2*
			MAC2A Mathematics after College*
			MAC2B Mathematics after College*
			MAC2C Mathematics after College*
			MAC3A Mathematics after College*
			MAC3B Mathematics after College*
			MAC3C Mathematics after College*
			MAP3B Mathematics Applied*
			MAP3C Mathematics Applied*
			MAP4B Mathematics Applied*
			MAP4C Mathematics Applied*
			MAW2A Mathematics at Work*
			MAW2B Mathematics at Work*
			MAW2C Mathematics at Work*
			MAW3A Mathematics at Work*
			MAW3B Mathematics at Work*
			MAW3C Mathematics at Work*
			MMX4B Mathematics Methods*
			MME4B Mathematics Methods*
			MME4C Mathematics Methods*
South Australia	Mathematics 2	Mathematics 1 (Double)	Mathematical Methods
	Specialist Mathematics	Mathematics 1 (Single)	Quantitative Methods
		Mathematical Studies	Business Mathematics – 1U*
			Business Mathematics – 2U*
			Mathematical Applications 1-unit*
			Mathematical Applications 2-unit*
			Applied Mathematics – 1U*
			Applied Mathematics – 2U*
Western Australia	Calculus	Applicable Mathematics	Discrete Mathematics
			Modelling with Mathematics*
Northern Territory	Mathematics 2	Mathematics 1 (Double)	Mathematical Methods

STATE/TERRITORY	Advanced	Intermediate	Elementary
Northern Territory cont.	Specialist Mathematics	Mathematics 1 (Single)	Quantitative Methods
		Mathematical Studies	Business Mathematics – 1U*
			Business Mathematics – 2U*
			Mathematical Applications 1-unit*
			Mathematical Applications 2-unit*
			Applied Mathematics – 1U*
			Applied Mathematics – 2U*

* Denotes mathematics subject not used for Tertiary Entrance scores

Section 1

Year 12 mathematics enrolments in Australia and the states/territories of Australia: pre-1990 to 2004

This section of the report is in two parts.

In Part 1, Year 12 mathematics enrolment numbers are examined for the states/territories and for Australia as a whole. While the period 2000-2004 is of major interest, data from earlier years are also considered.

In Part 2, mathematics enrolment data expressed as percentages of Year 12 cohort sizes are presented for the same time periods. Since there would appear to be a fairly direct relationship between Year 12 cohort sizes and Australian and state/territory population sizes, comparisons are made with respect to Year 12 cohort sizes and not national and state/territory populations. The justification for this conclusion is presented in Appendix 3.

Caveats on and limitations of the analyses presented of Year 12 mathematics enrolment trends pre-1990 to 2004

Since the basis for the categorisations of Year 12 mathematics subjects differed in the various time periods – pre-1990, 1990-1999, and 2000–2004 – it is somewhat dangerous to try and make comparisons across the time periods. Much caution, therefore, was needed in attempting to discuss trends in mathematics enrolment patterns over the entire time span pre-1990 to 2004. It was beyond the scope of this report, or the work of Barrington & Brown (2005), to re-categorise the Year 12 mathematics subjects offered prior to 2000 into the Barrington and Brown (2005) categories in order to be able to provide a more accurate discussion of the trends over the entire time period.

With these caveats in mind, the reader should be aware that care has been taken in discussing the patterns and trends in the data on mathematics subject enrolments that follow in this section of the report. The reader also needs to be cautious in how the data presented here are interpreted and used.

In defence of what is discussed, however, it should be noted that the mathematics subjects classified as "Type 3" in the pre-1990 categorisation, and those considered "High" in the 1990-1999 categorisation were the most challenging mathematics subjects offered in the pertinent eras. It is fairly safe to assume that Barrington and Brown (2005) would have classified them as "Advanced" subjects in their 2000-2004 categorisation. For a variety of reasons, the same relationship with the 2000-2004 Barrington and Brown (2005) mathematics subject levels cannot be claimed with respect to the pre-1990 and 1990-1999 "Type 2"/"intermediate" and "Type 1"/"low" Year 12 mathematics subject level categories.

In Section 3 of this report, there is a more detailed focus on trends and patterns for the more challenging, "advanced" level Year 12 mathematics subjects across the entire time span for which data were readily accessible.

It should also be noted at this point that although the data provided by Dekkers at al. are extensive, they are not comprehensive. Hence, there are some gaps in what is presented and discussed in this and the other sections of the report.

> NB. Capitalisation has been used to distinguish the Barrington and Brown (2005) 2000-2004 category, "Intermediate" from the Dekkers et al. (2000b) 1990-1999 "intermediate" category.

In presenting and discussing enrolment trends for Year 12 mathematics, it can be misleading to use raw enrolment numbers only. However, raw enrolment data are presented in this section of the report. Interpretations and trends noted should be treated with great caution since Year 12 cohort sizes differed from year to year for the period under analysis. In the second part of this section of the report, enrolment data are re-examined by considering enrolment numbers as percentages of Year 12 student cohort sizes.

Prior to the presentation of the Year 12 mathematics enrolment data, Australian population data and Australian Year 12 cohort data are examined.

Australian Year 12 cohort sizes in relation to population data: 1970 to 2004

Data were available to allow a comparison, for the years 1970-2004, of Year 12 cohort sizes (as well as male and female cohort sizes) as percentages of the Australian population. The data are represented in Figure 1.1.

As can be seen from Figure 1.1, the percentage of the Australian population represented by Year 12 students varied greatly over the time span 1970 to 2004. From 1970 to about 1982 there was a very steady, but very small, increase from about 0.5% to about 0.6%. It was during that period, in about 1976, that the trend for a higher proportion of males than females in the population to continue into Year 12 studies was reversed (see Collins, Kenway, & McLeod, 2000). From 1976 to the present day, the pattern is for a higher proportion of the female than the male population to continue into Year 12 studies.

From 1982 to 1992, there was a steady, and marked, increase in the percentages of the population found in Year 12 from about 0.6% of the population in 1982 to about 1.05% (almost double) in 1992. From 1992 to 1997 there was a steady, but small decrease to about .95% in 1997. After that time there was a small increase to about 1% of the population which has remained fairly stable at that proportion up to 2004.

The patterns for males and females after 1976 follow fairly closely the trends for entire Year 12 cohorts, with slight variations from year to year. Differences in male and female population percentages varied, but the female percentages were always higher than male percentages.

Because the Year 12 cohort sizes varied over the time periods of interest, it was considered meaningful to use mathematics enrolments as a percentage of Year 12 cohort sizes (also by gender) as the common comparative measure. In this section of the report Australian enrolment trends in the three levels of Year 12 mathematics subjects for the years 1990-2004 are examined following a discussion of total Australian Year 12 mathematics enrolment data.
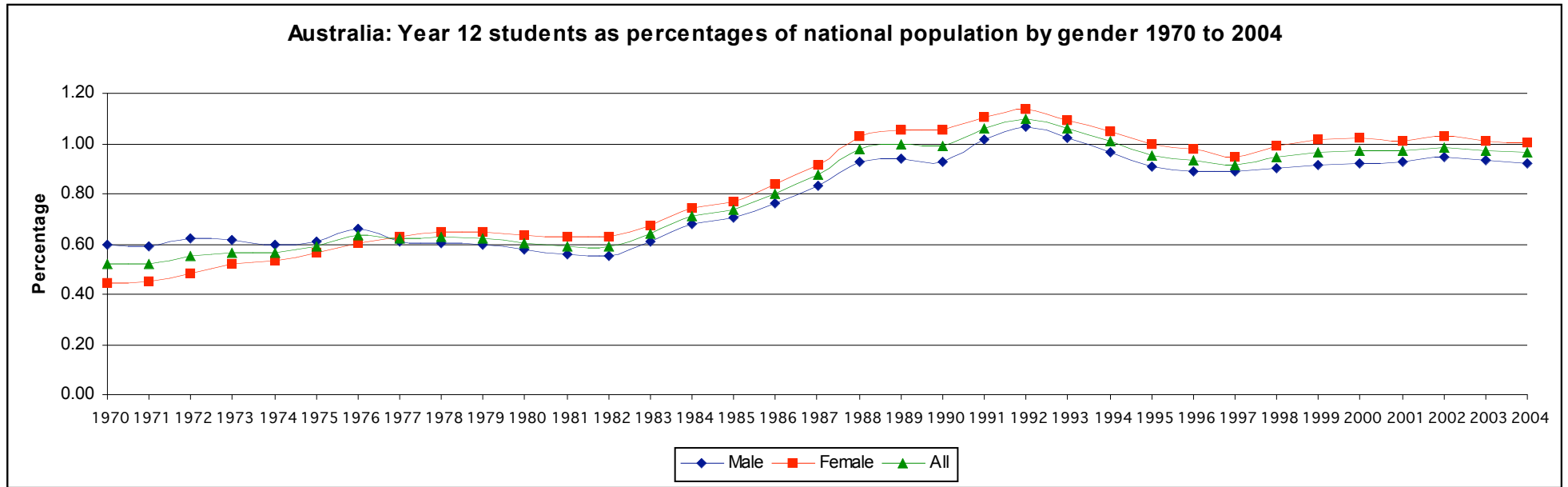
Figure 1.1. Australia: Year 12 students as percentage of national population by gender 1970 to 2004

Part 1

Patterns and trends in total Australian Year 12 mathematics enrolments, and in enrolments in "high/Advanced", "intermediate/Intermediate", and "low/Elementary" level mathematics subjects: 1990 – 2004

Total Year 12 enrolments for Australia

It should be noted that in calculating total Year 12 mathematics enrolment numbers for the period 2000-2004, the following were not included:

- Year 12 enrolments in tertiary level mathematics subjects. Students in Victoria are able to study tertiary mathematics subjects while in Year 12. Accurate enrolment numbers could not be confirmed for the five years from 2000-2004. The enrolment numbers identified were found to be quite small. Enrolments appeared to have increased initially, and more males than females appeared to have availed themselves of the tertiary mathematics options available: 99 students (60 male, 39 female) in 1994, 414 (251 male, 163 female) in 2002 and 376 (277 male, 99 female) were enrolled in these courses in 2005. A fuller description of Year 12 enrolments in tertiary mathematics courses is found in Appendix 2.

- National Year 12 enrolments in the International Baccalaureate [IB]. Enrolments increased from 61 in 1990 to 1256 in 2005 and are said to be approximately 60% female. All Diploma Program students (Years 11 and 12) must study at least one mathematics subject of the four offered. It was not possible to determine numbers for each of the four options. More information about IB enrolments can be found in Appendix 2.

The Year 12 mathematics enrolments in the high/Advanced, intermediate/Intermediate, and low/Elementary levels for the years 1990 – 2004, by gender, have been collated and are presented in Table 1.1. Also shown are total Year 12 mathematics enrolments. For the period 1990-1999, Dekkers el al.'s (2000b) figures have been used; for 2000-2004 the totals were arrived at by summing Advanced, Intermediate, and Elementary level enrolment numbers in each state/territory (raw data are found in Appendix 1).

Total mathematics enrolment numbers 1990-2004

Year 12 mathematics enrolments for all of Australia by level of mathematics course and gender from 1990 to 2004 are shown in Table 1.1.

The findings for 1990-1999 and for 2000-2004 are discussed separately.

1990-1999

As can be seen in Table 1.1, total Australian Year 12 enrolments in mathematics increased from 155,557 in 1990 to 184,793 in 1999 (18.8% increase). For male enrolments, the increase was from 79,598 to 93,067, (16.9% increase), and for female enrolments the percentage increase was a little higher at 20.8% (from 75,959 to 91726).

For the period 1990-1999, mean enrolment numbers indicated that the low level mathematics subjects attracted the highest number of enrolments (mean of 76,925), followed by intermediate level subjects (mean of 66,373), with high level subjects attracting the lowest numbers (mean of 34,481).

Table 1.1. Australia: Year 12 mathematics enrolments by level of mathematics course and gender 1990 to 2004

Year	High[1]			Intermediate			Low			Total Mathematics Enrolments		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1990	22806	15925	38731	34481	30490	64971	22311	29544	51855	79598	75959	155557
1991	21896	16666	38562	37287	32855	70142	35235	38900	74135	94418	88421	182839
1992	22561	15149	37710	37502	35864	73366	39307	40240	79547	99370	91253	190623
1993	21748	14953	36701	36802	36114	72916	38155	39335	77490	96705	90402	187107
1994	21334	13510	34844	33610	33803	67413	36296	39670	75966	91240	86983	178223
1995	19917	12771	32688	31588	32101	63689	35973	39569	75542	87478	84441	171919
1996	19116	12406	31522	30279	31349	61628	37625	41188	78813	87020	84943	171963
1997	18996	12696	31692	31128	31395	62523	38741	42266	81007	88865	86357	175222
1998	19084	12371	31455	31332	31955	63287	40206	44597	84803	90622	88923	179545
1999	18892	12011	30903	31391	32404	63795	42784	47311	90095	93067	91726	184793

Year	Advanced			Intermediate			Elementary			Total Mathematics Enrolments		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	15754	9261	25015	35891	32255	68146	46547	54442	100989	98192	95958	194150
2001	15456	9033	24489	34932	31092	66024	46552	52430	98982	96940	92555	189495
2002	15786	9339	25125	35044	30666	65710	49029	54355	103384	99859	94360	194219
2003	16812	10170	26982	36108	30810	66918	51022	54800	105822	103942	95780	199722
2004	16554	10242	26796	35143	29453	64596	49958	54600	104558	101655	94295	195950

[1] Dekkers et al. (2000b) categories for 1990-1999; Barrington and Brown (2005) categories for 2000-2004

2000-2004

For the period 1990-1999, mean enrolment numbers indicated that the Elementary level mathematics subjects attracted the highest number of enrolments (mean of 102,747), followed by Intermediate level subjects (mean of 66,279), with Advanced level subjects attracting the lowest numbers (mean of 25,681). In each year from 2000 – 2004, there were more male than female enrolments in Advanced and Intermediate level mathematics subjects, and more female than male enrolments in Elementary level mathematics subjects.

For the five year period, 2000-2004, total Australian Year 12 enrolments in mathematics increased 0.8 % from 194,150 to 195,744; for males the increase was 4.1% (from 98192 to 102,229) and for females there was a small decrease of 1.1% (from 95,958 to 94,870).

Summaries of the percentage changes for total Australian Year 12 mathematics enrolments, and for enrolments in each of the three levels of mathematics, for male enrolments, and for female enrolments are shown separately for the two time periods 1990-1999 and 2000-2004 in Table 1.2.

Table 1.2. Percentage changes in Australian mathematics enrolments for the periods 1990-1999 and 2000-2004 for the three levels of mathematics and by gender.

1990-1999	Total mathematics	High	Intermediate	Low
All	+18.8%	-20.2%	-1.8%	+73.7%
Male	+16.9%	-17.2%	-9.0%	+91.8%
Female	+20.8%	-24.6%	+6.3%	+60.1%
2000-2004	Total mathematics	Advanced	Intermediate	Elementary
All	+0.9%	+7.1%	-5.2%	+3.5%
Male	+3.5%	+5.1%	-2.1%	+7.3%
Female	-1.7%	+10.6%	-8.7%	+0.3%

The data in Table 1.2 reveal very dramatic differences in the patterns for the two time periods, differences among the three levels of mathematics, and differences for male and female enrolment numbers – see also Figure 1.2 in which total Year 12 enrolment data for 1990-1999 and 2000-2004 are shown.

In Figure 1.3, enrolment data for high/Advanced level Year 12 subjects are shown. Figure 1.4 shows enrolment data for intermediate/Intermediate level enrolments, and in Figure 1.5 low/Elementary level enrolment data are found.

Based on the data presented in Tables 1.1 and 1.2, and in Figures 1.2 – 1.5, a series of trends was identified for the periods 1990-1999 and 2000-2004.

Findings

For the period 1990-1999:

- Low level mathematics subjects attracted highest number of enrolments and high level subjects the lowest

- For each year in the period, there were consistently more male than female enrolments in high level mathematics, and more female than male enrolments in low level mathematics.

- There was an overall increase of 18.8% in total Year 12 mathematics enrolments (from 155,557 in 1990 to 184,793 in 1999)

- For high level mathematics there was a large decrease in enrolments of 20.2% (from 38,731 in 1990 to 30,903 in 1999), with a higher decrease in female (24.6%) than male enrolments (17.2%)

- For intermediate level mathematics subjects, male enrolments decreased by 9.0% while female enrolments increased by 6.3% resulting in only a small overall decrease of 1.8% (from 64,971 in 1990 to 63,795 in 1999)

- There was a dramatic increase of 73.7% in enrolments in low level mathematics subjects (from 51,855 in 1990 to 90,095 in 1999), with male enrolment changes being the major contributor (91.8%), compared to female enrolments which increased by 60.1%

For 2000-2004:

- In each year, Elementary level subjects attracted the highest number of enrolments and Advanced level mathematics subjects the lowest

- In each year, there were more male than female enrolments in Advanced and Intermediate level mathematics subjects, and more female than male enrolments in Elementary level subjects

- The changes in enrolment numbers over the five year period were relatively small

- Overall enrolments in Year 12 mathematics subjects increased only 0.9% (from 194,150 in 2000 to 195,950 in 2004), with an increase in male enrolments (3.5%) but a small decrease in female enrolments (1.7%)

- For advanced level mathematics subjects, there was an overall increase of 7.1% in enrolments (from 25,015 in 2000 to 26,796 in 2004), with female enrolments (10.6%) growing more than male enrolments (5.1%)

- Intermediate level enrolments dropped overall by 5.2% (from 68,146 in 2000 to 64,596 in 2004), with male enrolments dropping by 2.1% and female enrolments by 8.7%

- There was a small increase of 3.5% in Elementary level mathematics enrolments (from 100,989 in 2000 to 104,558 in 2004), with male enrolments increasing by 7.3% and females by a very small 0.3%
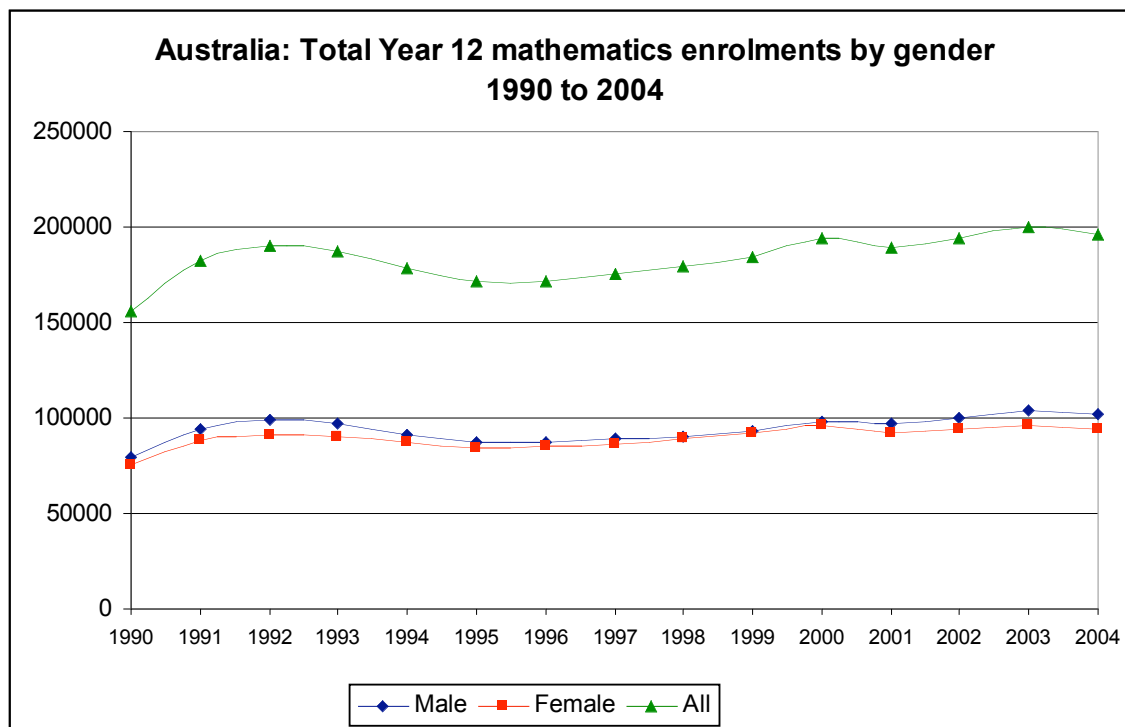
Figure 1.2. Australia: Total Year 12 mathematics enrolments, 1990 to 2004
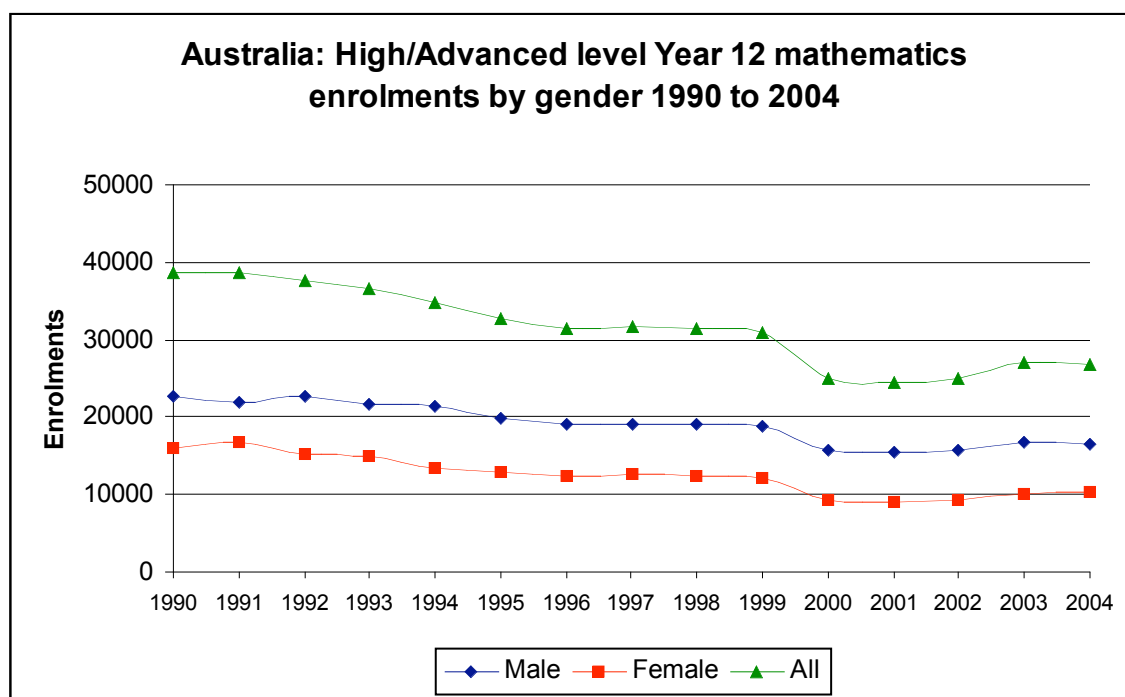
Figure 1.3 Australia: High/Advanced level Year 12 mathematics enrolments, 1990 to 2004

NB. The marked change from 1999 to 2000 is partially explained by different counting procedures. For example, WA Applicable mathematics enrolments were classified as "high" level prior to 2000.
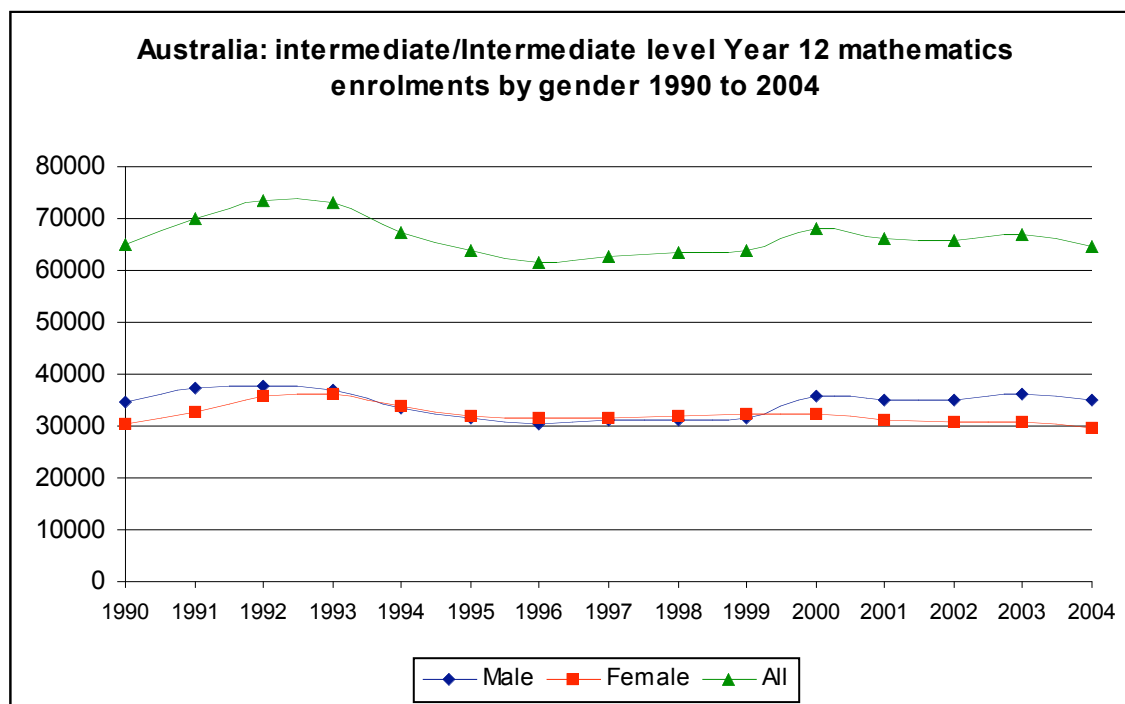
Figure 1.4   Australia: intermediate/Intermediate level Year 12 mathematics enrolments, 1990 to 2004
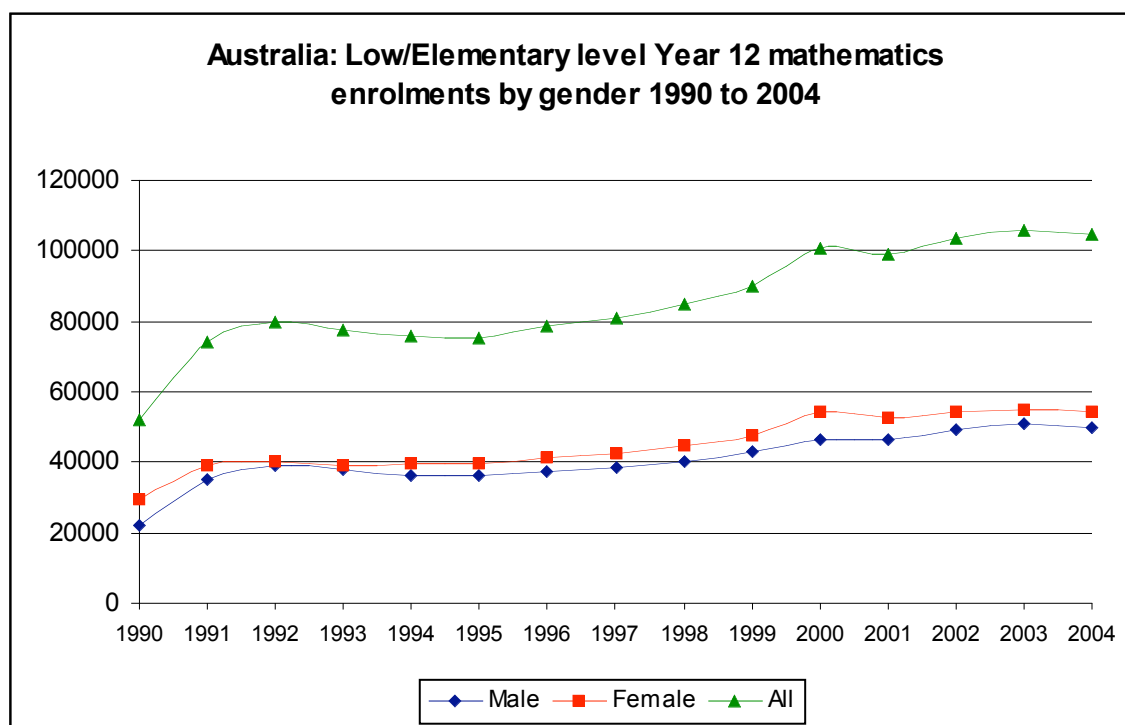
Figure 1.5   Australia: Low/Elementary level Year 12 mathematics enrolments, 1990 to 2004

Year 12 mathematics enrolments: 1980-1989

Dekkers et al. (2000b) provided Australian total Year 12 mathematics enrolment data for the years 1980-1989 by gender which are reproduced in Table 1.3. The percentage changes in student enrolment numbers from 1980 to 1989 were calculated and are also

included in Table 1.3. Unfortunately, there were no data available for enrolments in the three levels – high, intermediate, and low – for the years 1980-1989.

Table 1.3   Total mathematics enrolment data: 1980 to 1989

Year	Male	Female	All
1980	43302	35104	78406
1981	42683	35151	77834
1982	43543	37118	80661
1983	48218	40532	88750
1984	52567	44432	96999
1985	59370	50343	109713
1986	61314	54521	115835
1987	66863	61046	127909
1988	74524	68189	142713
1989	76407	71641	148048
% change 1980-1989	+76.5%	+104.1%	+88.8%

Source: Dekkers et al. (2000b)

For the period 1980 to 1989, the data in Table 1.3 indicate that:

▪ There was a remarkable increase in total Year 12 mathematics enrolments from 78,406 in 1980 to 148,048 in 1989 (88.8% increase). For male enrolments the increase was from 43,302 in 1980 to 76,407 in 1999 (76.5% increase); for female enrolments the increase was larger from 35,104 in 1980 to 71,641 in 1989 (104.1% increase).

It should be noted that during this period, Year 12 enrolments were growing very quickly across Australia - Year 12 retention rates showed huge growth almost doubling from around 30% in 1980 to around 60% in 1989 (see Collins, Kenway, & McLeod, 2000). The increased retention rate is mirrored in the data on the percentages of the Australian population represented by Year 12 students (see Figure 1.1). It is likely that this enormous growth in Year 12 student numbers was a major factor in the dramatic increases in Year 12 mathematics enrolment numbers at that time.

In order to put into context the changes in total Year 12 mathematics enrolments for the period 1980-1989 with what followed in 1990-1999 and 2000-2004 that were discussed earlier, total Year 12 mathematics enrolment data for 1980 to 2004 are illustrated in Figure 1.6, enabling the patterns and trends discussed above to be discerned for the entire period 1980-2004.
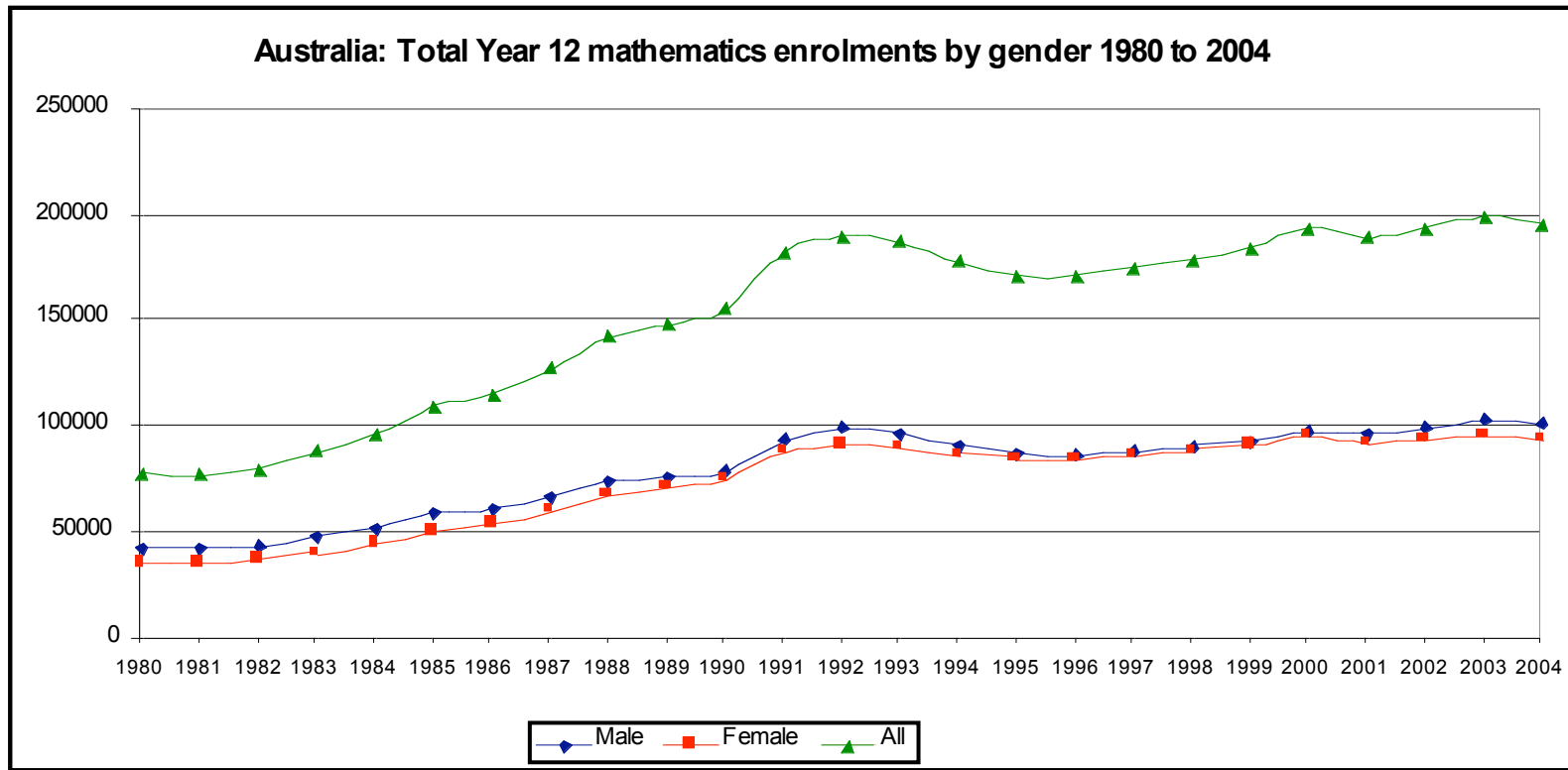
Figure 1.6. Australia: Total Year mathematics enrolments by gender 1980-2004

Gender patterns

For the years 2000-2004, male to female ratios [M:F] for enrolments in Advanced, Intermediate, and Elementary level Year 12 mathematics subjects for each state/territory (see Appendix 1 for raw data) and for Australia overall (see Table 1.1) are summarised in Table 1.4. Mean values for the M:F ratios for the five year periods are also presented.

Table 1.4. M:F ratios for Year 12 mathematics enrolments, 2000-2004

	Advanced					
	2000	**2001**	**2002**	**2003**	**2004**	**Mean**
Australia	1.70	1.71	1.63	1.60	1.58	1.64
ACT	1.60	1.47	1.46	1.40	1.37	1.46
NSW	1.44	1.51	1.51	1.44	1.40	1.46
NT	1.24	1.52	2.92	3.0	8.0	3.3
Queensland	2.21	2.47	2.27	2.15	2.22	2.26
SA	2.04	2.18	2.25	2.44	2.27	2.24
Tasmania	2.20	1.59	2.13	1.90	2.04	1.97
Victoria	1.78	1.57	1.56	1.64	1.56	1.62
WA	2.43	2.49	2.62	2.55	2.60	2.54
	Intermediate					
	2000	**2001**	**2002**	**2003**	**2004**	**Mean**
Australia	1.11	1.12	1.14	1.17	1.19	1.15
ACT	.81	.89	.74	.83	1.00	.85
NSW	1.04	1.05	1.09	1.13	1.14	1.09
NT	.79	1.38	1.08	1.22	1.56	1.21
Queensland	1.09	1.14	1.16	1.15	1.15	1.14
SA	1.21	1.29	1.29	1.40	1.44	1.33
Tasmania	1.13	1.29	1.18	1.29	1.46	1.27
Victoria	1.19	1.14	1.15	1.18	1.20	1.17
WA	1.29	1.26	1.33	1.38	1.43	1.34
	Elementary					
	2000	**2001**	**2002**	**2003**	**2004**	**Mean**
Australia	.85	.89	.90	.93	.91	.90
ACT	.95	.88	.99	.96	.99	.96
NSW	.76	.85	.88	.92	.94	.87
NT	.70	.83	.99	1.03	.88	.88
Queensland	.90	.90	.91	.92	.88	.90
SA	.85	.88	.94	.89	.90	.89
Tasmania	1.13	1.09	1.15	1.22	1.13	1.14
Victoria	.91	.90	.88	.94	.91	.91
WA	.83	.84	.86	.87	.86	.85

Findings

The data in Table 1.4 reveal a fairly consistent pattern across the various states/territories, with a few exceptions. For Year 12 mathematics enrolments across Australia, there were:

- more male than female enrolments in Advanced and Intermediate level mathematics subjects

- more female than male enrolments in Elementary level mathematics subjects

Details of these findings are summarised below.

Advanced

- In each state/territory in each year the M:F ratios for enrolments in Advanced level mathematics were greater than 1, indicating that male enrolments were always higher then female enrolments

- The mean M:F ratio for all Australian Advanced level enrolments was 1.64. That is, for each female enrolment in Advanced level subjects, there were 1.64 male enrolments

Intermediate

- Except for the ACT in 2000-2003 and the NT in 2000, the M:F ratios for enrolments in Intermediate level mathematics indicated that male enrolments were higher then female enrolments

- The mean M:F ratio for all Australian Intermediate level enrolments was 1.15

Elementary

- Except for Tasmania, the M:F ratios for enrolments in Elementary level mathematics indicated that female enrolments were higher then male enrolments

- The mean M:F ratio for all Australian Elementary level enrolments was 0.90

Male and female total enrolment numbers in all mathematics courses for the period 2000-2004 were very similar (see Table X.Y), so the M:F ratios were close to 1.0 in each year: 2000 – 1.02, 2001 – 1.05, 2002 – 1.06, 2003 – 1.09, 2004, 1.08 (mean of 1.06 over the five years). The pattern here is, of course, consistent with the small increase in total male mathematics enrolments, and very small decrease in female enrolments over the period.

Dekkers, De Laeter and Malone (1986) provided M:F ratios for mathematics enrolments in Types 1, 2 and 3 subjects by state for the years 1970 to 1985, although the data were incomplete. For a four year period, 1982 to 1985, data were available for all states and the ACT (no data for NT). In Victoria and SA, there was only subject offered that was not Type 3 and in each state that subject was categorised as "Type 1/2". In NSW, SA and Victoria, there were two Type 3 subjects

Mean M:F ratios were calculated for the four year period 1982–1985 for each category of mathematics subjects for each state/territory. The mean of the mean M:F ratios for each mathematics subject level were derived to provide an indication of an overall Australian perspective for that time period. The results are tabulated in Table 1.5.

Table 1.5. Mean M:F ratios for enrolments in Type 1, 2, and 3 subjects, 1982-1985

	ACT	NSW	Qld	SA	Tas	Victoria	WA	Mean of means
Type 1	.93	.73	.66		1.57		.67	.91
Type 2	.89	.85	1.32		4.29		.93	1.66
Type 1/2				.91		.86		.89
Type 3 (1)	1.22	3U: 1.66	2.67	1: 2.02	3.99	Pure: 1.97	I: 2.30	2.62
Type 3 (2)		4U: 3.08		2: 2.01		Applied: 2.44	II: 2.31	

Source: Adapted from Dekkers, De Laeter, and Malone (1986)

The data in Table 1.5 suggest that for the period 1982-1985:

▪ Male enrolments were higher than female enrolments in all Type 3 subjects

▪ Male enrolments were higher than female enrolments for Type 2 subjects overall but not in all states/territories. In the ACT, NSW, and WA, female enrolments were higher than male enrolments in Type 2 subjects

▪ Female enrolment were higher than male enrolments for Type 1 and Type 1/2 subjects, except in Tasmania

When the findings for 1982-1985 were compared to those from 2000-2004, it was clear that the following general pattern has not changed over time:

▪ More male than female enrolments in the most challenging mathematics subjects offered (Type 3/Advanced)

▪ Overall more male than female enrolments in the Type 2/Intermediate subjects with some state differences

▪ More female than male enrolments in Type 1/Elementary subjects

Part 2

Patterns and trends in total Australian Year 12 mathematics enrolments, and in and in enrolments in "high/Advanced", "intermediate/Intermediate", and "low/Elementary" level mathematics subjects with respect to Year 12 student numbers: 1990 – 2004

In Part 2 of this section of the report, total Australian mathematics enrolments, and enrolments in Advanced, Intermediate, and Elementary mathematics levels expressed as percentages of the relevant Year 12 cohort numbers are examined. The enrolment data are also explored by gender.

Total Year 12 mathematics enrolments

Total Australian Year 12 enrolment data expressed as percentages of Year 12 student cohort sizes by gender for 1990-1999 and 2000-2004 are shown in Figure 1.7. The findings for the periods 1990-1999 and 2000-2004 are reported separately.

It should be noted that students in some states/territories can enrol simultaneously in more than one mathematics subject. This means that enrolments do not equate to student numbers, and that enrolments expressed as percentages of Year 12 cohort sizes can exceed 100%.

Australia: Total Year 12 mathematics enrolments as percentages of Year 12 students by gender 1990-2004
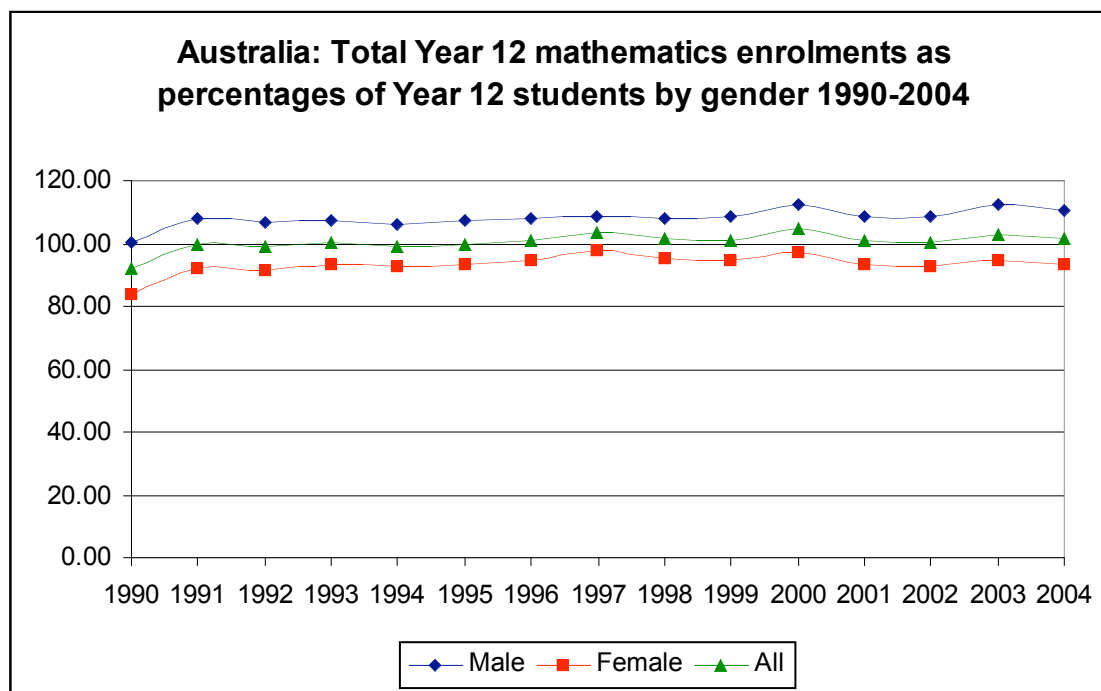
Figure 1.7. 1990 – 2004: Australian total Year 12 mathematics enrolments as percentages of Year 12 students by gender.

Findings

For 1990-1999:

The data in Figure 1.7 indicate that for total Australian Year 12 mathematics enrolments:

- There was an increase in total mathematics enrolments as a percentage of Year 12 student numbers from 91.8% in 1990 to 101.3% in 1999 (mean over the ten year period was (99.6%). For male enrolments the increase was steady over the time period from 100.6% in 1990 to 108.5% in 1999 (mean of 106.9%). For female enrolments, the increase was also steady from 84.1% in 1990 to 94.8% in 1999 (mean of 93.0%). [It should be noted that the big increase in percentages occurred between 1990 and 1991 in each case]

- For each year from 1990 to 1999, total male enrolments as percentages of male Year 12 cohorts were higher than female enrolments as percentages of female Year 12 cohorts. Percentages for male enrolments were over 100% for the entire period indicating that many males were studying more than one mathematics subject. For females, the percentages were always less than 100%

For 2000-2004:

The data in Figure 1.7 indicate that for total Australian Year 12 mathematics enrolments:

- There was a decrease in total mathematics enrolments as percentages of Year 12 student numbers from 104.5% in 2000 to 101.4% in 2004 (mean for the five year period was 102.0%). For males there was a small decrease over the five years from 112.6% 2000 to 110.4% in 2004 (mean of 110.5%). For female enrolments, the decrease was from 97.3% in 2000 to 93.2% in 2004 (mean of 94.3%)

- For each year from 2000 to 2004, total male enrolments as percentages of male Year 12 cohorts were higher than female enrolments as percentages of female Year

12 cohorts. Percentages for male enrolments were over 100% for the entire period indicating that many males were studying more than one mathematics subject. For females, the percentages were always less than 100%

From the data provided above, it can be inferred that a very large proportion of Australian Year 12 students are taking at least one mathematics subject as part of their Year 12 studies. Since enrolments do not equate to student numbers, it is not possible to say exactly what proportion of the Year 12 cohort this might be.

High/Advanced level mathematics

Australia-wide enrolments in Year 12 high/Advanced level mathematics subjects as percentages of Year 12 student numbers, by gender, are shown in Figure 1.8. The findings for the periods 1990-1999 and 2000-2004 are reported separately.
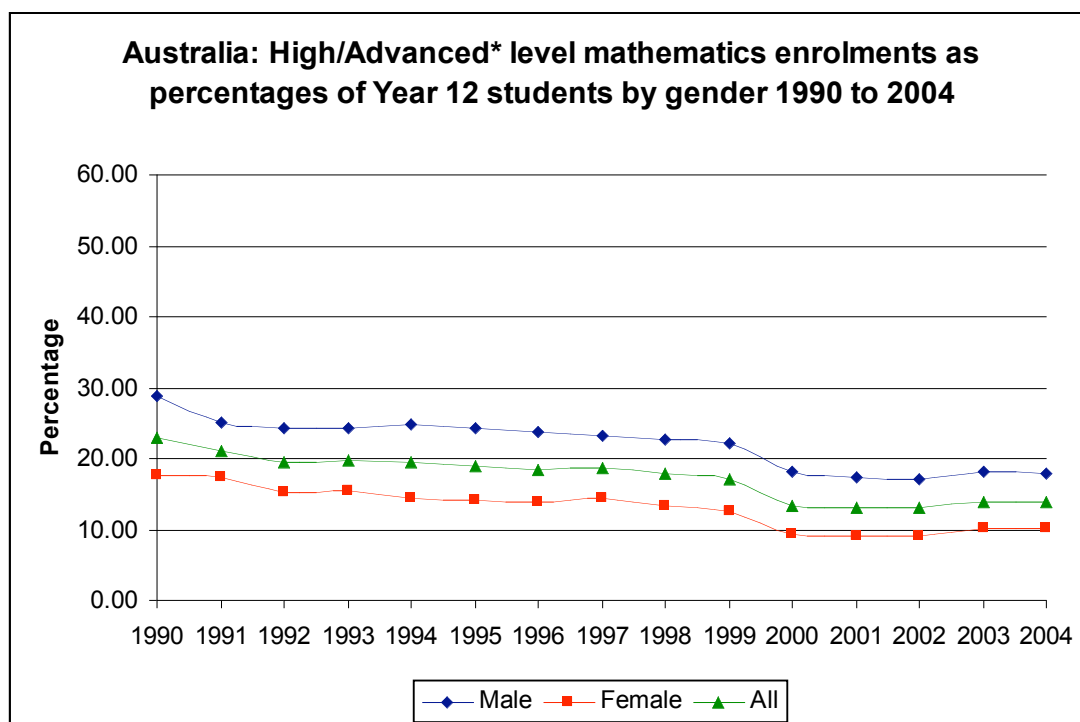
*   From 1990 to 1999, Dekkers et al. (2000b) "high" level mathematics
         From 2000 to 2004, the Barrington and Brown (2005) "Advanced" level mathematics

Figure 1.8. 1990 – 2004: Australian Year 12 high/Advanced level mathematics
          enrolments as percentages of Year 12 students by gender.

> NB.   The marked change from 1999 to 2000 is partially explained by different counting
>   procedures. For example, WA Applicable mathematics enrolments were classified as
>   "high" level prior to 2000.

Findings

For 1990-1999:

The data in Figure 1.8 indicate that for high level mathematics:

▪   There was an overall decrease in the enrolments in "high" level mathematics subjects expressed as percentages of all Year 12 students over the period 1990 to 1999 from 22.9% to 16.9% (mean over ten year period was 19.3%). Both male and female enrolments as percentages of their respective Year 12 student numbers also

decreased, with the decrease greater for male enrolments, from 28.8% to 22.0% (mean of 24.3%), than for female enrolments, from 17.6% to 12.4% (mean of 14.8%)

▪ In each year from 1990 to 1999 there was a higher percentage of male than female enrolments as percentages of their respective Year 12 student numbers

For 2000-2004:

The data in Figure 1.8 indicate that for Advanced level mathematics:

▪ From 2000 – 2004, enrolments expressed as percentages of Year 12 student numbers were varied slightly from year to year with an overall small increase from 13.5% in 2000 to 13.9% in 2004 (mean over the five year period was 13.5%). While female enrolments as percentages of female Year 12 student numbers increased slightly over the period from 9.4% to 10.1% (mean of 9.6%), male enrolments remained fairly steady at 18.1% in 2000 to 18.0% in 2004 with slight variations from year to year (mean of 17.7%)

▪ In each year from 2000-2004 male enrolments as percentages of male Year 12 student numbers were higher than female enrolments as percentages of female Year 12 student numbers

intermediate/Intermediate level mathematics

Australia-wide enrolments in Year 12 intermediate/Intermediate level mathematics subjects as percentages of Year 12 student numbers, by gender, are shown in Figure 1.9. The findings for the periods 1990-1999 and 2000-2004 are reported separately.

Findings

For 1990-1999

The data in Figure 1.9 indicate that for intermediate level mathematics:

▪ There was an overall, small decrease in enrolments expressed as percentages of all Year 12 students for the period from 38.3% in 1990 to 35.0% in 1999 (mean for the 10 year period was 37.2%). Male enrolments as percentages of male Year 12 student numbers also decreased from 43.6% to 36.6% over the period (mean of 39.5%); female enrolments as percentages of female Year 12 student numbers showed some variation over the years (e.g., 37.3% in 1993) but the overall change was a minimal decrease from 33.8% to 33.5% (mean of 35.1%)

▪ In each year from 1990 to 1999 male enrolments as percentages of male Year 12 student numbers were higher than female enrolments as percentages of female Year 12 cohort sizes. The differences in percentages for male and female enrolments varied over the years. Between 1990 and 1993, the difference in percentages shrank from about 10% to about 3%. The differences were stable during the period 1993 to 1999 at about 3%.

For 2000-2004:

The data in Figure 1.9 indicate that for Intermediate level mathematics:

▪ From 2000 – 2004, there was a fairly steady, but small, decrease in the enrolments in Intermediate level mathematics expressed as percentages of all Year 12 students from 36.7% in 2000 to 33.4% in 2004 (mean for the five year period of 34.7%). Both male and female enrolments as percentages of their respective Year 12 student

numbers also decreased. The decrease for male enrolments was from 41.2% to 38.2% (mean of 39.1%), and for female enrolments from 32.7% to 29.1% (mean of 30.8%)

▪ In each year from 2000 to 2004 male enrolments expressed as percentages of male Year 12 student numbers were higher than female enrolments as percentages of female Year 12 cohort sizes. The differences in percentages for male and female enrolments were stable during the period 2000 to 2004 at about 8%-9%.

Australia: intermediate/Intermediate* level mathematics enrolments as percentages of Year 12 students by gender 1990 to 2004
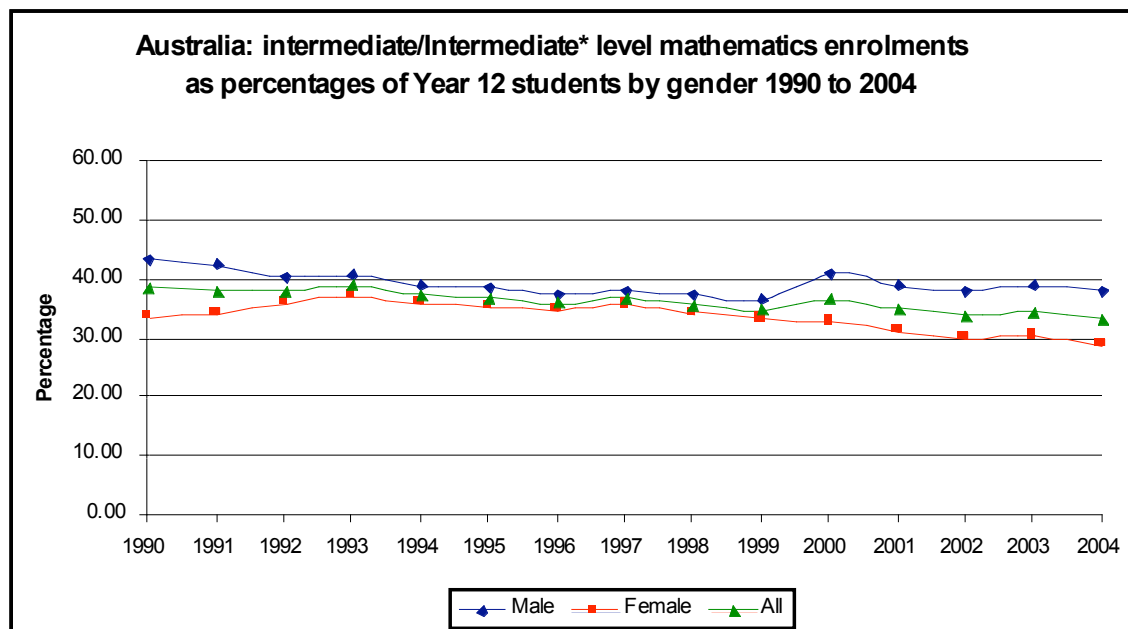
*   From 1990 to 1999, Dekkers et al. (2000b) "intermediate" level mathematics
     From 2000 to 2004, the Barrington and Brown (2005) "Intermediate" level mathematics

Figure 1.9. 1990 – 2004: Australian Year 12 intermediate/Intermediate level mathematics as percentages of Year 12 students by gender

Low/Elementary level mathematics

Australia-wide enrolments in Year 12 low/Elementary level mathematics subjects as percentages of Year 12 student numbers, by gender, are shown in Figure 1.10. The findings for the periods 1990-1999 and 2000-2004 are reported separately.

Findings

For 1990-1999:

The data in Figure 1.10 indicate that for low level mathematics:

▪ There was an initial increase in total, male, and female enrolments expressed as percentages of their respective Year 12 student numbers from about 30% in 1990 to about 40% in 1991. Thereafter there were very small but steady increases to about 49% in 1999. Means for the ten year period were the same for total, male, and female enrolments of 43.1%)

▪ In each year from 1990 to 1999, the male and female enrolments as percentages of their respective Year 12 student numbers were fairly similar. There were small variations with no consistent pattern of higher male or female percentages.

For 2000-2004:

The data in Figure 1.10 indicate that for Elementary level mathematics:

- From 2000 to 2004, total, male, and female enrolments expressed as percentages of their respective Year 12 student numbers remained fairly stable at around 54%. Means for the five year period were: all enrolments – 53.8%, male enrolments – 53.7%, and female enrolments – 54.0%

- In each year from 2000-2004, male and female enrolments expressed as percentages of their respective Year 12 student numbers were fairly similar. There were small variations with no consistent pattern of higher male or female percentages

Australia: Low/Elementary* level mathematics enrolments as percentages of Year 12 students by gender 1990 to 2004
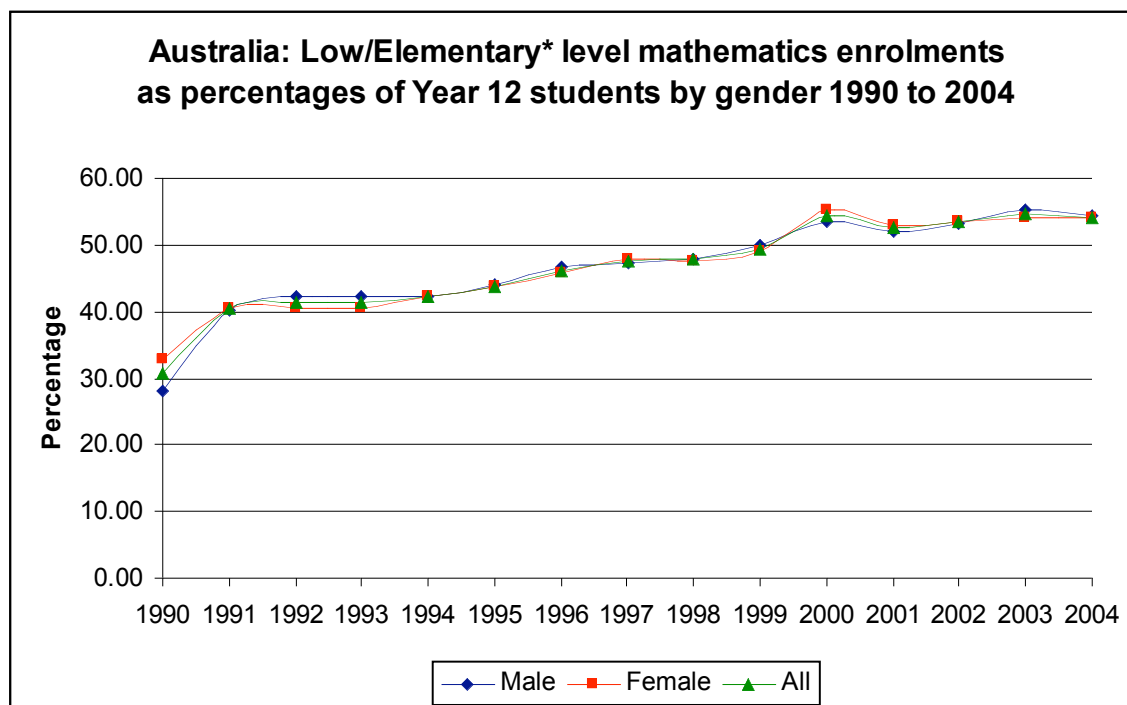
*   From 1990 to 1999, Dekkers et al. (2000b) "low" level mathematics
        From 2000 to 2004, the Barrington and Brown (2005) "Elementary" level mathematics

Figure 1.10.   1990 – 2004: Australian Year 12 low/Elementary level mathematics as percentages of Year 12 students by gender

Similar analyses for state/territory trends in enrolments expressed as percentages of Year 12 cohort sizes are presented in Section 2 of this report.

Australian data for the period 1970 to 1990 were incomplete. Some findings from earlier years are presented in Section 3 of this report.

A summary of the key findings from this section of the report is presented in Section 4.

SECTION 2

State/territory Year 12 mathematics enrolments in Advanced, Intermediate, and Elementary level subjects: 2000–2004

Patterns and trends for total Australian Year 12 mathematics enrolments and enrolments in Advanced, Intermediate, and Elementary level mathematics subjects, by gender, for the period 2000-2004 were discussed in Section 1 of this report. Also discussed in Section 1 were the patterns and trends for the same enrolment figures expressed as percentages of Year 12 cohort sizes.

In this section of the report, data for each state/territory for the period 2000-2004 are presented. Enrolments in the three Barrington and Brown (2005) categories of Year 12 mathematics subjects – Advanced, Intermediate and Elementary – for each state/territory and for Australia are examined and results of the gender analyses of these data are also presented.

The enrolment data for each state/territory are presented and examined in two forms, consistent with Section 1 of the report:

1. Total enrolments

2. Enrolments expressed as percentages of Year 12 cohort sizes. As discussed earlier, it was deemed meaningful to consider enrolment numbers in relation to cohort sizes as any comparisons made would be founded on a common base.

State/territory comparisons and an historical overview of state/territory enrolment patterns prior to 2000 are found in Section 3 of this report.

Advanced, Intermediate and Elementary level mathematics enrolments for Australian states/territory: 2000–2004

It should be noted that the Year 12 student numbers by gender for each state/territory that were used as the basis of some calculations are found in Table A3.2 in Appendix 3 of this report. The state/territory data upon which many of the analyses reported here were founded are provided in Appendix 1 of this report.

The reader is again reminded that enrolment numbers do not equate to student numbers. In some states/territories, students are able to study more than one mathematics subject simultaneously. These subjects can sometimes be within the same mathematics subject level (e.g., Tasmania – Elementary level), and sometimes across the mathematics subject levels (e.g., Victoria – Advanced and Intermediate levels).

Total mathematics enrolments: State/territory data

For each state/territory and for Australia overall, total Year 12 enrolments for the years 2000 to 2004 by gender are shown in Table 2.1 and shown graphically in Figure 2.1.

As can be seen from Table 2.1 and Figure 2.1, there were huge variations in the state/territory mathematics enrolment numbers. This was not unexpected given the quite different state/territory general population figures. These differences justify the

examination of Year 12 mathematics enrolments for each state/territory with respect to Year 12 cohort sizes. As for the Australian data presented in Section 1 of the report, this has been done by expressing mathematics enrolment numbers as percentages of Year 12 cohort sizes.

Table 2.1. Total mathematics enrolments for each state/territory and for Australia by gender, 2000-2004

		Australia	ACT	NSW	NT	Qld	SA	Tas	Vic	WA
	Male	98192	1933	32879	322	23525	5421	3619	21194	9299
2000	Female	95958	2012	34847	433	22992	4829	3148	18829	8868
	Total	194150	3945	67726	755	46517	10250	6767	40023	18167
	Male	96940	1874	31354	441	23480	5135	3508	21963	9185
2001	Female	92555	1986	30944	437	22343	4375	3120	20451	8899
	Total	189495	3860	62298	878	45823	9510	6628	42414	18084
	Male	99859	1876	32799	395	23838	5108	3477	22780	9586
2002	Female	94360	1972	31573	366	22768	4205	2962	21465	9049
	Total	194219	3848	64372	761	46606	9313	6439	44245	18635
	Male	103942	1944	34445	434	24179	4824	3634	24633	9849
2003	Female	95780	2030	32033	380	23019	3960	2904	22274	9180
	Total	199722	3974	66478	814	47198	8784	6538	46907	19029
	Male	101655	1925	33076	442	24120	4682	3068	24713	9629
2004	Female	94295	1867	30530	389	23345	3811	2564	22722	9067
	Total	195950	3792	63606	831	47465	8493	5632	47435	18696
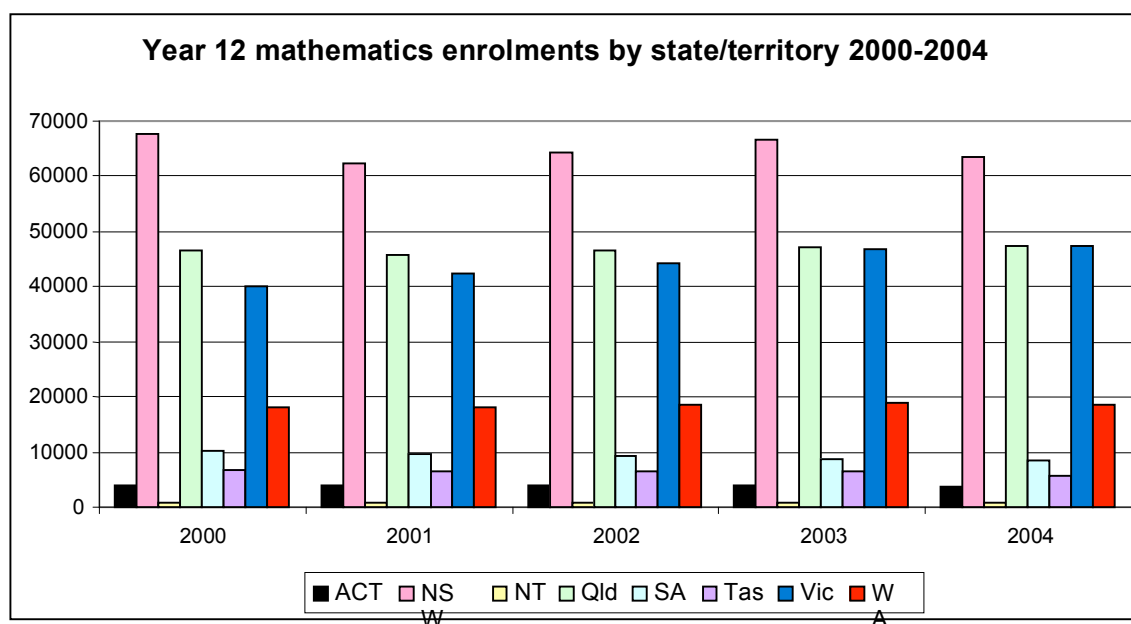
Figure 2.1. Year 12 mathematics enrolments by state/territory 2000-2004

Figure 2.1 is useful for noting enrolment changes within each state over the period, but not for comparing participation rates between the states. Victoria, for example, has more students taking Year 12 mathematics than does Queensland, yet Queensland has as many or more enrolments than Victoria owing to many Queensland students taking more than one mathematics subject. Enrolment and counting procedures vary from state to state.

Year 12 mathematics enrolment data and Year 12 enrolments expressed as percentages of Year 12 cohort sizes are now examined, in turn, for each state/territory.

Australian Capital Territory [ACT]

The ACT enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.1.

Table 2.2. ACT: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	All	Male	Female	All	Male	Female	All
2000	291	182	473	589	724	1313	1053	1106	2159
2001	283	193	476	583	654	1237	1008	1139	2147
2002	276	189	465	501	675	1176	1099	1108	2207
2003	275	197	472	590	712	1302	1079	1121	2200
2004	282	206	488	573	575	1148	1070	1086	2156

The data in Table 2.2 indicate that:

- For each of the five years:

    - There were more male than female enrolments in Advanced level mathematics.
    - There were more female than male enrolments in Intermediate and in Elementary level mathematics courses

- The male:female [M:F] enrolment ratios in Advanced level mathematics for the years 2000-2004 respectively were: 1.60, 1.47, 1.46, 1.40, and 1.37 indicating a decreasing proportion of male enrolments over the period. The mean M:F was 1.46

- Total enrolments in Advanced level mathematics increased slightly by 3.2% from 473 to 488 over the five year period. Male enrolments showed a small decrease (3.1%); female enrolments showed a larger increase (13.2%)

- Total enrolments in Intermediate level mathematics decreased by 12.6% from 1313 to 1148. Male enrolments showed a very small overall decrease (2.7%); female enrolments showed large overall decrease (20.6%)

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 0.81, 0.89, 0.74, 0.83 and 1.00. The mean M:F was 0.85

- Overall, total enrolments in Elementary level mathematics were stable over the five year period with some variation each year. Male enrolments showed a very small increase (1.6%); female enrolments showed a slight decrease (1.8%)

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.95, 0.88, 0.99, 0.96 and 0.99. The mean M:F was 0.96

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.2 – 2.4.

For **Advanced** level mathematics enrolments in the ACT expressed as percentages of Year 12 student numbers, the data in Figure 2.2 indicate that for the five year period:

- Total enrolments represented about 11% of all Year 12 student numbers

- In each year, male enrolments as percentages of male Year 12 students (13-14%) were higher than female enrolments as percentages of female Year 12 students (8-10%)

- While male enrolments as percentages of male Year 12 students remained fairly stable over the five year period, female enrolments showed a steady increase from 8% - 10% of female Year 12 students

Figure 2.2 ACT: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Intermediate** level mathematics enrolments in the ACT expressed as percentages of Year 12 student numbers, the data in Figure 2.3 indicate that for the five year period:

- Total enrolments varied over the five year period with an overall decrease from 30.3% of all Year 12 student numbers to 26.7%.

- In 2004, at the end of the five year period, male and female enrolments as percentages of their respective Year 12 student numbers were the same, at about 26.7%

- For the years 2000-2003, female enrolments as percentages of female Year 12 students were higher than male enrolments as percentages of male Year 12 students.

- While male and female enrolments as percentages of their respective Year 12 student numbers varied over the five years, male enrolments showed only a small decrease over the five-year period from 27.2% to 26.7%, while female enrolments showed a much larger decrease from 33.4% to 26.7%

For **Elementary** level mathematics enrolments in the ACT expressed as percentages of Year 12 student numbers, the data in Figure 2.4 indicate that for the five year period:

- Total enrolments were fairly stable at about 50% of all Year 12 student numbers

- With the exception of 2001, male, female, and total enrolments as percentages of their respective Year 12 student numbers were almost identical at around 50%. In 2001, female enrolments represented a higher percentage of Year 12 female enrolments (53.3%) than did male enrolments as a percentage of male Year 12 students (47.1%)

Figure 2.3 ACT: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

Figure 2.4. ACT: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

New South Wales [NSW]

The NSW enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.3.

Table 2.3 NSW: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	All	Male	Female	All	Male	Female	All
2000	6897	4800	11697	11459	11026	22485	14523	19021	33544
2001	6836	4536	11372	10641	10160	20801	13877	16248	30125
2002	7282	4831	12113	10484	9657	20141	15033	17085	32118
2003	8044	5588	13632	11140	9898	21038	15261	16547	31808
2004	7865	5608	13473	10523	9228	19751	14688	15694	30382

The data in Table 2.3 indicate that:

- For each of the five years, there were:

  - more male than female enrolments in Advanced level and Intermediate level mathematics
  - more female than male enrolment in Elementary level mathematics courses

- The M:F enrolment ratios in Advanced level mathematics for the years 2000-2004 respectively were: 1.44, 1.51, 1.51, 1.44, and 1.40 with a mean value of 1.46.

- Over the five year period:

  - Total enrolments in Advanced level mathematics increased by 15.2% (from 11,697 to 13,473). Male enrolments increased from 6,897 to 7,865 (14.0%); female enrolments increased from 4800 to 5608 (16.8%)
  - Total enrolments in Intermediate level mathematics decreased by 12.2% (from 22,485 to 19,751). Male enrolments decreased from 11,459 to 10,523 (8.2%); female enrolments decreased from 11026 to 9228 (16.3%)
  - Total enrolments in Elementary level mathematics decreased by 9.4% (from 33,544 to 30,382). Male enrolment remained increased slightly from 14,523 to 14,688 (1.1%); female enrolment numbers decreased quite dramatically from 19,021 to 15,694 (17.5%)

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.04, 1.05, 1.09, 1.13, and 1.14. The mean M:F was 1.09

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.76, 0.85, 0.88, 0.92 and 0.94. The mean M:F was 0.87

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.5 – 2.7.

For **Advanced** level mathematics enrolments in NSW expressed as percentages of Year 12 student numbers, the data in Figure 2.5 indicate that for the five year period:

- The patterns of variation for all enrolments, for male enrolments, and for female enrolments were very similar, with a slight increase in percentages for each group. All enrolments increased from 20.6% to 22.5% over the five-year period, male enrolments from 26.1% to 27.6%, and female enrolments from 15.8% to 17.9%

- In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students
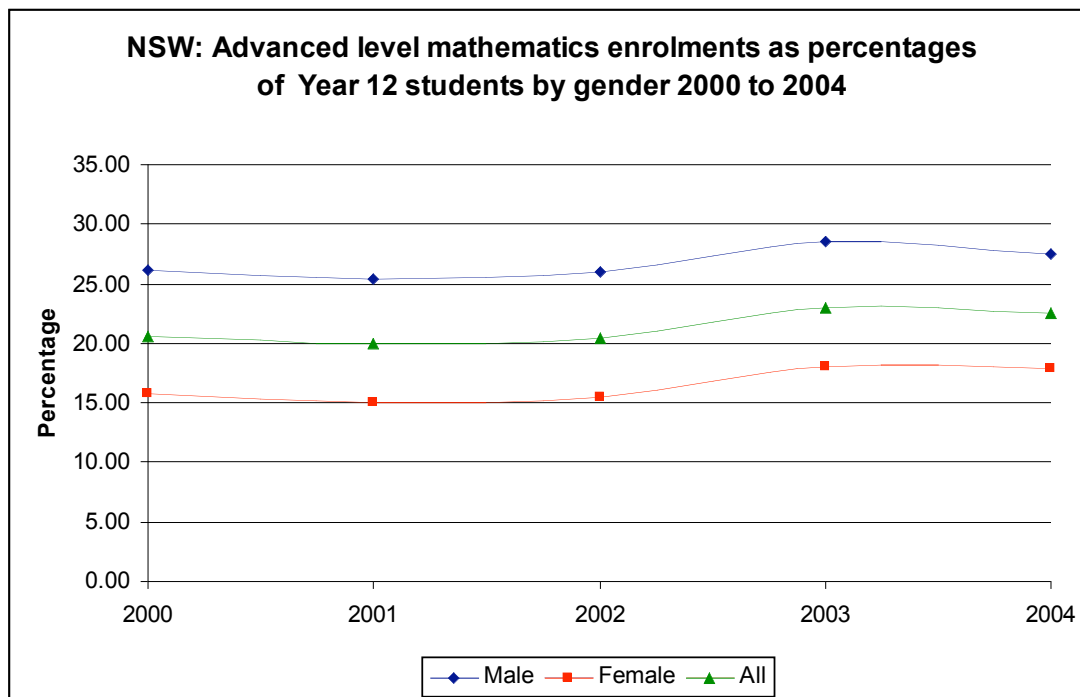
Figure 2.5. NSW: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Intermediate** level mathematics enrolments in NSW expressed as percentages of Year 12 student numbers, the data in Figure 2.6 indicate that for the five year period:

- the patterns of variation for all enrolments, for male enrolments, and for female enrolments were very similar, with a decreases in percentages for each group. All enrolments decreased from 39.6% to 33.0% over the five-year period, male enrolments from 43.4% to 36.9%, and female enrolments from 36.2% to 29.4%

- in each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students

For **Elementary** level mathematics enrolments in NSW expressed as percentages of Year 12 student numbers, the data in Figure 2.7 indicate that for the five year period:

- Total enrolments as percentages of Year 12 numbers decreased overall from about 59.0% in 2000 to about 50.5% in 2004. The most dramatic decrease was evident from 2001 to 2001 (from 59.0% to 52.9%) after which there was an overall decrease with some variation in particular years

- Male enrolments as percentages of male Year 12 student numbers decreased from 55% to 51.4% over the five year period; the decrease in female enrolments as percentage of female Year 12 student numbers was much greater from 62.5% to 50.7%

- With the exceptions of 2000 and 2001, male and female enrolments as percentages of their respective Year 12 student numbers were very similar in each year from 2002 – 2004.

- In both 2000 and 2001, female enrolments as percentages of female Year 12 student numbers were higher than male enrolments as percentages of male Year 12 student numbers: 2000 – F: 62.5%, M: 55.0%; 2001 – F: 53.9%; M: 51.7%

- Interestingly at the end of the five year period, male enrolments as a percentage of male Year 12 student numbers (51.4%) were slightly higher than female enrolments as a percentage of female Year 12 student numbers (50%)

Figure 2.6 NSW: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

Figure 2.7 NSW: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

Northern Territory [NT]

The NT enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.4.

It should be noted that numbers in the NT are very small. Hence trends identified below need to be interpreted with caution.

Table 2.4. NT: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	21	17	38	100	127	227	201	289	490
2001	41	27	68	149	108	257	251	302	553
2002	35	12	47	119	110	229	241	244	485
2003	39	13	52	117	96	213	278	271	549
2004	40	5	45	148	95	243	254	289	543

The data in Table 2.4 indicate that:

- For each of the five years, there were more male than female enrolments in Advanced level mathematics

- The M:F enrolment ratios in Advanced level mathematics for the years 2000-2004 respectively were: 1.24, 1.52, 2.92, 3.0, and 8.0 indicating an apparent trend of increasing male enrolments relative to female enrolments. The mean M:F was 3.3

- Over the five year period, there was some variation from year to year, yet:

  - overall enrolment in Advanced level mathematics increased slightly. While male enrolments increased from 21 to 40, female enrolments decreased from 17 to 5
  - overall enrolments in Intermediate level mathematics increased. While male enrolments increased from 100 to 148, female enrolments decreased from 127 to 95.
  - overall enrolments in Elementary level mathematics increased. While male enrolments increased from 201 to 254, female enrolments remained at 289

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 0.79, 1.38, 1.08, 1.22 and 1.56. The mean M:F was 1.21

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.70, 0.83, 0.99, 1.03, and 0.88. The mean M:F was 0.88

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.8 – 2.10.

For **Advanced** level mathematics enrolments in the NT expressed as percentages of Year 12 student numbers, the data in Figure 2.8 indicate that for the five year period:

- Total enrolments represented about 3.2% of all Year 12 student numbers

- In each year, male enrolments as percentages of male Year 12 students (ranging from 4.1% to 7.5%) were higher than female enrolments as percentages of female Year 12 students (ranging from 0.7% – 3.9%)

▪ While male enrolments as percentages of male Year 12 students increased over the five year period from 4.1% to 6.1%, female enrolments showed a decrease from 2.5% to 0.7% of all female Year 12 students
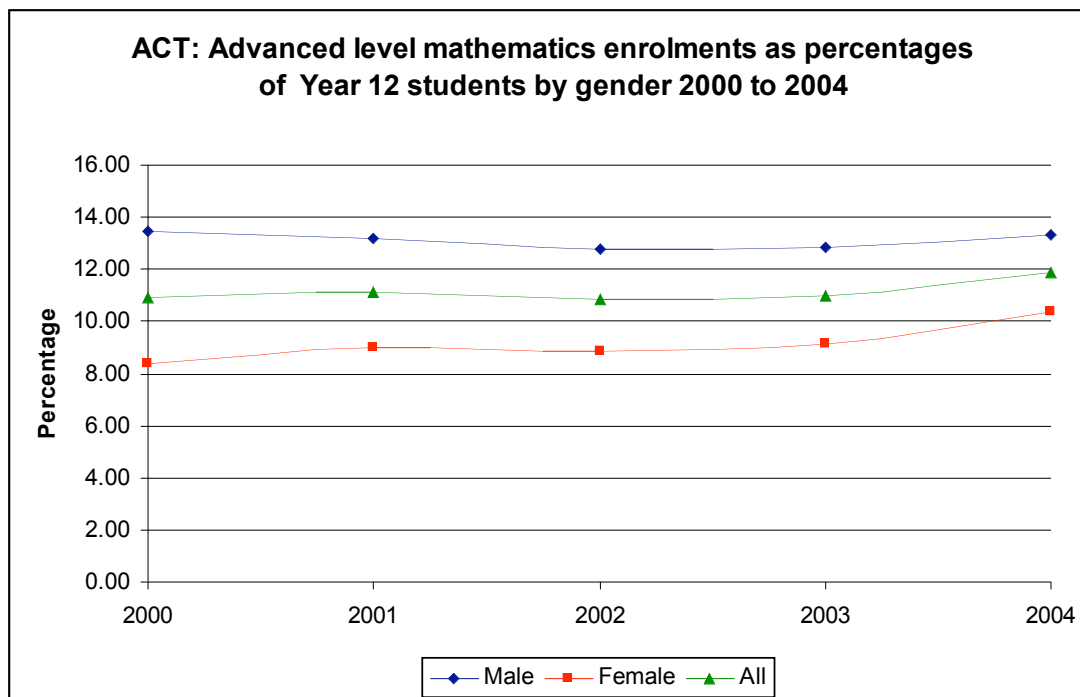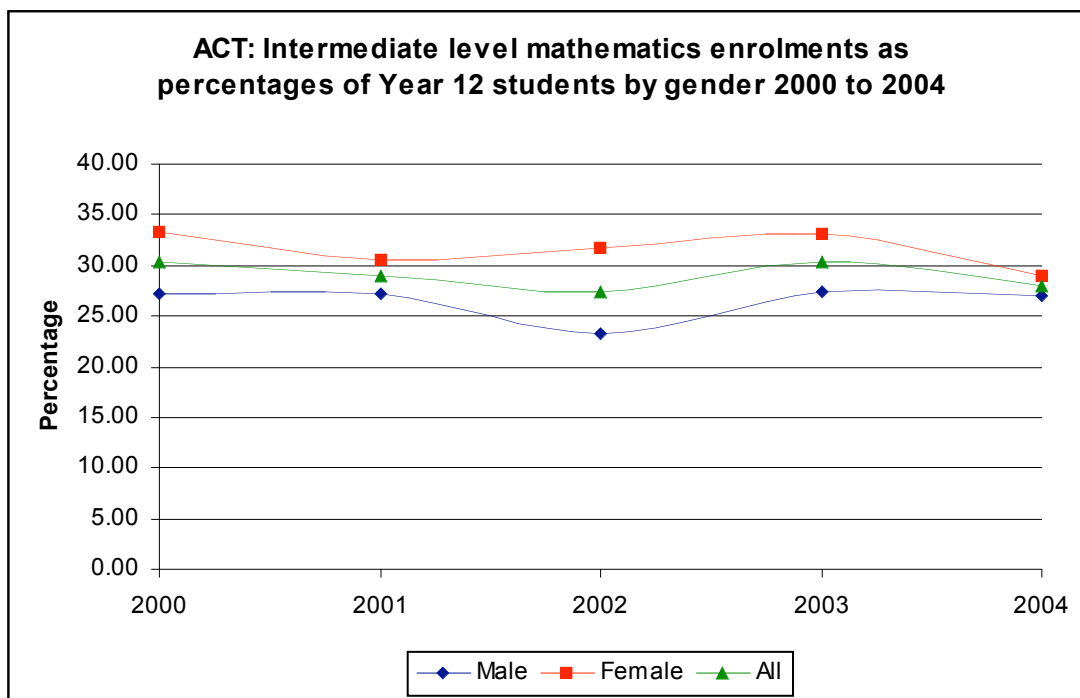

Figure 2.8. NT: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

Figure 2.9. NT: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

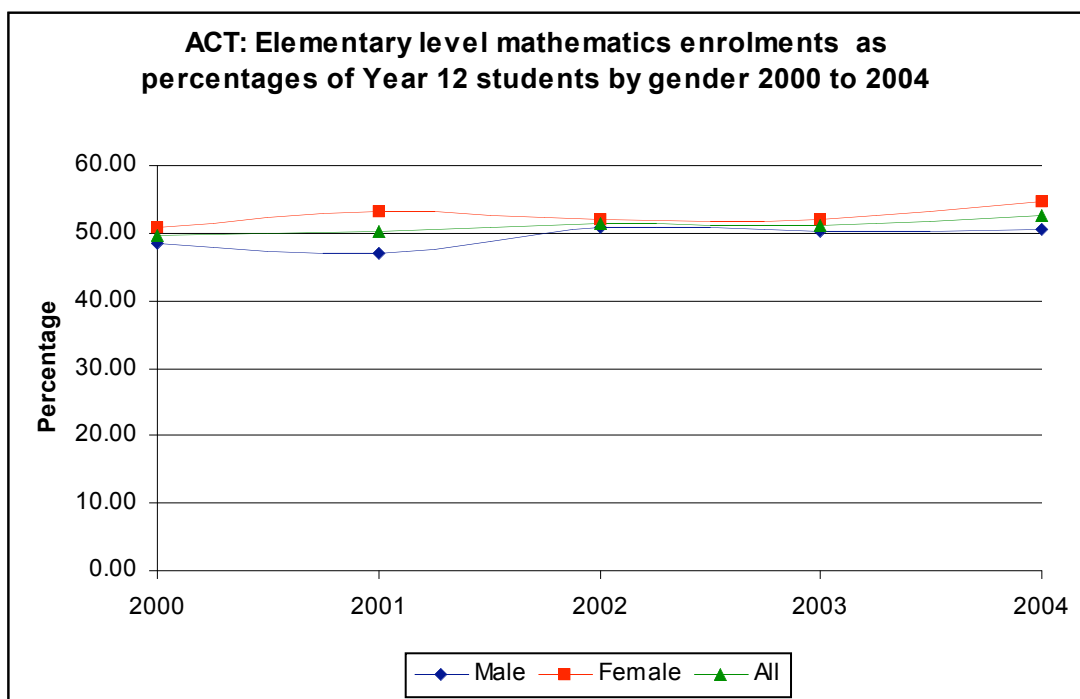For **Intermediate** level mathematics enrolments in the NT expressed as percentages of Year 12 student numbers, the data in Figure 2.9 indicate that for the five year period:

- 38 -

- Total enrolments, as well as male and female enrolments expressed as percentages of their respective Year 12 student numbers varied from year to year

- Overall enrolments in Intermediate level mathematics expressed as percentages of Year 12 cohorts were fairly steady at around 18-19%. For male enrolments there was an increase from 19.5% to 22.6% of male Year 12 student numbers; for female enrolments there was a decrease from 18.8% to 12.9% of female Year 12 student numbers

Figure 2.10.   NT: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Elementary** level mathematics enrolments in the NT expressed as percentages of Year 12 student numbers, the data in Figure 2.10 indicate that for the five year period:

- Total enrolments, as well as male and female enrolments expressed as percentages of their respective Year 12 student numbers varied from year to year

- Over the five year period, overall enrolments showed a small decrease from 41.3% to 39.1% of all Year 12 student numbers. Male enrolments remained fairly steady at about 39% of male Year 12 student numbers; female enrolments showed a small decrease from 42.9% to 39.3% of female Year 12 student numbers

Queensland

The Queensland enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.5.

Table 2.5. Queensland: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	2233	1009	3242	8867	8110	16977	12425	13873	26298
2001	2298	932	3230	8847	7771	16618	12335	13640	25975
2002	2149	965	3114	8929	7704	16633	12760	14099	26859
2003	2166	1009	3175	8958	7804	16762	13055	14206	27261
2004	2366	1064	3430	8897	7723	16620	12857	14558	27415

The data in Table 2.5 indicate that:

- For each of the five years, there were more male than female enrolments in Advanced level mathematics and in Intermediate level mathematics

- The M:F enrolment ratios in Advanced level mathematics for the years 2000-2004 respectively were: 2.21, 2.47, 2.27, 2.15, and 2.22. The mean M:F was 2.26

- Over the five year period, there was some variation from year to year, yet:
  - Total enrolments in Advanced level mathematics increased by 5.8% (from 3,242 to 3,430). Male enrolments increased by 6.0% and female enrolments increased by 5.5%
  - Total enrolments in Intermediate level mathematics decreased by 2.1%. While male enrolments were fairly stable (0.3% increase), female enrolments decreased from 8,110 to 7,223 (4.8%)
  - Total enrolments in Elementary level mathematics increased by 4.2% from 26,298 to 27,415. Male enrolments increased by 3.5% and female enrolments increased by 4.9%

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.09, 1.14, 1.16, 1.15, and 1.15. The mean M:F was 1.14

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.90, 0.90, 0.91, 0.92, and 0.88. The mean M:F was 0.90

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.11 – 2.13.

For **Advanced** level mathematics enrolments in the Queensland expressed as percentages of Year 12 student numbers, the data in Figure 2.11 indicate that for the five year period:

- Total enrolments represented about 8% of all Year 12 student numbers

- In each year, male enrolments as percentages of male Year 12 students (ranging from 10.8%-12.0%) were higher than female enrolments as percentages of female Year 12 students (ranging from 4.6 – 5.1%)

- Both male and female enrolments as percentages of their respective Year 12 student numbers were fairly stable over the five year period

For **Intermediate** level mathematics enrolments in Queensland expressed as percentages of Year 12 student numbers, the data in Figure 2.12 indicate that for the five year period:

▪ Total enrolments, as well as male and female enrolments expressed as percentages of their respective Year 12 student numbers were fairly stable from year to year

▪ Overall enrolments in Intermediate level mathematics expressed as percentages of Year 12 cohorts were fairly steady at around 41% to 42%. Male enrolments decreased slightly from around 44.7% to 46.2% of male Year 12 student numbers; for female enrolments there was a small but steady decrease from 39.3% to 37.0% of female Year 12 student numbers

Figure 2.11. Queensland: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

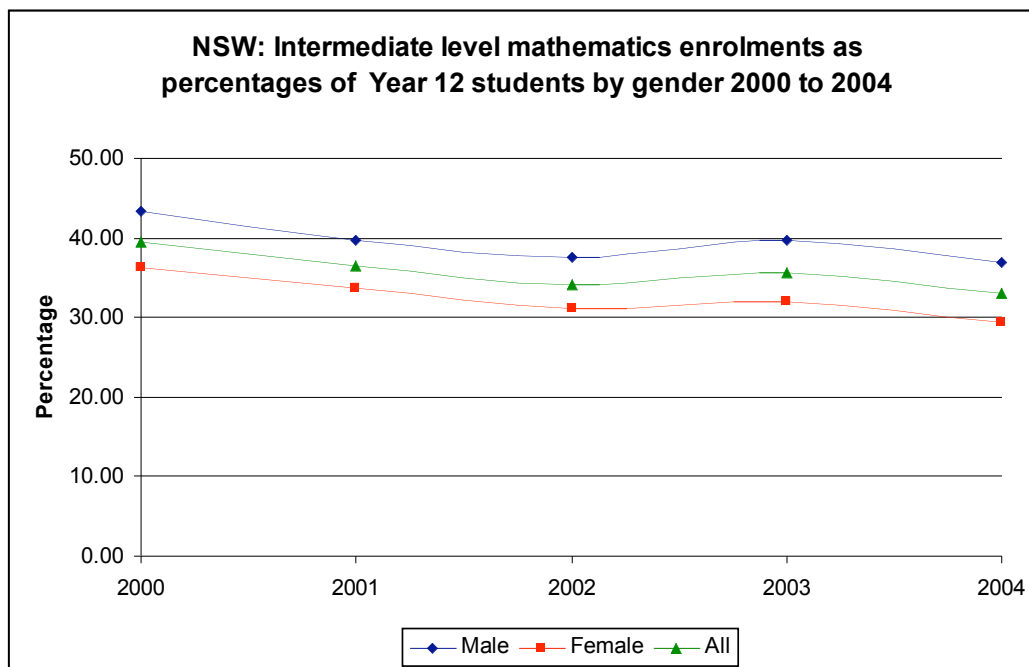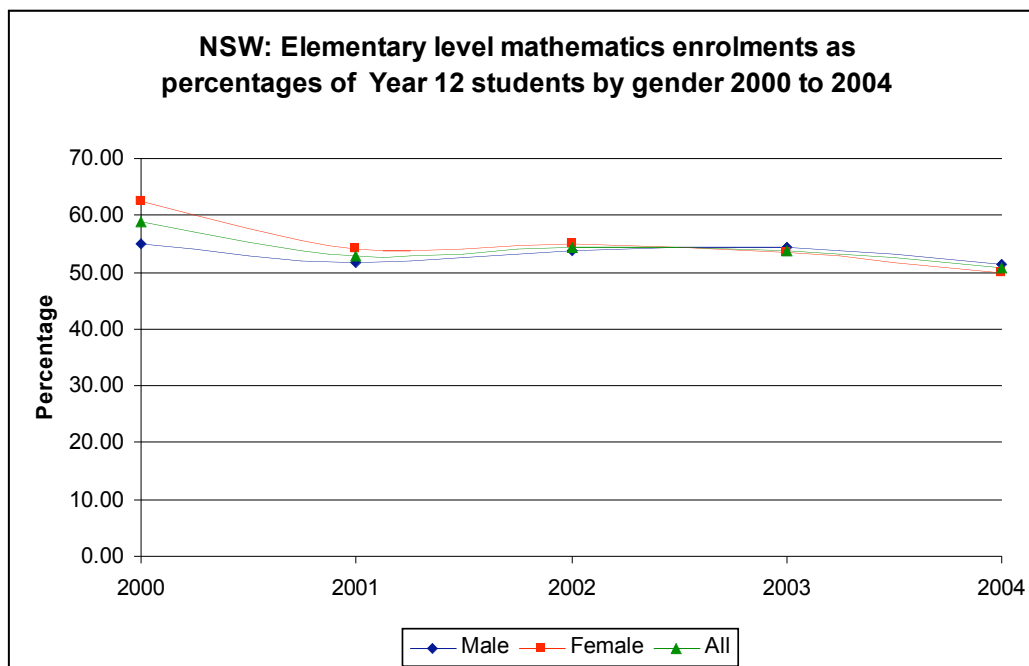Figure 2.12. Queensland: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Elementary** level mathematics enrolments in Queensland expressed as percentages of Year 12 student numbers, the data in Figure 2.13 indicate that for the five year period:

▪   Total enrolments expressed as percentages of Year 12 student numbers increased slightly from 66.0% in 2000 to 67.5% in 2005. Male enrolments expressed as percentages of male Year 12 students were fairly stable at around 65% over the five-year period, while female enrolments expressed as percentages of female Year 12 students increased from 67.3% to 69.8%.
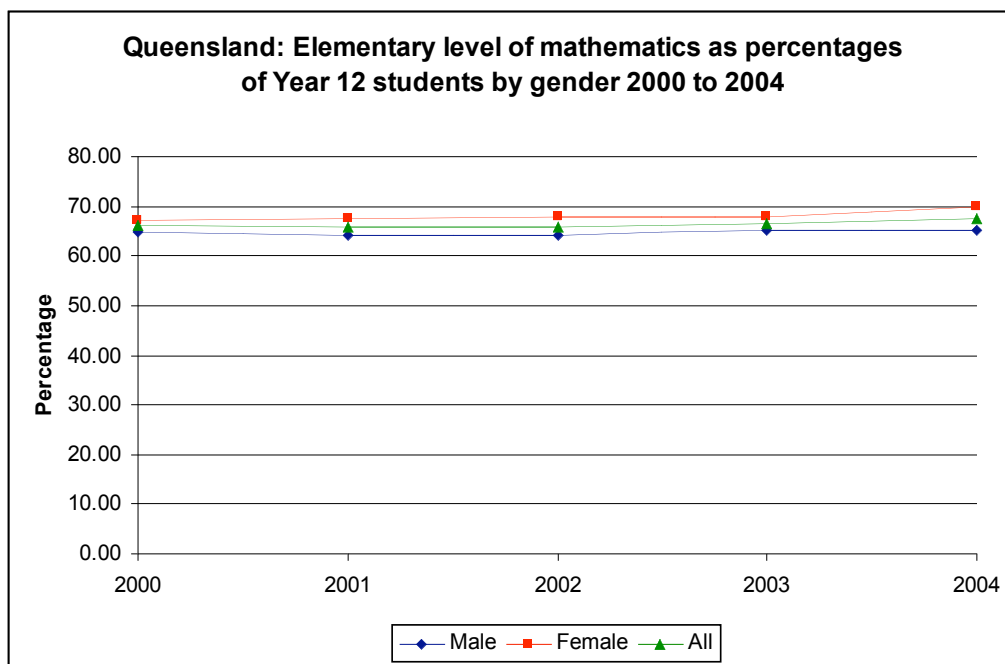
Figure 2.13. Queensland: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

South Australia [SA]

The SA enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.6.

Table 2.6. SA: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	1040	511	1551	2380	1960	4340	2001	2358	4359
2001	936	430	1366	2260	1754	4014	1939	2191	4130
2002	915	406	1321	2317	1798	4115	1876	2001	3877
2003	832	341	1173	2152	1540	3692	1840	2079	3919
2004	841	370	1211	1974	1371	3345	1867	2070	3937

The data in Table 2.6 indicate that:

- For each of the five years, there were:

  ➢ more male than female enrolments in Advanced level mathematics and Intermediate level mathematics
  ➢ more female than male enrolment in Elementary level mathematics courses

- The M:F ratios in enrolment numbers for Advanced level mathematics over the five years from 2000 to 2005 were: 2.04, 2.18, 2.25, 2.44, and 2.27, indicating that the trend was towards a higher proportion of male than female enrolments. The mean M:F ratio in enrolments for the five year period was 2.24.

- Total enrolments in Advanced level mathematics, Intermediate level mathematics, and Elementary level mathematics decreased from 2000-2004:

  ➢ Advanced level: from 1551 to 1221 (27.3% decrease)
  ➢ Intermediate level: from 4340 to 3345 (22.9%)
  ➢ Elementary level: from 4275 to 3319 (22.4%)

- For all levels of mathematics, both male and female enrolments decreased over the five year period, 2000 to 2004. For each level of mathematics, the decrease in female enrolments was higher than the decrease in male enrolments:

  ➢ Advanced level: Male enrolments from 1040 to 841 (19.1% decrease)
                         Female enrolments from 511 to 370 (27.6% decrease)
  ➢ Intermediate level: Male enrolments from 2380 to 1974 (17.1% decrease)
                         Female enrolments from 1960 t0 1371 (30.1% decrease)
  ➢ Elementary level: Male enrolments from 2001 to 1867 (6.7% decrease)
                         Female enrolments from 2358 to 2070 (12.2% decrease)

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.21, 1.29, 1.29, 1.40, and 1.44. The mean M:F was 1.33

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.85, 0.88, 0.94, 0.89, and 0.90. The mean M:F was 0.89

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.14 – 2.16.

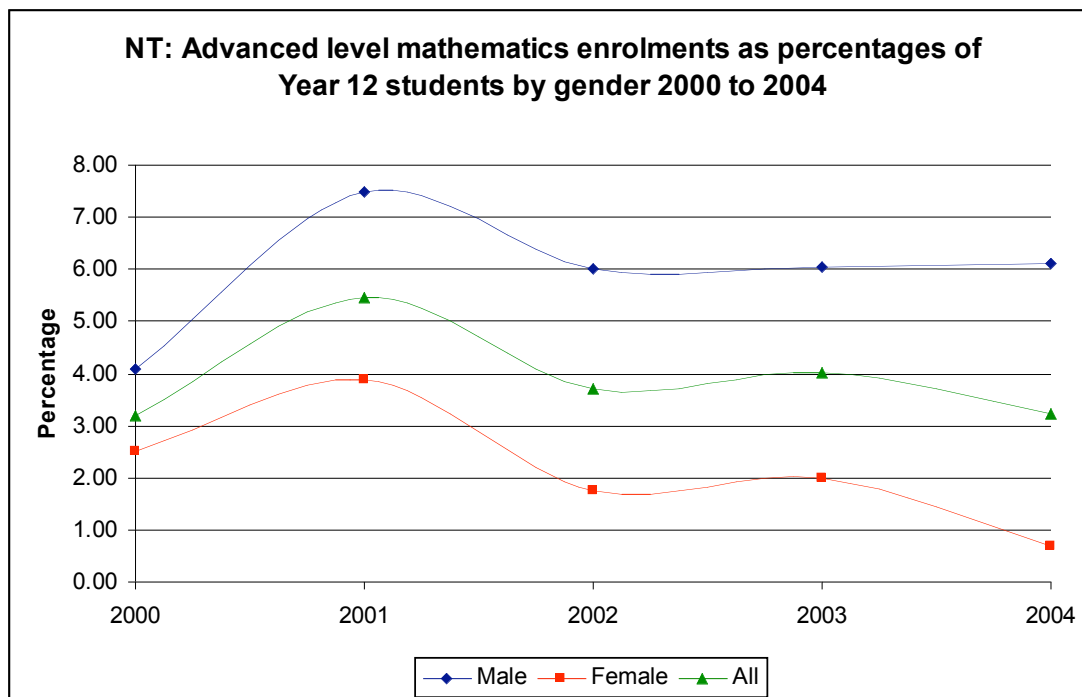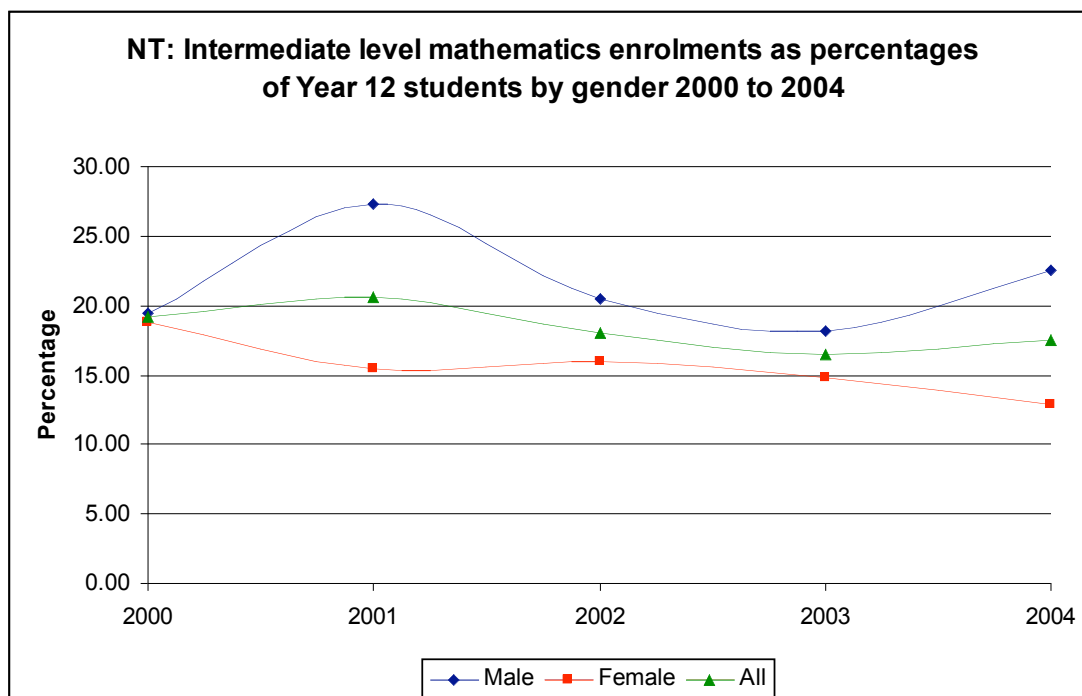Figure 2.14. SA: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Advanced** level mathematics enrolments in SA expressed as percentages of Year 12 student numbers, the data in Figure 2.14 indicate that for the five year period:

- There were similar patterns of decrease in total, male, and female enrolments as percentages of their respective Year 12 student numbers:
  - ➢ total enrolments decreased from 12.0% of all Year 12 students in 2000 to 9.1% in 2004
  - ➢ male enrolments decreased from 17.3% of male Year 12 students in 2000 to 13.8% in 2004
  - ➢ female enrolments decreased from 7.3% of female Year 12 students in 2000 to 5.1% in 2004

- In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students

For **Intermediate** level mathematics enrolments in SA expressed as percentages of Year 12 student numbers, the data in Figure 2.15 indicate that for the five year period:

- There were similar patterns of decrease in total, male, and female enrolments as percentages of their respective Year 12 student numbers:
  - ➢ total enrolments decreased from 33.5% of all Year 12 students in 2000 to 25.1% in 2004
  - ➢ male enrolments decreased from 39.6% of male Year 12 students in 2000 to 32.4% in 2004
  - ➢ female enrolments decreased from 28.1% of female Year 12 students in 2000 to 18.9% in 2004

- In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students
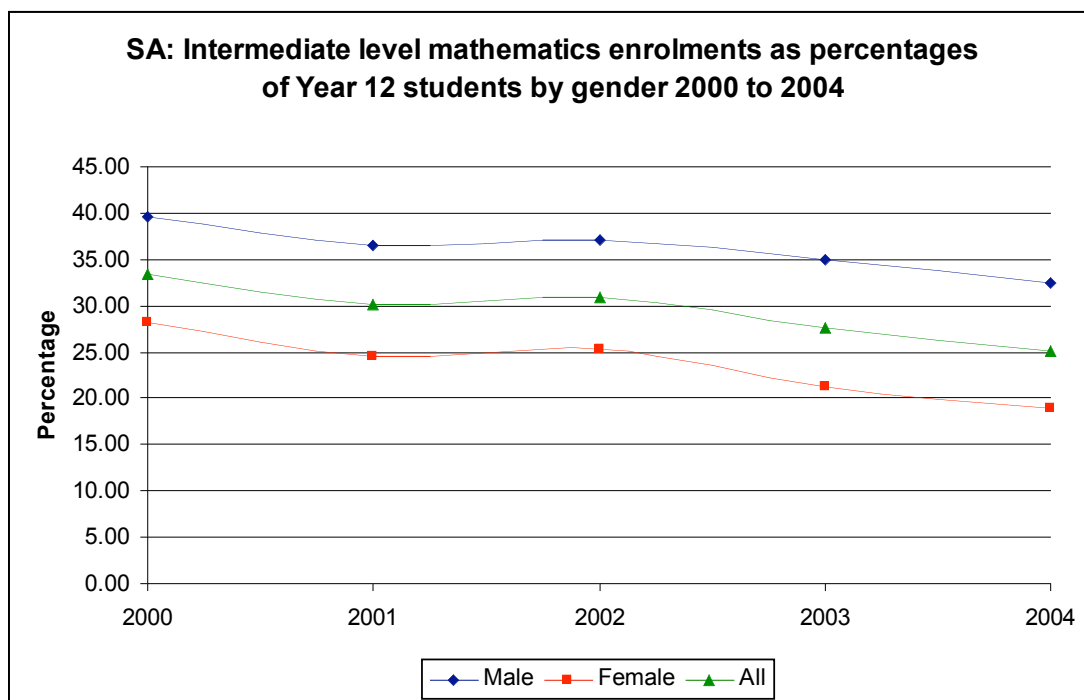
Figure 2.15.   SA: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
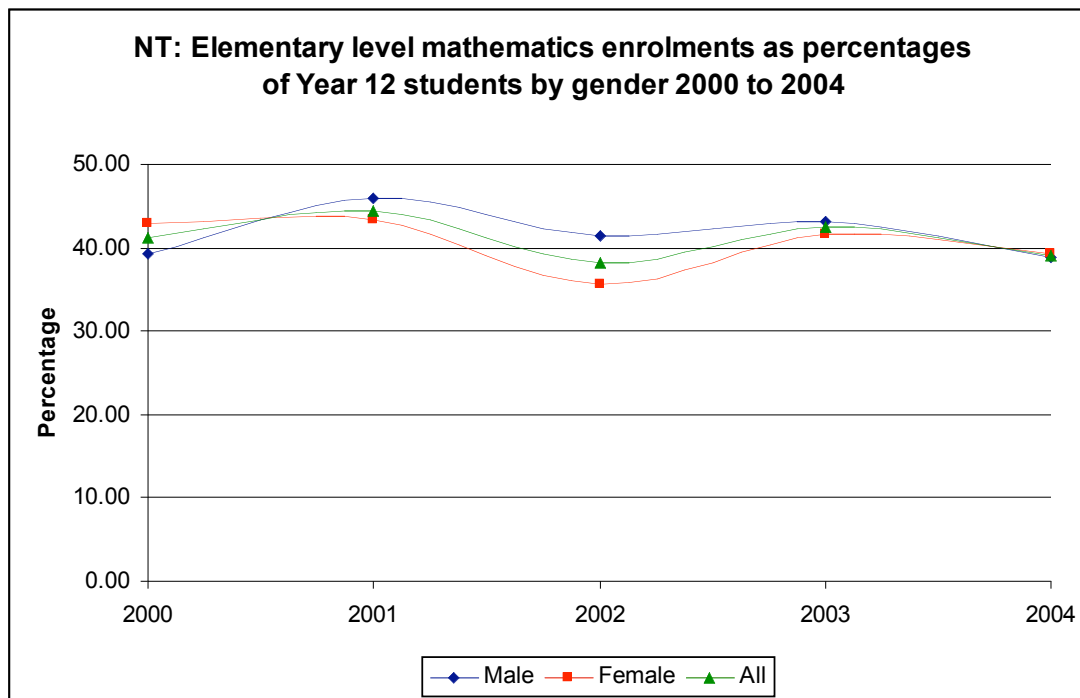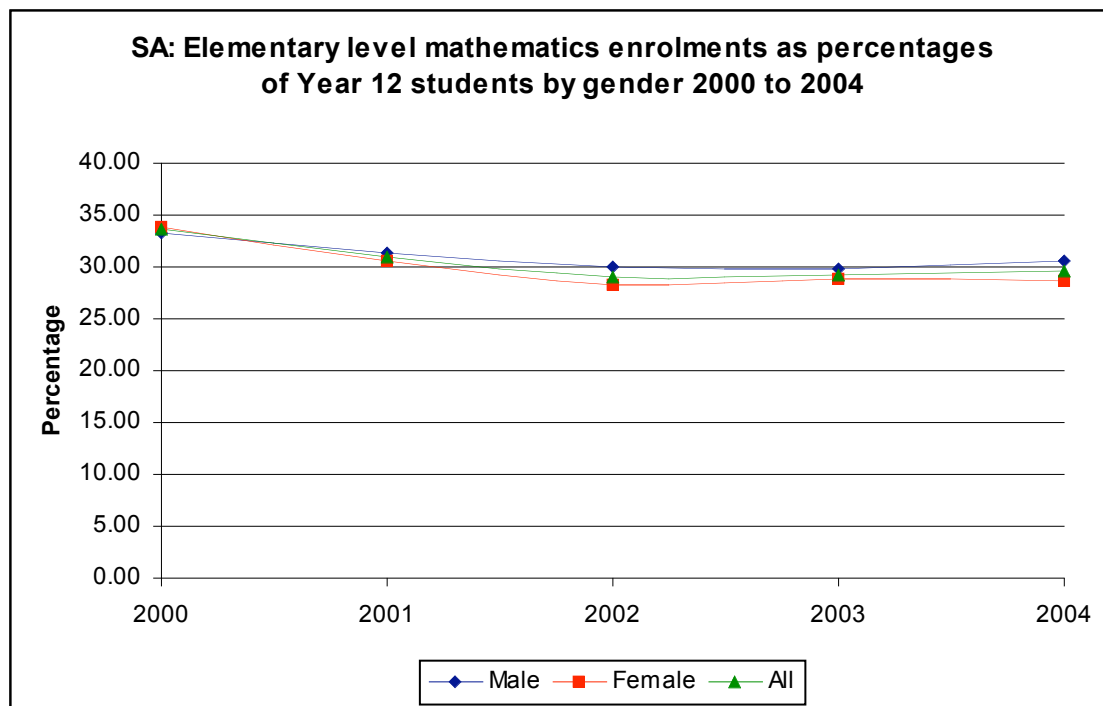

Figure 2.16. SA: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Elementary** level mathematics enrolments in SA expressed as percentages of Year 12 student numbers, the data in Figure 2.16 indicate that for the five year period:

- There was a steady decrease in total, male, and female enrolments as percentages of their respective Year 12 student numbers, with female enrolments showing the greatest decrease:

  ➢ total enrolments decreased from 33.6% of all Year 12 students in 2000 to 29.6% in 2004

  ➢ male enrolments decreased from 33.3% of male Year 12 students in 2000 to 30.7% in 2004

  ➢ female enrolments decreased from 33.9% of female Year 12 students in 2000 to 28.6% in 2004

Tasmania

The Tasmanian enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.7.

Table 2.7. Tasmania: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	108	49	157	383	338	721	3128	2761	5889
2001	135	85	220	423	327	750	2950	2708	5658
2002	153	72	225	427	361	788	2897	2529	5426
2003	184	97	281	466	360	826	2984	2447	5431
2004	153	75	228	488	335	823	2427	2154	4581

The data in Table 2.7 indicate that:

- For each of the five years, there were:

  ➢ more male than female enrolments in Advanced level mathematics, Intermediate level, and Elementary level mathematics

- The M:F ratios in enrolment numbers for Advanced level mathematics over the five years from 2000 to 2005 were: 2.20, 1.59, 2.13, 1.90, and 2.04. The mean M:F ratio in Advanced level enrolments for the five year period was 1.97

- Total enrolments in Advanced level mathematics increased from 157 to 228 (45.2% increase). Male enrolments increased by 41.7%; female enrolments increased by 53.1%

- Total enrolments in Intermediate level mathematics increased from 721 to 823 (14.1% increase). Male enrolments increased by 27.4%; female enrolments remained steady (-0.9%)

- The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.13, 1.29, 1.18, 1.29, and 1.46. The mean M:F was 1.27

- Total, male, and female enrolments in Elementary level mathematics decreased steadily over the five year period: All enrolments decreased by 22.2% from 5889 to 4581, male enrolments decreased by 22.4%, and female enrolments decreased by 22.0%

- The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 1.13, 1.09, 1.15, 1.22, and 1.13. The mean M:F was 1.14

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.17 – 2.19.

For **Advanced** level mathematics enrolments in Tasmania expressed as percentages of Year 12 student numbers, the data in Figure 2.17 indicate that for the five year period:

- There were similar patterns of increase in total, male, and female enrolments as percentages of their respective Year 12 student numbers:

  ➢ total enrolments increased from 3.2% of all Year 12 students in 2000 to 5.5% in 2004
  ➢ male enrolments increased from 4.7% of male Year 12 students in 2000 to 8.1% in 2004

> ➢ female enrolments increased from 1.8% of female Year 12 students in 2000 to 3.3% in 2004

- In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students.
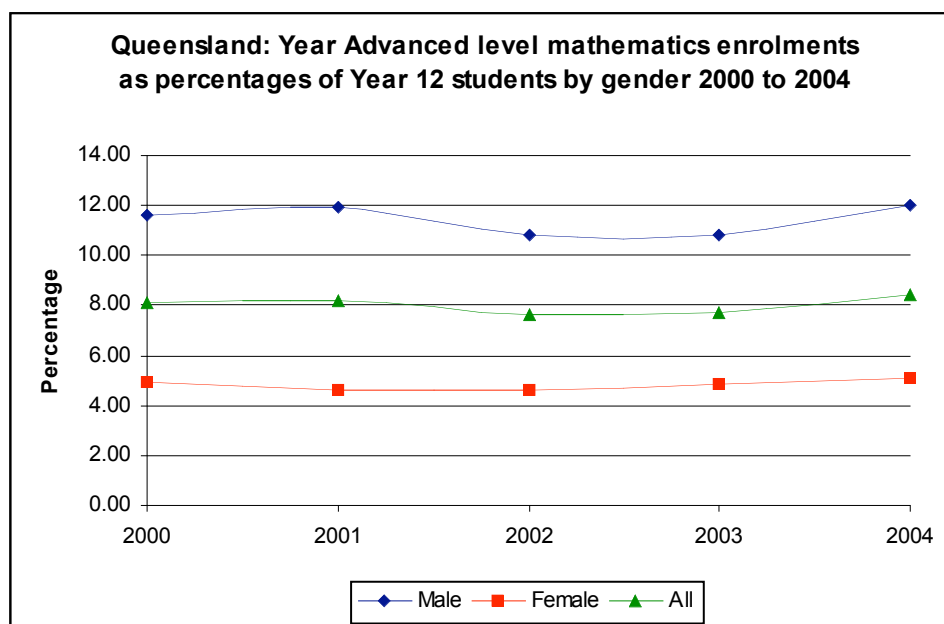

Figure 2.17. Tasmania: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
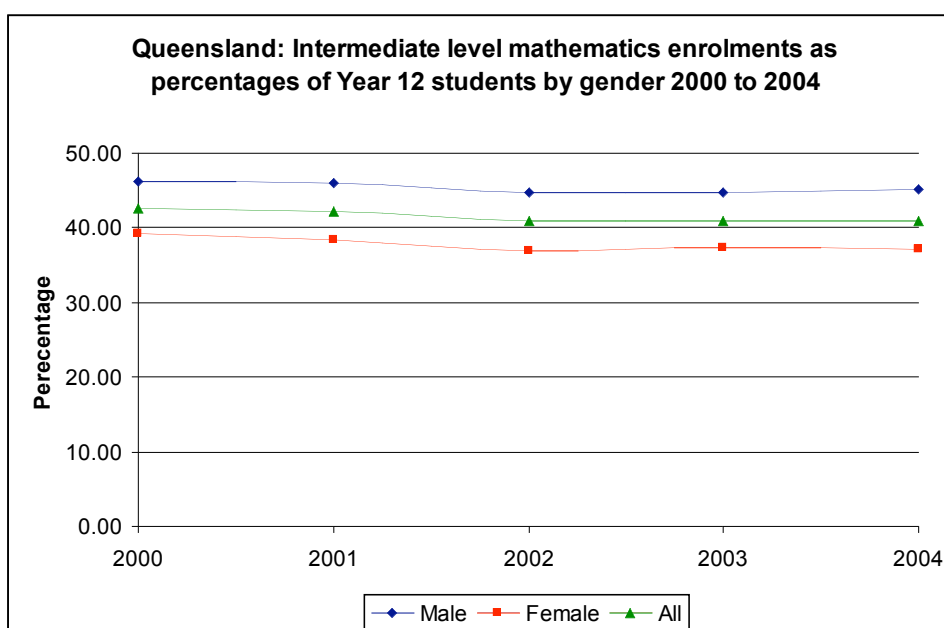

Figure 2.18. Tasmania: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

For **Intermediate** level mathematics enrolments in Tasmania expressed as percentages of Year 12 student numbers, the data in Figure 2.18 indicate that for the five year period:

▪ There were similar patterns of increase in total, male, and female enrolments as percentages of their respective Year 12 student numbers, with the increase for female enrolments smaller than for males:

  ➢ total enrolments increased from 14.5% of all Year 12 students in 2000 to 19.8% in 2004
  ➢ male enrolments increased from 16.7% of male Year 12 students in 2000 to 25.7% in 2004
  ➢ female enrolments increased from 12.6% of female Year 12 students in 2000 to 14.8% in 2004

▪ In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students.

For **Elementary** level mathematics enrolments in Tasmania expressed as percentages of Year 12 student numbers, the data in Figure 2.19 indicate that for the five year period:

▪ Since total, male, and female enrolments expressed as percentages of their respective Year 12 student numbers were greater than 100%, many students were studying more than one Elementary level mathematics subject

▪ Total, male, and female enrolments as percentages of their respective Year 12 student numbers remained fairly stable from 2000 to 2004:

  ➢ total enrolments ranged from 104.8% to 118.7% of all Year 12 students
  ➢ male enrolments ranged from 121.6% to 136.7% of all male Year 12 students
  ➢ female enrolments ranged from 88.4% to 103.3% of all female Year 12 students
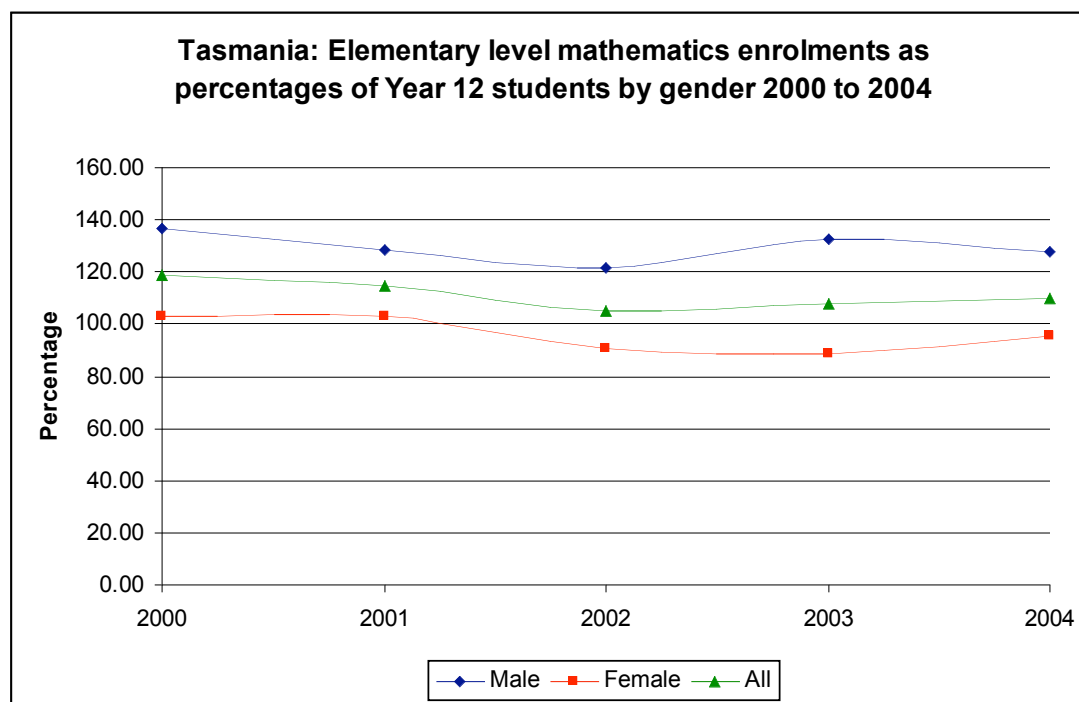
Figure 2.19. Tasmania: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
NB: Percentage in excess of 100% indicates students enrolled in more than one course.

Victoria

The Victorian enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.8.

Table 2.8. Victoria: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	3777	2123	5900	9310	7793	17103	8107	8913	17020
2001	3642	2314	5956	9393	8234	17627	8928	9903	18831
2002	3744	2394	6138	9611	8371	17982	9425	10700	20125
2003	3961	2411	6372	9978	8439	18417	10694	11424	22118
2004	3831	2462	6293	10016	8367	18383	10866	11893	22759

The data in Table 2.8 indicate that:

▪ For each of the five years, there were:

  ➢ more male than female enrolments in Advanced and Intermediate level mathematics
  ➢ more female than male enrolments in Elementary level mathematics

▪ Total enrolments in Advanced level mathematics increased from 5900 to 6293 (6.7%). Male enrolments increased by 1.4%; female enrolments increased by 16.0%

▪ The M:F ratios in enrolment numbers for Advanced level mathematics over the five years from 2000 to 2005 were: 1.78, 1.57, 1.56, 1.64, and 1.56. The mean M:F ratio in Advanced level enrolments for the five year period was 1.62

▪ Total enrolments in Intermediate level mathematics increased from 17,103 to 18,383 (7.5%). Male enrolments increased by 7.6%; female enrolments increased by 7.4%

▪ The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.19, 1.14, 1.15, 1.18, and 1.20. The mean M:F was 1.17

▪ Total enrolments Elementary level mathematics increased from 17,020 to 22,759 (33.7%). Male enrolments increased by 34.0%; female enrolments increased by 33.4%

▪ The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.91, 0.90, 0.88, 0.94, and 0.91. The mean M:F was 0.91

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.20 – 2.22.
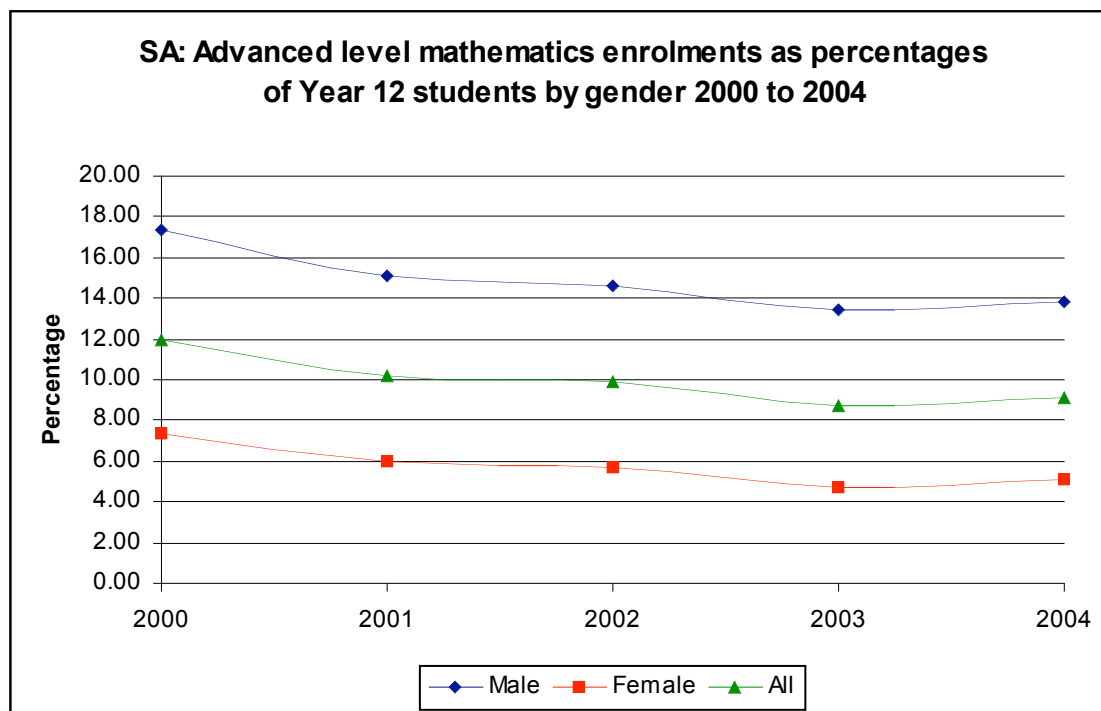
For **Advanced** level mathematics enrolments in Victoria expressed as percentages of Year 12 student numbers, the data in Figure 2.20 indicate that for the five year period:

▪ In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students

▪ Total and male enrolments as percentages of their respective Year 12 student numbers showed similar, relatively stable patterns:

  ➢ total enrolments ranged from 12.3% to 12.8% of all Year 12 students
  ➢ male enrolments ranged from 16.1% to 17.6% of male Year 12 students

- ▪ Female enrolments as percentages of female Year 12 student numbers showed a small, but steady increase from 8.5% to 9.3 %

For **Intermediate** level mathematics enrolments in Victoria expressed as percentages of Year 12 student numbers, the data in Figure 2.21 indicate that for the five year period:

- ▪ In each year, male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students

- ▪ Total, male, and female enrolments as percentages of their respective Year 12 student numbers were all remarkably stable:

  - ➢ total enrolments ranged from 36.3% to 36.9% of all Year 12 students
  - ➢ male enrolments ranged from 41.6% to 43.3% of male Year 12 students
  - ➢ female enrolments ranged from 31.2% to 32.0% of female Year 12 students

For **Elementary** level mathematics enrolments in Victoria expressed as percentages of Year 12 student numbers, the data in Figure 2.22 indicate that for the five year period:

- ▪ male and female enrolments as percentages of their respective Year 12 student numbers were fairly similar in each year, with the biggest difference occurring in 2003 when male enrolments represented 45.6% and female enrolments 43.3%

- ▪ total, male, and female enrolments as percentages of their respective Year 12 student numbers all increased:

  - ➢ total enrolments as percentages of all Year 12 students increased from 36.6% to 45.5%
  - ➢ male enrolments as percentages of male Year 12 students increased from 37.7% to 46.2%
  - ➢ female enrolments as percentages of all Year 12 students increased from 35.7% to 45.0%
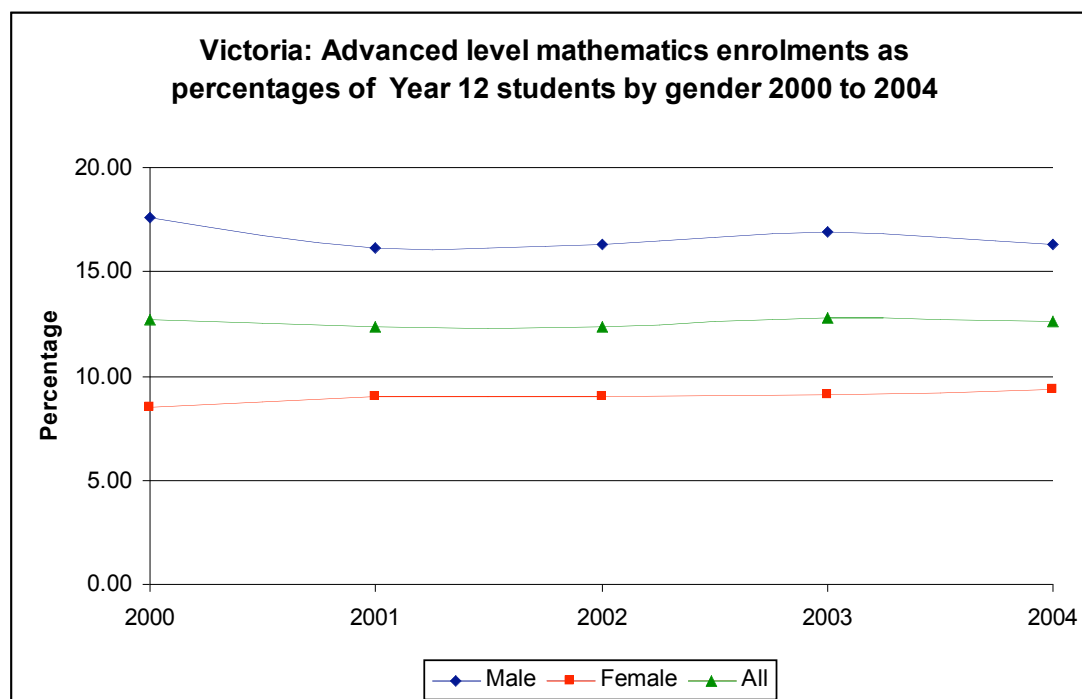
Figure 2.20. Victoria: Year 12 Advanced level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
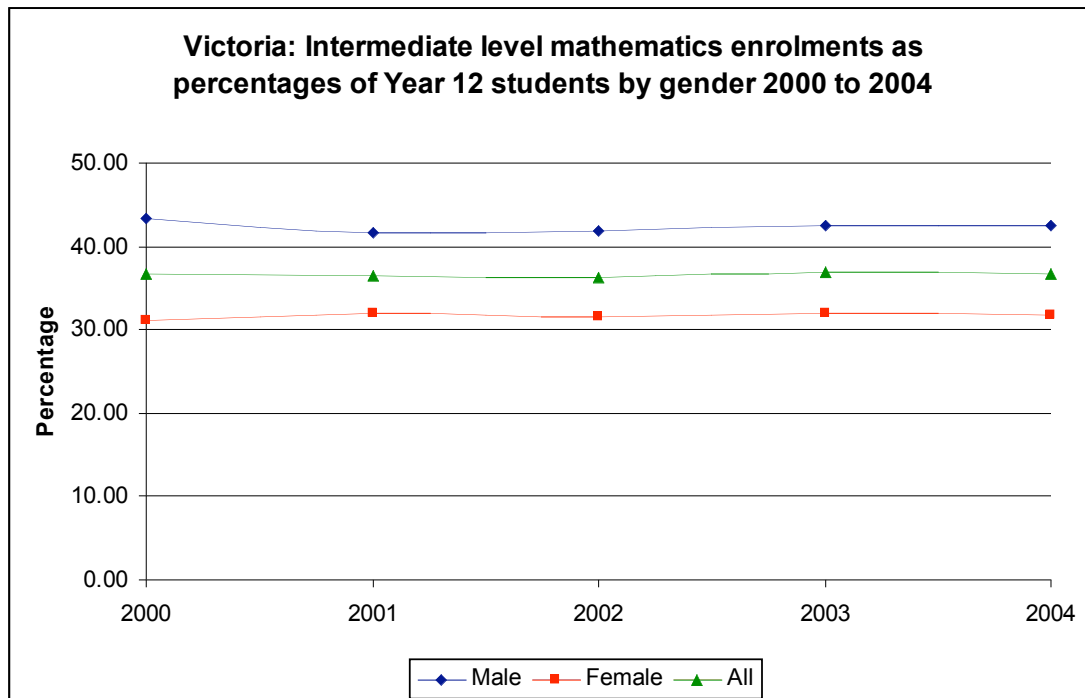
Figure 2.21. Victoria: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
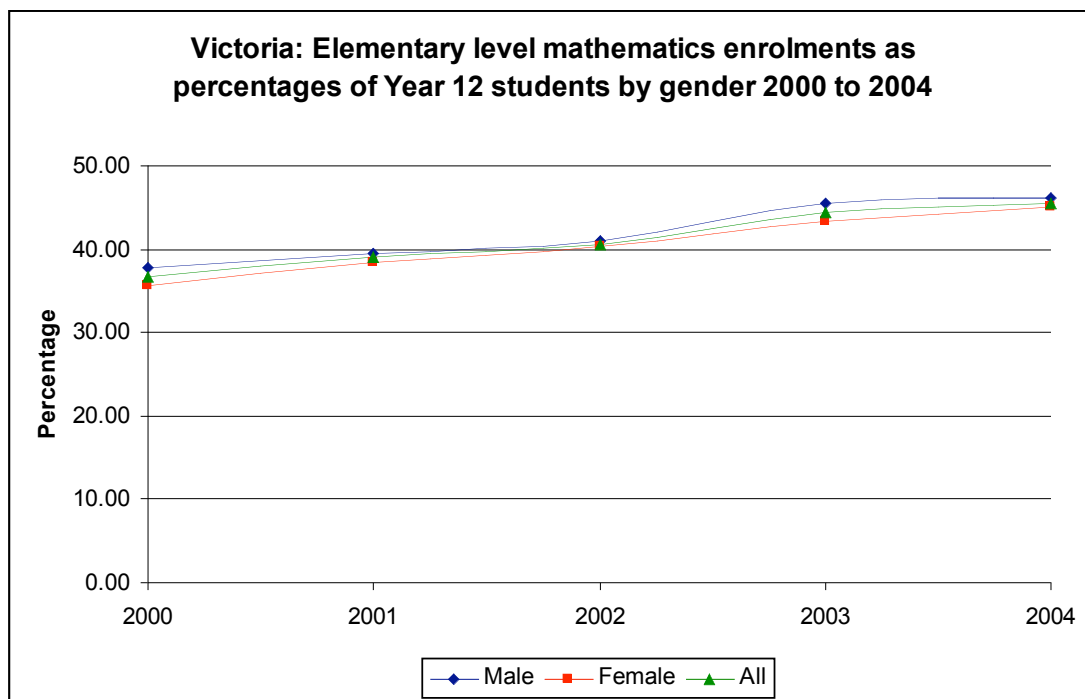
Figure 2.22. Victoria: Year 12 Elementary level mathematics enrolments as percentages of Victoria Year 12 students by gender 2000 to 2004

Western Australia [WA]

The Western Australian enrolment numbers for Advanced, Intermediate, and Elementary mathematics courses, by gender, for the years 2000-2004 are shown in Table 2.9.

Table 2.9. WA: Year 12 mathematics enrolments by level and gender, 2000 to 2004

Year	Advanced			Intermediate			Elementary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2000	1387	570	1957	2803	2177	4980	5109	6121	11230
2001	1285	516	1801	2636	2084	4720	5264	6299	11563
2002	1232	470	1702	2656	1990	4646	5698	6589	12287
2003	1311	514	1825	2707	1961	4668	5831	6705	12536
2004	1176	452	1628	2524	1759	4283	5929	6856	12785

The data in Table 2.9 indicate that:

▪ For each of the five years, there were:

➢ more male than female enrolments in Advanced and Intermediate level mathematics

➢ more female than male enrolments in Elementary level mathematics

▪ Total enrolments in Advanced level mathematics decreased from 1957 in 2000 to 1628 in 2004 (16.8% decrease). Male enrolments decreased by 15.2%; female enrolments decreased by 20.7%

▪ The M:F ratios in enrolment numbers for Advanced level mathematics over the five years from 2000 to 2005 were: 2.43, 2.49, 2.62, 2.55, and 2.60. The mean M:F ratio in Advanced level enrolments for the five year period was 2.54

▪ Total enrolments in Intermediate level mathematics decreased from 4980 to 4283 (14.0%). Male enrolments decreased by 10.0%; female enrolments decreased by 19.2%

▪ The M:F enrolment ratios in Intermediate level mathematics for the years 2000-2004 respectively were: 1.29, 1.26, 1.33, 1.38, and 1.43. The mean M:F was 1.34

▪ Enrolments in Elementary level mathematics increased from 112,30 to 127,85 (13.8%). Male enrolments increased by 16.1%; female enrolments increased by 12.0%

▪ The M:F enrolment ratios in Elementary level mathematics for the years 2000-2004 respectively were: 0.83, 0.84, 0.86, 0.87 and 0.86. The mean M:F was 0.85

Trends in enrolment numbers in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of Year 12 student numbers, by gender, for the five-year period 2000-2004 are shown in Figures 2.23 – 2.25.

For **Advanced** level mathematics enrolments in Western Australia expressed as percentages of Year 12 student numbers, the data in Figure 2.23 indicate that for the five year period:

▪ Male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students.
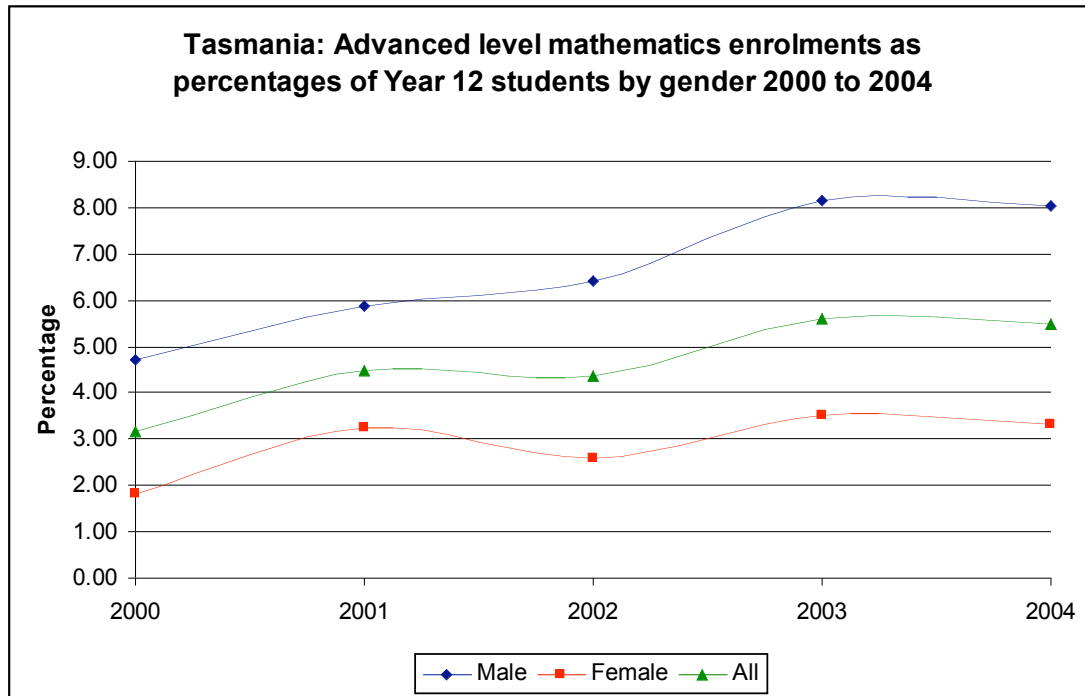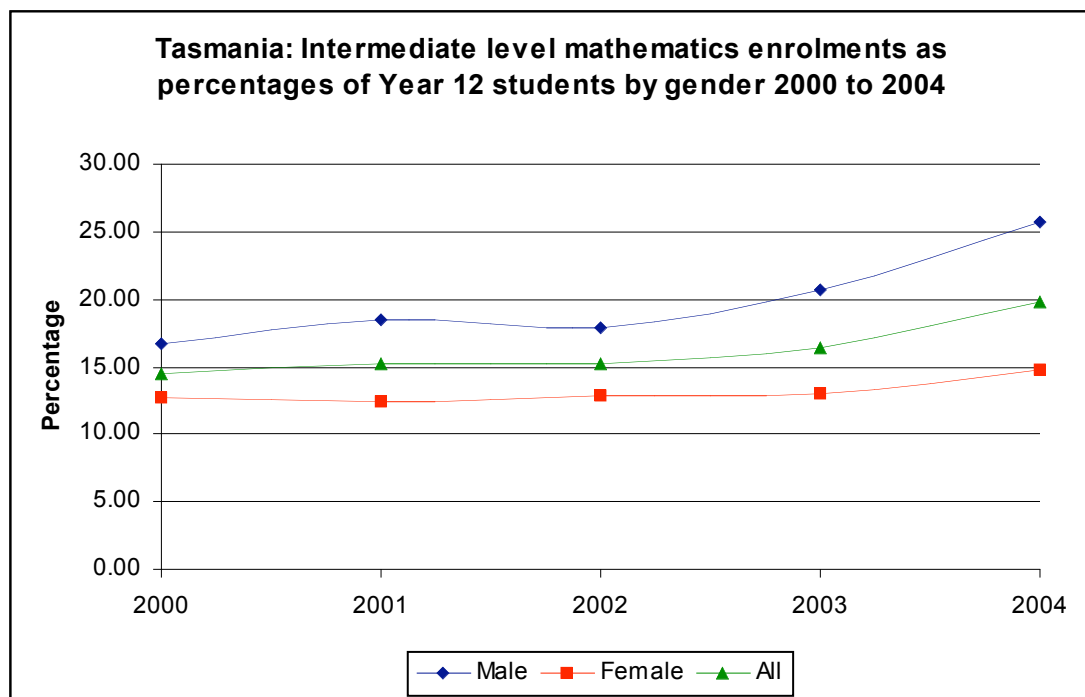
▪ Total, male, and female enrolments as percentages of their respective Year 12 student numbers showed identical patterns of small overall decrease:

> ➢ total enrolments decreased from 10.2% of all Year 12 students in 2000 to 8.2% in 2004
> ➢ male enrolments decreased from 15.2% of all Year 12 students in 2000 to 12.4% in 2004
> ➢ female enrolments decreased from 5.7% of all Year 12 students in 2000 to 4.4% in 2004
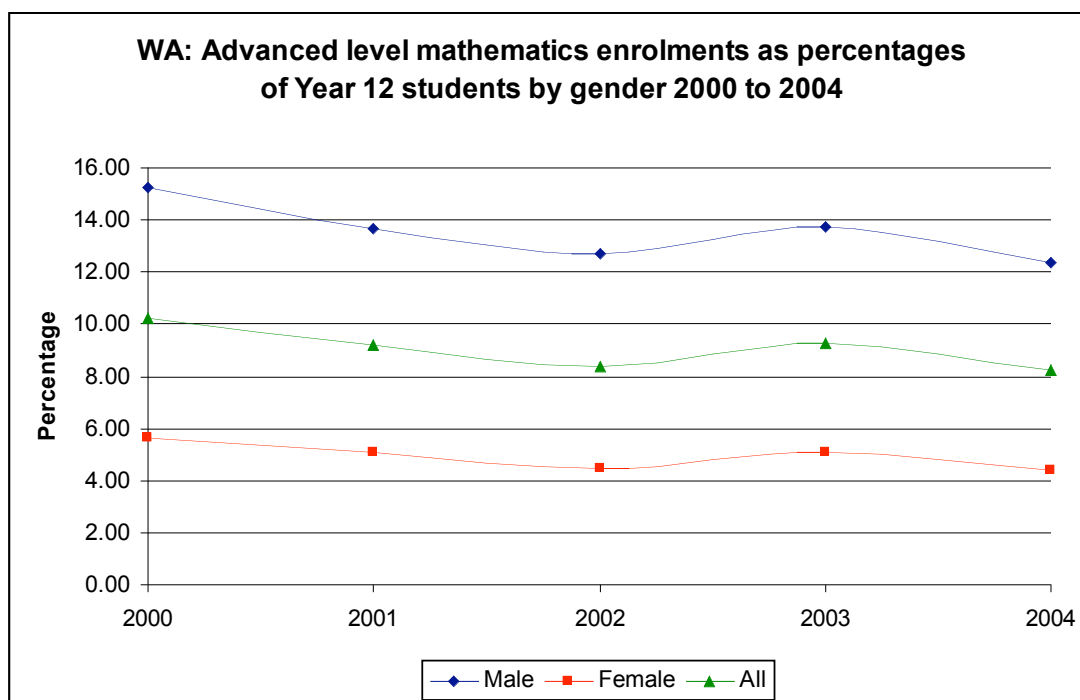
Figure 2.23. WA: Year 12 Advanced level mathematics enrolments as percentage of Year 12 students by gender 2000 to 2004

For **Intermediate** level mathematics enrolments in Western Australia expressed as percentages of Year 12 student numbers, the data in Figure 2.24 indicate that for the five year period:

- Male enrolments as percentages of male Year 12 students were higher than female enrolments as percentages of female Year 12 students.

- Total, male, and female enrolments as percentages of their respective Year 12 student numbers showed identical patterns of overall decrease:

> ➢ total enrolments decreased from 26.0% of all Year 12 students in 2000 to 21.6% in 2004
> ➢ male enrolments decreased from 30.8% of all Year 12 students in 2000 to 26.5% in 2004
> ➢ female enrolments decreased from 21.6% of all Year 12 students in 2000 to 17.1% in 2004

For **Elementary** level mathematics enrolments in Western Australia expressed as percentages of Year 12 student numbers, the data in Figure 2.25 indicate that for the five year period:

- Female enrolments as percentages of female Year 12 students were slightly higher than male enrolments as percentages of male Year 12 students.

- ▪ Total, male, and female enrolments as percentages of their respective Year 12 student numbers showed nearly identical patterns of overall increase:
  - ➢ total enrolments increased from 58.6% of all Year 12 students in 2000 to 64.6% in 2004
  - ➢ male enrolments increased from 56.1% of all Year 12 students in 2000 to 62.3% in 2004
  - ➢ female enrolments increased from 60.8% of all Year 12 students in 2000 to 66.7% in 2004
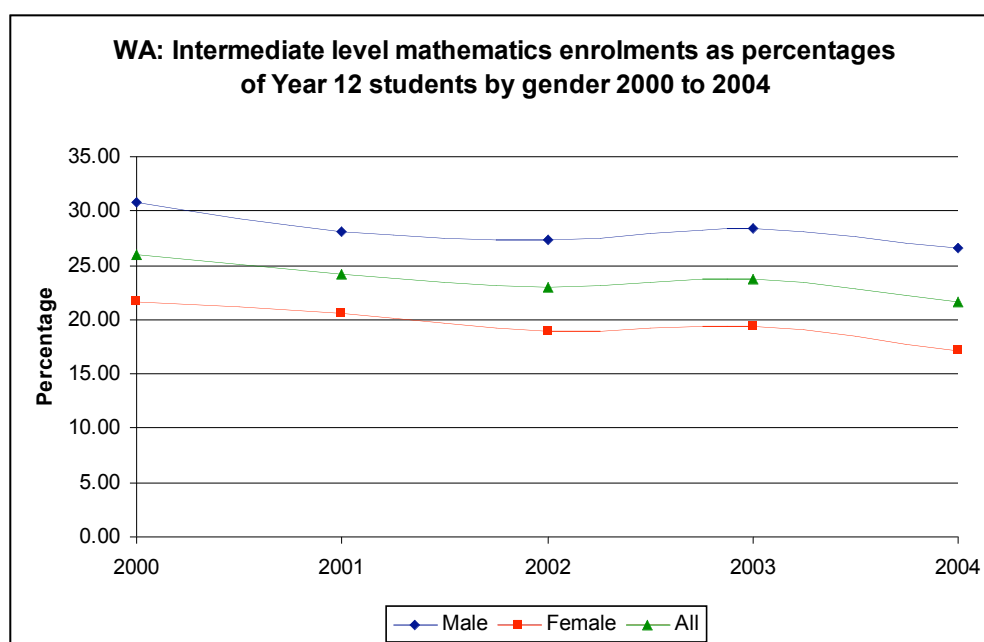
Figure 2.24. WA: Year 12 Intermediate level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004
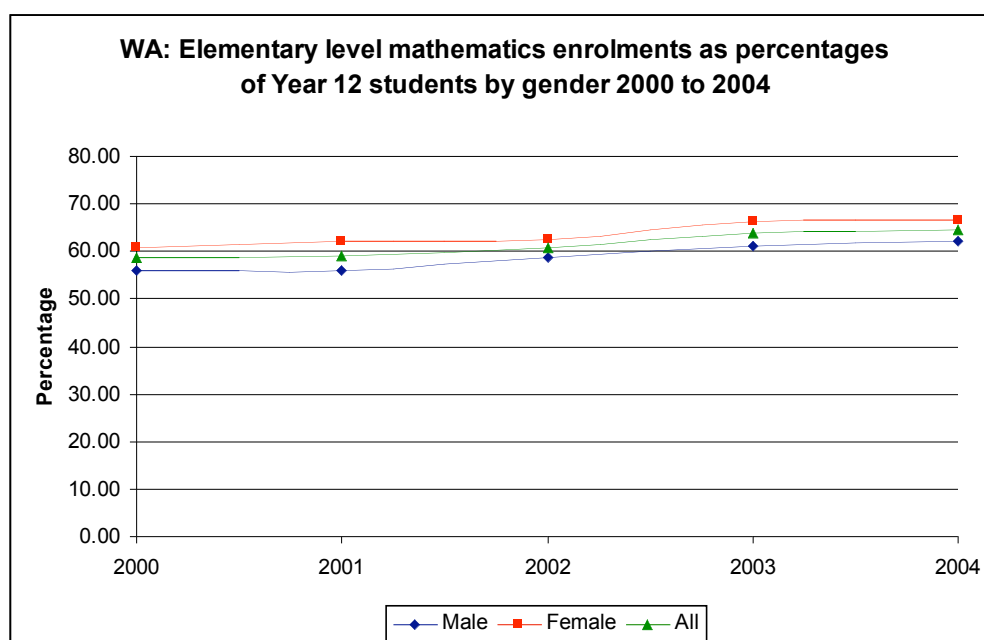
Figure 2.25. WA: Year 12 Elementary level mathematics enrolments as percentages of Year 12 students by gender 2000 to 2004

In the next section of the report, state/territory comparisons for enrolments in Advanced, Intermediate, and Elementary mathematics for the years 2000-2004 are reported. Patterns of participation with respect to enrolment numbers and in terms of enrolments expressed as percentages are considered. Gender differences in these patterns are also presented.

A summary of the key findings from this section of the report is presented in Section 4.

Section 3

State/territory comparisons for Year 12 mathematics enrolments

There are two parts to this section of the report.

In Part 1, state/territory enrolment data for the years 2000-2004 are compared. Comparisons were made for enrolments expressed as percentages of state/territory Year 12 cohort sizes in each of the three Barrington and Brown (2005) categories of Year 12 mathematics subjects – Advanced, Intermediate and Elementary – as well as for total Year 12 mathematics enrolments. Gender analyses were also undertaken.

In Part 2, an historical overview of data available by state/territory for enrolments in Type 3 (Dekkers et al., 2005), high (Dekkers et al., 2000b), and Advanced (Barrington & Brown, 2005) level mathematics subjects is presented. The findings were limited by the availability of data.

Part 1

State/territory comparisons of Year 12 mathematics enrolments expressed as percentages of Year 12 cohort sizes

Total Year 12 mathematics enrolments: 2000-2004

Total Year 12 mathematics enrolments for each state/territory expressed as percentages of Year 12 cohort sizes for each year from 2000-2004 are shown in Figure 3.1.
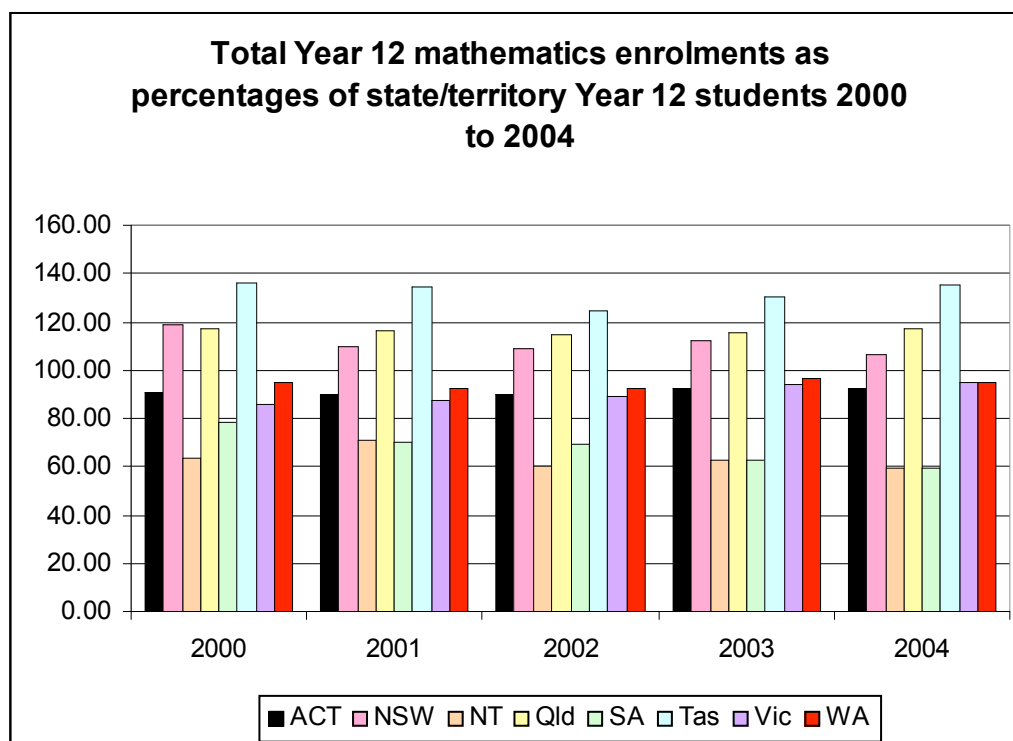
Figure 3.1. Total Year 12 mathematics enrolments as percentages of Year 12 students by state/territory 2000 to 2004

> NB. Percentages greater than 100% indicate that many students were enrolled in more than one mathematics subject. For example, enrolment in two or more Elementary level subjects is common practice in some States/Territories.

As can be seen in Figure 3.1, there were several states - NSW, Queensland, and Tasmania – in which the percentage of total mathematics enrolments with respect to Year 12 cohorts was greater than 100%. This indicates that many students were enrolled simultaneously in more than one mathematics course, either within the same mathematics subject level (e.g., Tasmania: Elementary level subjects) or in different mathematics levels (e.g, Victoria: Advanced and Intermediate level subjects). It should be noted that this may also have been true in states/territories in which percentages were less than 100%.

The data in Figure 3.1 indicate that for total Year 12 mathematics enrolments from 2000-2004:

- There was great variation in the percentages of enrolments with respect to Year 12 cohorts among the various states/territories (e.g., Tasmania: mean of 132.2% over the five year period, compared to the ACT with a mean of 91.2%)

- Tasmania had the highest total percentages of enrolments with respect to Year 12 cohorts. While the percentages remained approximately the same at the beginning and end of the five year period (136.4% in 2000 and 135.4% in 2004) there were slight variations in the intervening years (e.g., 124.4% in 2002)

- NT had the lowest percentages of enrolments with respect to Year 12 cohorts (mean of 63.3%). A slight decrease was evident over the five year period from 63.6% in 2000 to 59.8% in 2004, although the percentages fluctuated in the intervening years

- SA showed a dramatic and steady decrease in the percentages of enrolments with respect to Year 12 cohorts over the five year period, from 79.0% in 2000 to 63.7% in 2004 (mean of 67.9%)

- NSW also showed a large and steady decrease in the percentages of enrolments with respect to Year 12 cohorts over the five year period, from 119.1% in 2000 to 106.1% in 2004 (mean: 111.2%)

- Victoria was the only state which showed a clear and steady increase in the percentages of enrolments with respect to Year 12 cohorts over the five year period, from 86.1% in 2000 to 94.9% in 2004 (mean of 90.43%)

- In WA, the ACT, and Qld, the percentages of total mathematics enrolments with respect to Year 12 cohorts remained fairly stable over the five year period: WA – mean of 94.1%, ACT – mean of 91.2%, and Qld – mean of 115.9%

Advanced level mathematics enrolments: 2000-2004

Data for Advanced level Year 12 mathematics enrolments, expressed as percentages of Year 12 student numbers, are shown for each state/territory for the period 2000-2004 in Figure 3.2.

Figure 3.2 is useful for noting changes in Advanced level enrolments within each state over the period 2000-2004, but not for direct comparisons of participation rates between the States/Territories. In NSW, for example, many students enrol in two Advanced level mathematics subjects.

The data in Figure 3.2 indicate that for Advanced level mathematics from 2000-2004:

- there was great variation in the percentages of enrolments with respect to Year 12 cohorts in each state/territory. The patterns were fairly consistent for each state/territory over the five year period, 2000-2004

- New South Wales [NSW] had the highest percentages of enrolments with respect to Year 12 cohorts and there was a slight increase in the percentages from 20.6% in 2000 to about 22.5% in 2004. The mean over the five year period was 21.3%

- The NT had the lowest percentages of enrolments with respect to Year 12 cohorts with percentages varying between 3.0% and 5.0%; mean was 3.9%

- Tasmania also had fairly low percentages of enrolments with respect to Year 12 cohorts. There was, however a steady increase over the five-year period from about 3.2% in 2000 to 5.5% in 2004; mean was 4.6%

- South Australia [SA] showed a steady decrease in the percentages of enrolments with respect to Year 12 cohorts over the five year period from around 12.0% in 2000 to 9.1% in 2004; mean was 10.0%

- Western Australia [WA] also showed a decrease in the percentages of enrolments with respect to Year 12 cohorts over the five year period from 10.2% in 2000 to 8.2% in 2004; mean was 9.1%

- In Victoria, the ACT, and Queensland, the percentages of enrolments with respect to Year 12 cohorts were fairly consistent: Victoria – mean over the five year period of 12.6%; ACT – mean of 11.2%; and Queensland – mean of 8.0%
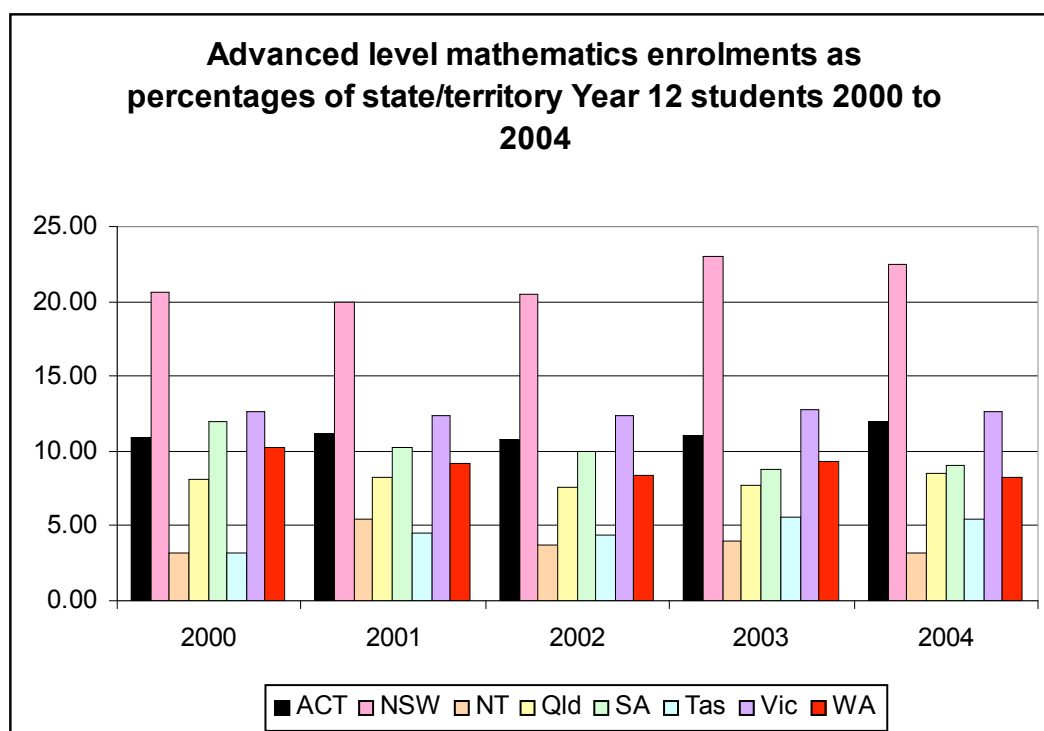
Figure 3.2. Advanced level mathematics enrolments as percentages of state/territory Year 12 students 2000 to 2004

Intermediate level mathematics enrolments: 2000-2004

Data for Intermediate level Year 12 mathematics enrolments, expressed as percentages of Year 12 student numbers, are shown for each state/territory for the period 2000-2004 in Figure 3.3.

Figure 3.3 is useful for noting changes in Intermediate level enrolments within each state over the period 2000-2004, but not for direct comparisons of participation rates between the States/Territories.
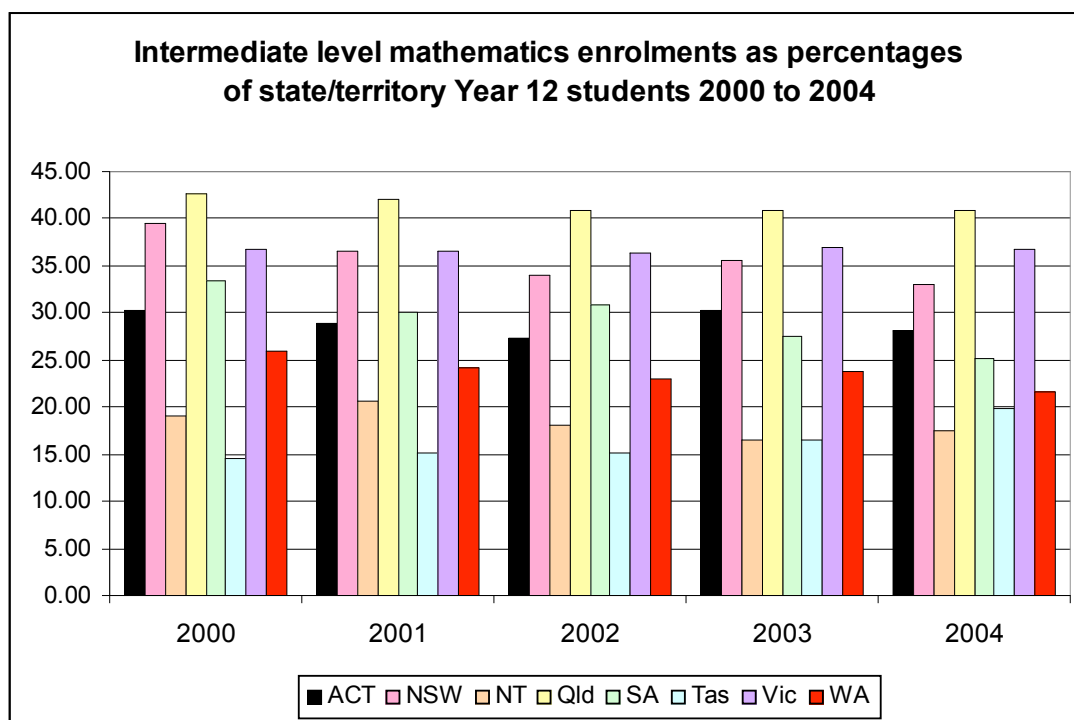
Figure 3.3. Intermediate level mathematics enrolments as percentages of state/territory Year 12 students 2000 to 2004

The data in Figure 3.3 indicate that for Intermediate level mathematics from 2000-2004:

- Queensland had the highest percentages of enrolments with respect to Year 12 cohorts – mean of 41.5% over the five year period – with a fairly consistent pattern for the period 2000-2004

- Tasmania had the lowest percentages of enrolments with respect to Year 12 cohorts. Tasmania was the only state showing in increase in the percentages of enrolments with respect to Year 12 cohorts over the five year period – from 14.5% in 2000 to 19.8% in 2004. The mean over the five year period was 16.2%

- The NT also had low percentages of enrolments with respect to Year 12 student numbers and there was a decrease in the percentages from 19.1% in 2000 to 17.5% in 2004. The mean was 18.4%

- In Victoria, the percentages of enrolments with respect to Year 12 cohorts were fairly consistent over the five year period – mean of 36.7%

- In the ACT, NSW, SA, and WA there were decreases in the percentages of enrolments with respect to Year 12 cohorts for 2000-2004. The most dramatic decrease was in SA from 33.5% in 2000 to 25.1% in 2004. The decreases from 2000 to 2004 for the others were: ACT – 30.3% to 26.7%; NSW – 39.6% to 33.0%; WA – 26.0% to 21.6%. For each of these states the mean percentages over the five year period were: ACT – 29.0%, NSW – 35.7%, SA – 29.4%, and WA – 23.7%

Elementary level mathematics enrolments: 2000-2004

Data for Elementary level Year 12 mathematics enrolments, expressed as percentages of Year 12 cohort sizes, are shown for each state/territory for 2000-2004 in Figure 3.4.

Figure 3.4 is useful for noting changes in Elementary level enrolments within each state over the period 2000-2004, but not for direct comparisons of participation rates between

the States/Territories. In Tasmania, for example, many short duration Elementary level mathematics subjects are offered.
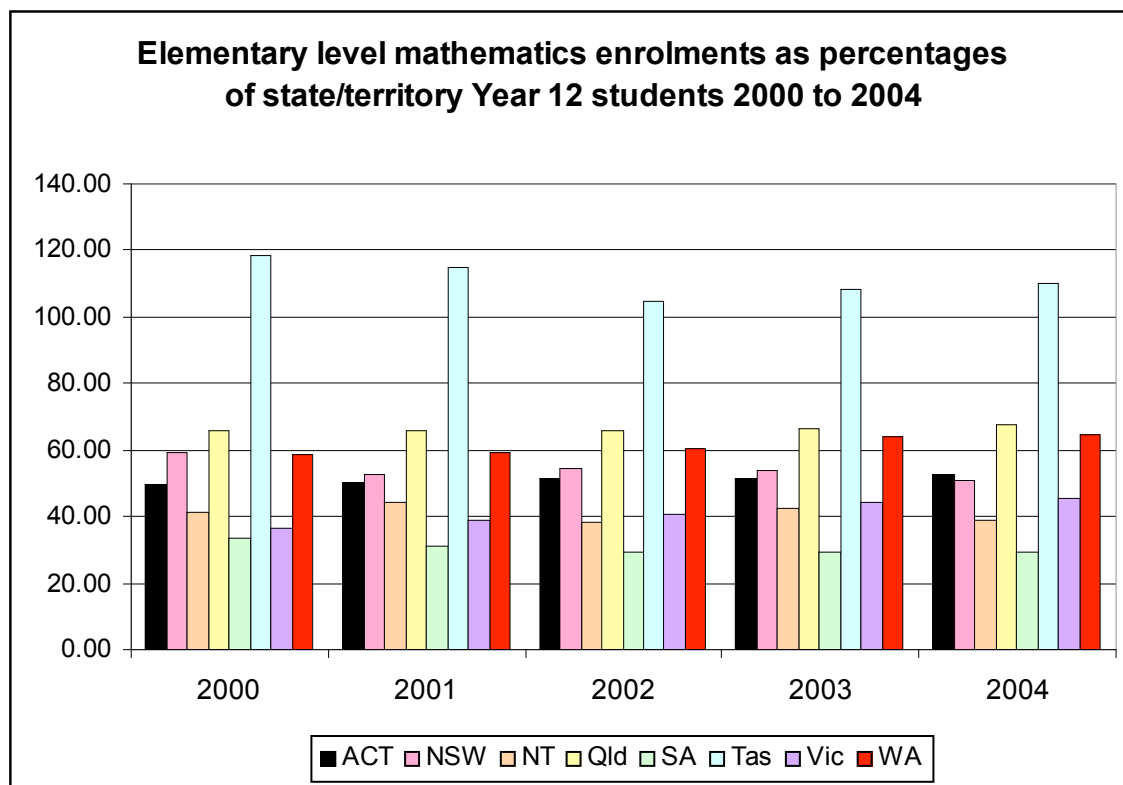
Figure 3.4.   Elementary level mathematics enrolments as percentages of state/territory Year 12 students 2000 to 2004
    NB.   Percentages greater than 100% indicate that many students were enrolled in more than one Elementary level mathematics subject.

The data in Figure 3.4 indicate that for Elementary level mathematics from 2000-2004:

▪   In each year in Tasmania many students were enrolled in more than one Elementary level subject (percentages of enrolments with respect to Year 12 cohorts >100%). There was a decrease in the percentages of enrolments with respect to Year 12 cohorts from 118.7% in 2000 to 110.1% in 2004. The mean over the five year period was 111.3%

▪   SA had the lowest percentages of enrolments with respect to Year 12 cohorts, with a decrease from 33.6% in 2000 to 29.6% in 2004. Mean was 30.5%.

▪   NSW and the NT also had decreases in the percentages of enrolments with respect to Year 12 cohorts over the five year period: NSW from 59.0% in 2000 to 50.7% in 2004; and NT from 41.3% in 2000 to 39.1% in 2004. The means for the two states were: NSW – 54.1%, and NT – 41.1%

▪   For the ACT the percentages of enrolments with respect to Year 12 cohorts over the five year period were fairly constant – mean of 51.0%

▪   Victoria and WA had increases in the percentages of enrolments with respect to Year 12 cohorts for 2000-2004: Victoria from 36.6% in 2000 to 45.5% in 2004; and WA from 58.6% in 2000 to 64.4% in 2004. The means for these two states were: Victoria – 41.2%, and WA – 61.4%

Part 2

Pre-1990 – 2004: Advanced level mathematics

In this part of the report, the focus is on tracking enrolments over time in the most demanding mathematics courses offered. The data needed to cover the full scope of the years 1970 to 2004 were incomplete, however. Using only available published data, mainly from the earlier work of Dekkers and his colleagues, and/or easily located data, a limited portrait of the trends in enrolments in the highest level of mathematics offered at the Year 12 level across Australia for that entire time period is presented.

Year 12 enrolments in "Type 3" mathematics subjects (pre-1990 categorisation), "high" level mathematics subjects (1990-1999 categorisation), and "Advanced" level mathematics subjects (2000-2004 categorisation) are the focus of the analyses presented in this section of the report. Hereafter, for convenience, the three categorisations are combined and the term "advanced" is used.

Advanced level mathematics enrolments

Mathematics enrolment data, by state/territory, for "Type 3" mathematics courses for the period 1970 – 1985 were provided by Dekkers et al. (1986, p.43) and are reproduced in Table 3.1. As can be seen on Table 3.1, the data for all states/territories are incomplete. It is also important to note that during that period there were several states/territories in which more than one subject offered was considered to by Type 3 e.g., Victoria – two subjects: "Pure" and "Applied".

Advanced level mathematics enrolments expressed as percentages of Year 12 student numbers for the period 1970 to 2004 (in 5-year intervals) are illustrated in Figure 3.5. It should be noted that advanced level mathematics enrolment data were unavailable for the years 1986 to 1989. Any changes that occurred between 1985 and 1990 can only be inferred from the graph in Figure 3.5.

The data in Figure 3.5 indicate an overall decline in the number of enrolments in advanced level mathematics when considered in relation to Year 12 cohort sizes over the period 1970 to 2004. It is difficult to conclude whether there was any real change in the number of students studying advanced level mathematics. It is impossible to untangle the relationship between enrolment numbers and student numbers because there were some states/territories in which one or more mathematics subject were categorised as "Type 3" by Dekkers et al. (1986) for the period 1970-1985 and as "high" by Dekkers et al. (2000b) for the period 1990-1999. Data were also missing for the period 1986-1989.

Besides the differences in the criteria adopted for categorising mathematics subjects as "advanced", there are several factors that may partially explain why the numbers of student enrolments in advanced level mathematics changed over the period 1970-2004:

- Curriculum changes over the period leading to variations in the choices of mathematics options at the Year 12 level

- Changes in tertiary level pre-requisites from mandated to recommended completion of advanced level mathematics at the Year 12 level

- Increases in the numbers of students enrolled in Year 12 studies and the composition of the changing cohorts

The exploration of the extent or impact of these factors was beyond the scope of this report.

Table 3.1. Enrolment statistics for mathematics in Australia 1970 – 1985

Year	Queensland			New South Wales				ACT**			Victoria			Tasmania			South Australia			Western Australia				Year
	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3		Type I	Type 2	Type 3	Type 1/2	Type 3		Type I	Type 2	Type 3	Type 1/2	Type 3		Type I	Type 2	Type 3		
	Social	I	II	2UA	2U	3U	4U	Ma 3	Ma 2	Ma 1	General*	Pure	Applied	Maths	Alg + Ge	An + St	IS	1	2	IV	I	II	III	Year
1970	357	6425	3723	-	-	-	-	-	-	-	3903	5215	4950	-	-	-	1062	3657	3636	-	2458	2374	2167	1970
1971	267	6659	3643	-	-	-	-	-	-	-	4288	5151	4863	-	-	-	1536	3413	3407	-	2839	2252	2159	1971
1972	305	7138	4046	-	-	-	-	-	-	-	4578	4989	4581	-	-	-	2107	3184	3169	-	3465	2276	2208	1972
1973	306	7554	3588	-	-	-	-	-	-	-	5366	4761	4390	-	-	-	2571	2749	2730	-	3866	2212	2154	1973
1974	325	7711	3466	-	-	-	-	-	-	-	5777	4497	4138	230	-	6	2749	2277	2266	599	3686	2124	2081	1974
1975	416	7462	3205	-	-	-	-	-	-	-	6338	4380	4029	648	78	137	2829	2080	2076	1283	3795	1831	1820	1975
1976	917	8186	3158	7927	13604	6187	1059	-	-	-	6629	4233	3851	744	115	174	2959	1997	1990	1622	3943	1797	1788	1976
1977	2533	7926	3235	8513	14356	5314	571	-	-	-	6733	4205	3851	933	95	161	2886	2011	2004	1724	3849	1829	1819	1977
1978	3287	8326	3423	8824	15177	5199	584	-	-	-	7366	4096	3774	976	76	184	2653	2152	2145	1524	4072	1737	1730	1978
1979	4101	8403	3425	8237	14889	5658	702	-	-	-	7517	4053	3717	1040	61	141	2677	2257	2256	1606	4135	1758	1755	1979
1980	4760	8533	3587	7092	13882	5695	783	-	-	-	7542	4041	3729	1005	63	166	2707	2329	2323	1741	4346	1713	1704	1980
1981	5243	8177	3480	6866	13578	5425	891	-	-	-	7552	4239	3820	1071	101	164	2369	2434	2425	1859	4377	1701	1685	1981
1982	5944	8734	3675	6709	13851	5130	1000	525	706	1081	7168	4680	4083	1051	87	173	2560	2576	2572	1878	4173	1773	1772	1982
1983	7053†	9449	4008	7836	14620	5766	1262	552	927	1224	7380	4970	4357	1135	68	237	2932	2631	2632	2214	4701	1940	1936	1983
1984	8653†	10669	4303	9474	15011	6435	1357	632	954	1360	8246	5206	4501	1152	77	206	2972	2520	2520	2629	5107	2010	2011	1984
1985	9656	1132	4597	1005	1453	668	164	626	1005	1358	8911	491	4269	1164	98	166	3014	242	241	2838	5763	206	205	1985

5	†	4	7	8	2	2	8	5	5	1	8	5

Key

*	Include Computing Option enrolment from 1976	Type 1:	Terminal Units—no expectation of further mathematics
**	No breakdown by course type available prior to 1982	Type 2:	Some non-specialised mathematics expected
†	Includes students enrolled in Mathematics in Society	Type 3:	Further specialised mathematics expected

(Source: Dekkers, De Laeter, & Malone, 1986, p.43)
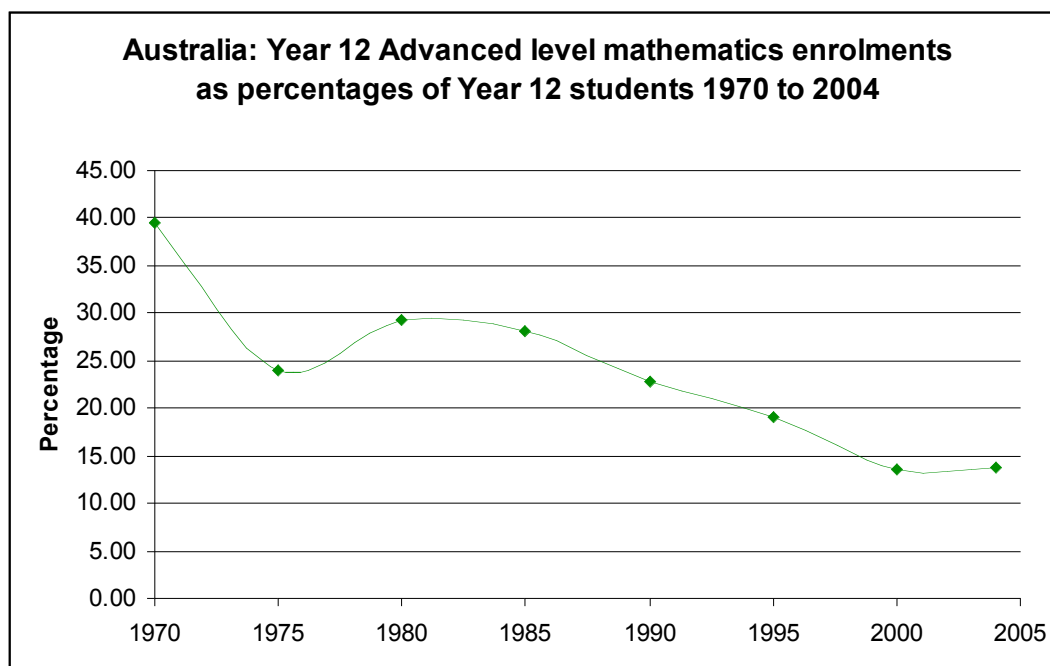
Figure 3.5. Australia: Year 12 advanced level mathematics enrolments as percentages of Year 12 students 1970 to 2004

Year 12 advanced level mathematics enrolments as percentages of Year 12 student numbers for four states: 1970 - 1985

As shown in Table 3.1, data on mathematics enrolments in advanced level mathematics subjects were available for the entire period 1970 – 1985 for only four states: Queensland, South Australia, Victoria, and Western Australia. Year 12 cohort sizes were also available for the four states for same period and are shown in Table 3.2. Please note that no data were available by gender.

Table 3.2. Year 12 student numbers for Qld, SA, Vic, and WA: 1970 - 1985

Year	Queensland	South Australia	Victoria	Western Australia
1970	9407	5972	18915	4680
1971	9883	6836	19221	4866
1972	10770	7468	20367	5648
1973	10973	7730	21416	6121
1974	11368	7758	21465	6581
1975	11586	8670	22930	6870
1976	12920	9093	23580	7380
1977	13871	9066	22884	7416
1978	14818	9124	23046	7543
1979	14995	9356	22528	7631
1980	15251	9535	22580	7700
1981	15016	9308	22573	7843
1982	15996	9580	23050	8184
1983	17810	10653	25395	8970
1984	20865	11087	28971	10090
1985	22668	11711	30706	11059

Source: Derived from Dekkers, De Laeter, and Malone, 1986

The data in Table 3.2 indicate that:

- Year 12 student numbers increased fairly steadily in each of the four states.

- The greatest percentage increase in enrolments was for Queensland: from 9407 in 1970 to 22,668 in 1985 (141.0% increase), followed by WA: from 4680 in 1970 to 11,059 in 1985 (136.3% increase). Next was SA: from 5972 in 1970 to 11,711 in 1985 (96.1% increase), and Victoria had the least percentage increase in enrolments: from 18,195 in 1970 to 30,706 in 1985 (68.8% increase)

Unfortunately, Year 12 enrolments in advanced level mathematics subjects were unavailable for the period 1986 – 1989. Hence the analyses of pre-1990 advanced level mathematics enrolments as percentages of Year 12 student numbers are restricted to the years 1970 to 1985 and to only four states: Qld, SA, Victoria, and WA.

For the period 1970 – 1985, the Dekkers et al. (1986) "Type 3" classification of Year 12 mathematics subjects (see Table 3.1) indicated that:

- Victorian Type 3 subjects comprised two co-requisite subjects

- South Australian Type 3 subjects comprised two units usually studied concurrently

- Western Australia Type 3 course comprised two units usually studied concurrently

- Queensland had only one Type 3 mathematics subject

Enrolments as percentages of Year 12 student numbers in Qld, SA, Victoria, and WA are shown in Figure 3.6 for the period 1970 – 1985.

The data in Figure 3.6 indicate that for the period 1970 – 1985:

- There was a decrease in enrolments when expressed as percentages of Year 12 student numbers in all four states

- The biggest decreases occurred in SA and WA, with similar patterns of decline:

  ➢ SA: large steady decrease from 122.1% of Year 12 students in 1970 to 44.3% in 1977, followed by several years in which the enrolments remained fairly stable with a very small decrease to 41.3% in 1985
  ➢ WA: large steady decrease from 97.0% in 1970 to 46.0% in 1978, followed by several years in which the enrolments remained fairly stable with a very small decrease to 37.3% in 1985

- Victoria and Qld showed similar patterns of slow, but steady decreases in Type 3 mathematics enrolments as percentages of Year 12 student numbers:

  ➢ Victoria: steady decrease from 53.7% in 1970 to 29.9% in 1985
  ➢ Qld: steady decrease from 39.6% in 1970 to 20.3% in 1985

- On average, SA had the highest enrolments as percentages of Year 12 cohort sizes – mean percentage over the 16 year period was 59.9% – although between 1973 and 1978 the percentages in SA were slightly lower than in WA. WA had the second highest mean of enrolments as percentages of Year 12 cohort sizes (mean of 56.2%), with Victoria third highest (mean of 38.7%). Qld had the lowest enrolments as percentages of Year 12 cohort sizes (mean over the 16 year period was 27.0%)
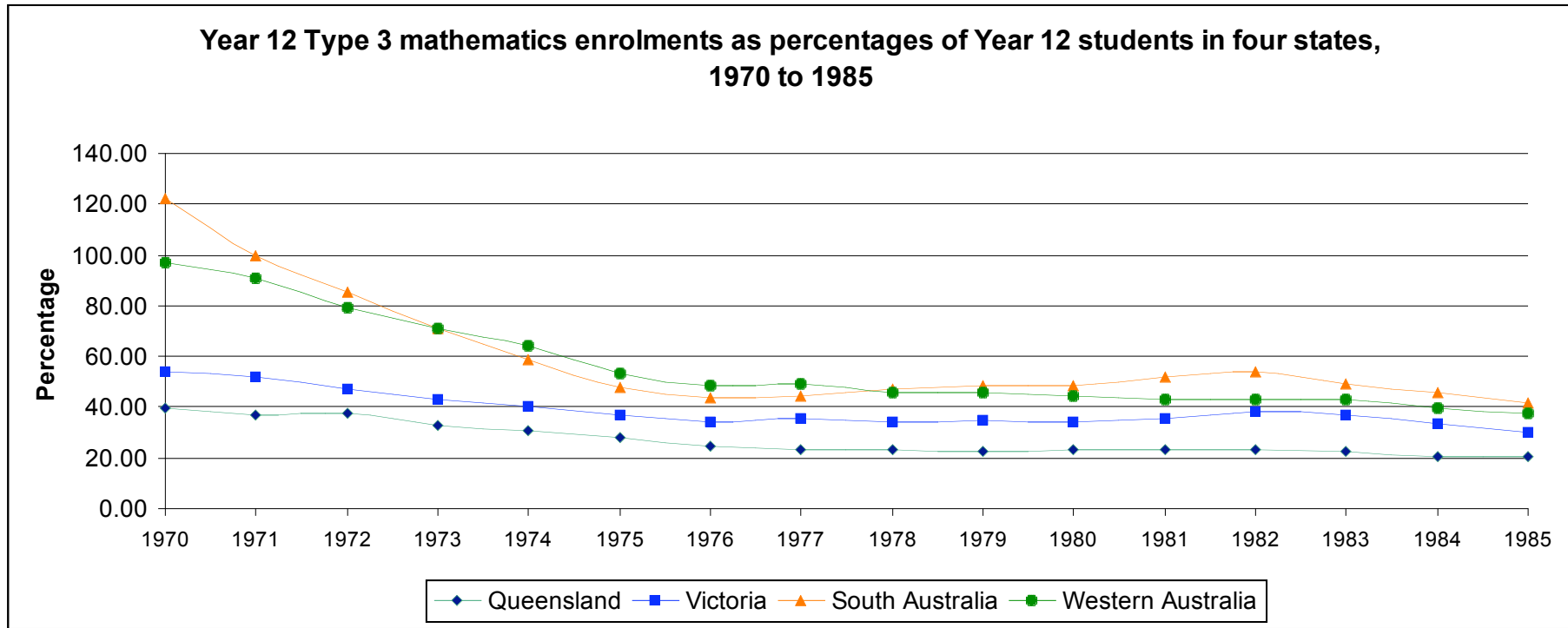
Figure 3.6. Year 12 Type 3 level mathematics enrolments as percentages of Year 12 students for four states: 1970 - 1985

NB: Percentages in excess of 100% indicate that many students were enrolled in more than one subject.

Advanced level mathematics enrolments in four states and for Australia 1985-1989

Unfortunately, Year 12 enrolments in "advanced" level mathematics were not available for the four states for the period 1985 to 1989. Hence the enrolments as percentages of Year 12 cohort sizes could not be calculated and thus there is no information provided here on the patterns of enrolments in "advanced" level mathematics for those states during that period.

Neither Year 12 student cohort sizes for Australia nor Year 12 enrolments in advanced level mathematics subjects were available for the period 1986 – 1989. Thus no patterns of enrolments as percentages of Australian Year 12 student numbers could be examined for the period 1986 – 1989.

Australia: Advanced level mathematics enrolments 1990-2004

In Section 1 of this report, the data for Advanced level mathematics enrolments as percentages of Year 12 student numbers for the two periods: 1990 – 1999 (Dekkers et. al., 2000b "high" category) and 2000 – 2004 (Barrington & Brown, 2005 "Advanced" category) were presented and discussed. The data were shown in Figure 1.7 and indicated that:

- In each year from 1990 to 2004 there was a higher percentage of male than female enrolments as percentages of their respective Year 12 student numbers

- There was an overall decrease in the percentage of all Year 12 students taking "high" level mathematics subjects over the period 1990 to 1999 from 22.9% to 16.9%. Both male and female enrolments as percentages of their respective Year 12 student numbers also decreased, with the decrease greater for male enrolments (from 28.8% to 22.0%) than for female enrolments (from 17.6% to 12.4%)

- From 2000 – 2004, there was a fairly stable percentage of all Year 12 students taking "Advanced" level mathematics with a very slight increase from 13.5% in 2000 to 13.8% in 2004. Both male and female enrolments as percentages of their respective Year 12 student numbers also increased, with the increase greater for female enrolments (from 9.4% to 10.7%) than for male enrolments (from 18.1% to 18.6%)

A summary of the key findings from this section of the report is presented in Section 4.

Section 4

Key Findings

The key findings from Sections 1, 2 and 3 of this report are found here.

Section 1: Key findings

Year 12 mathematics enrolments

For the periods 1990-1999 and 2000-20004, a summary of the percentage increases and decreases in enrolments for total Year 12 mathematics, high/Advanced, intermediate/Intermediate, and low/Elementary mathematics subject levels was presented in Table 1.2 and is reproduced here. Overviews of the main findings from data in the table are summarised below.

Table 1.2 . Percentage changes in Australian mathematics enrolments for the periods
1990-1999 and 2000-2004 for the three levels of mathematics and by gender

1990-1999	Total mathematics	High	Intermediate	Low
All	+18.8%	-20.2%	-1.8%	+73.7%
Male	+16.9%	-17.2%	-9.0%	+91.8%
Female	+20.8%	-24.6%	+6.3%	+60.1%
2000-2004	**Total mathematics**	**Advanced**	**Intermediate**	**Elementary**
All	+0.9%	+7.1%	-5.2%	+3.5%
Male	+3.5%	+5.1%	-2.1%	+7.3%
Female	-1.7%	+10.6%	-8.7%	+0.3%

1990-1999

- There were large percentage increases for total mathematics enrolment numbers, mainly due to big increases in low level mathematics enrolments

- High level mathematics enrolment numbers decreased, more so for females than males

- Intermediate level mathematics enrolment numbers decreased slightly. While female enrolments increased, male enrolment numbers decreased.

- Low level mathematics enrolment numbers increased greatly, more so for males than females.

2000-2004

- There was a very small overall increase in total mathematics enrolment numbers. While male enrolments increased, female enrolments decreased.

- Advanced level enrolment numbers increased, more so for females than males

- Intermediate level enrolment numbers decreased, more so for females than males

- Elementary level enrolment number increased, more so for males than females

Due to the limited data available, findings for the period 1980-1999 were limited to total mathematics enrolments only.

1980-1989

- Very large percentage increase of 88.8% for total mathematics enrolment numbers. The increase was larger for female enrolments (104.1%) than male enrolments (76.5%)

A major contributor to the very large increases in total enrolment numbers for the periods 1980-1989 and 1990-1999 is likely to be the increase in Year 12 retention rates during that period, peaking in 1992 (see Collins, Kenway, & McLeod, 2000).

Male to female [M:F] ratios in mathematics enrolments: 2000-2004

For total Australian Year 12 mathematics enrolments in the period 2000-2004 there were almost equal male and female enrolments. The mean M:F ratio for the five year period was 1.06.

For total Australian enrolments in Advanced, Intermediate, and Elementary level mathematics courses the following patterns were found:

- Advanced level mathematics: more male than female enrolments; mean M:F over the five year period: 1.64. No variation among states/territories

- Intermediate level mathematics: more male than female enrolments; mean M:F over the five year period: 1.15. Only in the ACT was the pattern different with M:F of .85

- Elementary level mathematics: more female than male enrolments; mean M:F over the five year period: .90. Only in Tasmania was the pattern different with M: F of 1.14

When the gender patterns for 2000-2004 were compared with those from 1982-1985, there was evidence that very little had changed since that time, with the same patterns across Australia of male/female enrolment differences in the three levels of mathematics subjects.

Mathematics enrolments expressed as percentages of Year 12 cohort sizes

A summary of the key findings for total Australian Year 12 mathematics enrolments, and for Australian mathematics enrolments in Advanced, Intermediate, and Elementary level mathematics courses expressed as percentages of relevant Year 12 cohort sizes is presented below. In Table 4.1 is a summary of the direction of the percentage changes with more detail provided below

Table 4.1. Summary of increases/decreases in enrolments expressed as percentages of relevant Year 12 cohort sizes

1990-1999	Total mathematics	High	Intermediate	Low
All	Increase	decrease	decrease	Increase
Male	Increase	decrease	decrease	Increase
Female	Increase	decrease	Small decrease	Increase
2000-2004	**Total mathematics**	**Advanced**	**Intermediate**	**Elementary**
All	decrease	Small increase	decrease	Steady
Male	decrease	Steady	decrease	Steady
Female	decrease	Small increase	decrease	Steady

1990-1999

- Total Australian mathematics enrolments: increased from 91.8% to 101.3%. Male enrolments: increased from 100.6% to 108.5% ; female enrolments: increased from 84.1% to 94.8%. [It should be noted that the biggest increases were from 1990-1991]

- High level mathematics enrolments: decreased from 22.9% to 16.9%. Male enrolments: decreased from 28.8% to 22.0%; female enrolments decreased from 17.6% to 12.4%

- Intermediate level mathematics enrolments: decreased from 38.3% to 35.0%. Male enrolments decreased from 43.6% to 36.6%; female enrolments showed some variation over the years, with overall minimal decrease from 33.8% to 33.5%

- Low level mathematics enrolments: total, male, and female enrolments increased from about 30% to about 49%

2000-2004

- Total Australian mathematics enrolments: Decreased from 104.5% to 101.4% (mean for the five year period was 102.0%). Male enrolments: decreased from 112.6% 2000 to 110.4%; female enrolments: decreased from 97.3% to 93.2%.

- Advanced level mathematics enrolments: varied slightly from year to year with an overall small increase from 13.5% to 13.9%. Male enrolments: varied from year to year, but were steady overall at about 18%; female enrolments: increased slightly from 9.4% to 10.1%

- Intermediate level mathematics enrolments: decreased from 36.7% to 33.4%. Male enrolments: decreased from 41.2% to 38.2%; female enrolments decreased from 32.7% to 29.1%

- Elementary level mathematics enrolments: total, male, and female enrolments remained fairly stable at around 54% for the entire period

As can seen from the data, it could be inferred that a very large proportion of Australian Year 12 students took at least one mathematics subject as part of their Year 12 studies in the years 2000-2004 – percentages for total mathematics enrolments were close to or over 100%. Since enrolments do not equate to student numbers, it is not possible to say exactly what proportion of the Year 12 cohort this might be.

Comparing trends evident in mathematics enrolment data and when enrolments were expressed as percentages of Year 12 cohort sizes

When the two summary tables, Tables 1.2 and 4.1 are compared, superficially there appear to be inconsistencies. For example, there was a small overall increase in total Australian Year 12 enrolments of 0.9% over the five year period 2000-2004. Yet, when these same enrolments were expressed as percentages of their relevant Year 12 cohort sizes, a small decrease from 104.5% in 2000 to 101.3% in 2004 was evident. The apparent discrepancy is due the different bases for making the comparisons. Raw enrolment numbers, it was argued earlier, can give misleading information since they do not take into account the relative sizes of the cohorts involved .

It is argued here that the evidence provided by enrolment numbers expressed as percentages of Year 12 cohort sizes provides a more accurate picture of what has happened to Year 12 mathematics enrolments over time.

Summary of trends for 2000-2004

For the period 2000-2004, the following trends in enrolments with respect to the relevant Year 12 cohort sizes were found:

- Decrease in enrolments in Year 12 mathematics subjects overall

- Very small increase in Advanced level mathematics enrolments, but not necessarily in the national Advanced level mathematics participation rate

- Large decrease in Intermediate level mathematics enrolments

- No change in Elementary level mathematics enrolments

Section 2: Key findings

State/Territory mathematics enrolments by gender

The data in Table 4.2 summarise the pattern of changes in Year 12 mathematics enrolment numbers for each state/territory, by gender, for the period 2000-2004. Percentage increases and decreases for total mathematics enrolments, and for enrolments in Advanced, Intermediate, and Elementary level mathematics courses are shown.

Table 4.2. Percentage changes in Australian mathematics enrolments for the periods 1990-1999 and 2000-2004 for the three levels of mathematics and by gender

2000-2004	Advanced	Intermediate	Elementary
ACT			
All	+ 3.2%	-12.6%	Steady
Male	- 3.1%	-2.7%	+1.6%
Female	+13.2	-20.6%	-1.8%
NSW			
All	+15.2%	-12.2%	-9.4%
Male	+14.0%	-8.2%	+1.1%
Female	+16.8%	-16.3%	-17.5%
NT (very small numbers – percentages not calculated)			
All	+	+	+
Male	+	+	+
Female	-	-	Steady
Queensland			
All	+5.8%	-2.1%	+4.2%
Male	+6.0%	+0.3%	+3.5%
Female	+5.7%	-4.8%	+4.9%
SA			
All	-27.3%	-22.9%	-22.4%
Male	-19.1%	-17.1%	-6.7%
Female	-27.6%	-30.1%	-12.2%
Tasmania			
All	+45.2%	+14.1%	-22.2%
Male	+41.7%	+27.4%	-22.4%
Female	+53.1%	-0.9%	-22.0%
Victoria			
All	+6.7%	+7.5%	+33.7%
Male	+1.4%	+7.6%	+34.0%
Female	+16.0%	+7.4%	+33.4%
WA			
All	-16.8%	-14.0%	+13.8%
Male	-15.2%	-10.0%	+16.1%
Female	-20.7%	-19.2%	+12.0%

Table 4.2 reveals clearly that there is no consistent pattern for the various states/territories.

▪ Victoria was the only state with an increase in enrolments in all three course levels – Advanced, Intermediate, and Elementary – for both males and females.

▪ SA was the only state with a decrease in enrolments in all three course levels for both males and females.

▪ There were increases in total enrolments in Advanced level mathematics in all states/territories except SA and WA. Largest percentage increase in Advanced level enrolments was in Tasmania (45.2%); largest percentage decrease was in SA (27.3).

▪ There were increases in total enrolments in Intermediate level mathematics in only three states/territories: Victoria, Tasmania and the NT. Largest percentage increase in Intermediate level enrolments was in Tasmania (14.1%); largest percentage decrease was in SA (22.9%).

▪ There were increases in total enrolments in Elementary level mathematics in four states/territories: Victoria, WA, Queensland and NT. Largest percentage increase in elementary level enrolments was in Victoria (33.7); largest percentage decrease was in SA (22.4%)

State/Territory mathematics enrolments expressed as percentages of Year 12 cohorts by gender

The data in Table 4.3 summarise the pattern of changes in Year 12 mathematics enrolments expressed as percentages of relevant Year 12 cohort sizes for each state/territory, by gender, for the period 2000-2004. Increases and decreases for total mathematics enrolments, and for enrolments in Advanced, Intermediate, and Elementary level mathematics courses are shown.

The data in Table 4.3 reveal again that there is no consistent pattern for the states/territories of Australia with respect to Year 12 mathematics enrolments expressed as percentages of relevant Year 12 cohort sizes.

Summary

As was argued for total Australian enrolments in Section 1 of the report, comparing raw enrolment data can be misleading because the differences in Year 12 cohort sizes are not considered. The data in Table 4.4 give a more representative picture of what has happened in mathematics enrolments in each state/territory:

ACT Enrolments generally steady in all three levels of Year 12 mathematics subjects. Small change in female enrolment patters with small increase in Advanced level subjects and a small decrease in Intermediate level subjects

NSW Small increases in enrolments in Advanced level mathematics subjects and decreases in Intermediate and Elementary level subjects

NT Fairly steady overall enrolments in the three levels of Year 12 mathematics subjects. Female enrolments have decreased while male enrolments have increased in Advanced and Intermediate level mathematics subjects

SA Decreasing mathematics enrolments in all three levels of mathematics subjects. The same decreased for both for male and female enrolments

Tasmania Increasing enrolments in Advanced and Intermediate level mathematics subjects and no change in Elementary enrolments. Same patterns for male and female enrolments

Victoria Enrolments in Advanced and Intermediate level mathematics subjects were steady; enrolments in Elementary level subjects have increased. Same patterns for male and female enrolments

WA   Decreased enrolments in Advanced and Intermediate level mathematics subjects and increased enrolments in Elementary level mathematics subjects. Same patterns for male and female enrolments.

Table 4.3. Summary of increases/decreases in enrolments expressed as percentages of relevant Year 12 cohort sizes

2000-2004	Advanced	Intermediate	Elementary
ACT			
All	Steady	Small decrease	Steady
Male	Steady	Small decrease	Steady
Female	Increase	Decrease	Steady
NSW			
All	Small increase	Decrease	Decrease
Male	Small increase	Decrease	Decrease
Female	Small increase	Decrease	Decrease
NT			
All	Steady	Steady	Small decrease
Male	Increase	Increase	Steady
Female	Decrease	Decrease	Decrease
Queensland			
All	Steady	Steady	Small increase
Male	Steady	Small increase	Steady
Female	Steady	Small decrease	Increase
SA			
All	Decrease	Decrease	Decrease
Male	Decrease	Decrease	Decrease
Female	Decrease	Decrease	Decrease
Tasmania			
All	Increase	Increase	Steady
Male	Increase	Increase	Steady
Female	Increase	Increase	Steady
Victoria			
All	Steady	Steady	Increase
Male	Steady	Steady	Increase
Female	Steady	Steady	Increase
WA			
All	Decrease	Decrease	Increase
Male	Decrease	Decrease	Increase
Female	Decrease	Decrease	Increase

Section 3: Key Findings

Part 1

Key findings from the comparisons of state/territory data on Year 12 mathematics enrolments expressed as percentages of Year 12 student cohorts for the period 2000-2004 are summarised below.

Total mathematics enrolments as percentages of Year 12 students

- Over the five year period, Tasmania had the highest mean percentage of total mathematics enrolments with respect to Year 12 student numbers (132.2%), followed by Queensland (115.9%); the NT had the lowest (63.3%) with SA next lowest (67.9%)

- Over the five year period, SA and NSW showed decreases in total mathematics enrolments as percentages of Year 12 students:

    ➢ SA – from 78.4% in 2000 to 59.1% in 2004; and
    ➢ NSW – from 119.1% in 2000 to 106.1% in 2004

- Victoria was the only state showing steady increase in total Year 12 mathematics enrolments as percentages of Year 12 students from 86.1% in 2000 to 94.9% in 2004

Advanced, Intermediate, and Elementary level mathematics subjects as percentages of Year 12 students

The mean percentages over the five year period 2000 to 2004 of enrolments with respect to Year 12 student numbers for each level of mathematics subjects for each state territory are presented in Table 4.4.

Table 4.4. Mean percentages of enrolments with respect to Year 12 cohort sizes by mathematics level and state/territory

	Advanced	Intermediate	Elementary	Total enrolments
ACT	11.2	29.0	51.0	91.2
NSW	21.3	35.7	54.1	111.2
NT	3.9	18.4	41.1	63.3
Queensland	8.0	41.5	66.4	115.9
SA	10.0	29.4	30.5	69.9
Tasmania	4.6	16.2	111.3	132.2
Victoria	12.6	36.7	41.2	90.4
WA	9.1	23.7	61.4	94.1

The data in Table 4.4 reveal the variations in total mathematics enrolments, and in enrolments in Advanced, Intermediate, and Elementary mathematics subjects as percentages of Year 12 student numbers across Australian states/territories. There is no consistent pattern evident among the various states/territories.

The reasons behind the variation in the enrolment patterns cannot be determined from the data presented here. Whether there is a relationship with tertiary entrance requirements in each state/territory is also unknown. The data raise a number of issues with respect to

comparisons in the mathematical backgrounds of students from the various states/territories. Which state pattern of participation provides students with their optimal future career opportunities is another unknown.

The data indicate that for Year 12 mathematics enrolments expressed as percentages of Year 12 cohort sizes:

- NSW had the highest percentage of enrolments in Advanced level mathematics subjects (mean over the period 2000-2004 was 21.3%), and the NT the lowest (mean: 3.9%)

- Queensland had the highest percentage of enrolments in Intermediate level mathematics subjects (mean: 41.5%), and Tasmania the lowest (mean: 16.4%)

- Tasmania had the highest percentage of enrolments in Elementary level mathematics (mean: 111.3%), and SA the lowest (mean: 28.5%)

- For overall Year 12 mathematics enrolments, Tasmania had the highest percentage (132.2) and the NT the lowest (63.6%)

As indicated by these data, it is clear that Australia is a long way from common practices and/or expectations with respect to the levels of mathematical background of its student cohorts from the states/territories across the nation.

State/Territory overviews

The enrolment trends with respect to percentages of Year 12 student numbers for each state/territory for each level of mathematics subjects are summarised below.

[NB. >100% indicates that students were enrolled in more than one subject at a particular level]

Australian Capital Territory [ACT]

Advanced: very small variations over the five years (mean: 11.2%)
Intermediate: small decrease from 30.3% in 2000 to 28.0% in 2004 (mean: 29.0%)
Elementary: generally consistent over the five years (mean: 51.0%)

New South Wales [NSW]

Advanced: steady increase from 20.6% in 2000 to 22.5% in 2004 (mean: 21.3%)
Intermediate: steady decrease from 39.6% in 2000 to 33.0% in 2004 (mean: 35.7)
Elementary: steady decrease from 59.0% in 2000 to 50.7% in 2004 (mean: 54.1%)

Northern Territory [NT]

Advanced: very small variations over the five years (mean: 3.9%)
Intermediate: small variations over the five years (mean: 18.4%)
Elementary: small variations over the five years (mean: 41.1%)

Queensland [Qld]

Advanced: very small variations over the five years (mean: 8.0%)
Intermediate: very small variations over the five years (mean: 41.5%)
Elementary: very small variations over the five years (mean: 66.4%)

South Australia [SA]

Advanced: steady decrease from 12.0% in 2000 to 9.1% in 2004 (mean: 10.0%)
Intermediate: steady decrease from 33.5% in 2000 to 25.1% in 2004 (mean: 29.4%)
Elementary: steady decrease from 33.6% in 2000 to 29.6% in 2004 (mean: 30.5%)

Tasmania [Tas]

Advanced: increase from 3.2% in 2000 to 5.5% in 2004 (mean: 4.6%)
Intermediate: increase from 14.5% in 2000 to 19.8% in 2004 (mean: 16.2%)
Elementary: decrease from 118.7% in 2000 to 110.1% in 2004 (mean: 111.3%)

Victoria [Vic]

Advanced: small variations over the five years (mean: 12.6%)
Intermediate: very small variations (mean: 36.7%)
Elementary: steady increase from 36.6% in 2000 to 45.5% in 2004 (mean: 41.2%)

Western Australia [WA]

Advanced: decrease from 10.2% in 2000 to 8.2% in 2004 (mean: 9.1%)
Intermediate: decrease from 26.0% in 2000 to 21.6% in 2004 (mean: 23.7%)
Elementary: increase from 58.6% in 2000 to 64.6% in 2004 (mean: 61.4%)

Part 2

Enrolment patterns in advanced level mathematics subjects: pre-1990 to 2004

The data upon which the analyses were conducted were incomplete. However some interesting patterns emerged as data from three time periods: pre-1990, 1990-1999, and 2000-2004 were examined.

Although there were different subject classification models used for the three time periods: Dekkers et al. (1986) for the pre-1990 data, Dekkers et al. (2000b) for the 1990-1999 data, and Barrington and Brown (2005) for the 2000-2004 data – it was argued that the Type 3 subjects (pre-1990) and high level subjects (1990-1999) would be likely to be consistent with Barrington and Brown's (2005) Advanced category.

Cautiously, trends over the entire time span were examined. It was found that:

▪ enrolments in advanced level mathematics subjects expressed as percentages of Year 12 cohort sizes decreased over the period 1970-1990, decreased further over the period 1990-1999, but remained fairly stable (slight increase) from 2000-2004

   Identifying the reasons for the decreases was beyond the scope of the report. However, several possible contributing factors were postulated: curriculum changes, changes in tertiary entrance requirements, increases in Year 12 student numbers and the composition of the increased cohorts.

▪ When data for the period 1970-1985 from four states – Qld, SA, Victoria, and WA – were examined, it was found that was a decrease in enrolments expressed as percentages of Year 12 state cohorts over the 16 year time period in all four states. SA (122.1% to 41.3%) and WA (97.0% to 37.3%) had the larger decreases, with Victoria (53.7% to 29.9%) and Qld (39.6% to 20.3%) having smaller decreases. At the end of the 16 year period, the rank order of the states was the same as it had been in 1970: SA had the highest enrolments as percentages of Year 12 state cohort, followed by WA, Victoria, and Qld with the lowest.

Findings for the periods 1990-1999 and 2000-2004 are presented above in detail in the key findings from Section 1 of the report.

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Boards of Study

- Queensland Studies Authority
- Board of Studies NSW
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- Senior Secondary Assessment Board of South Australia
- Tasmanian Secondary Assessment Board
- Curriculum Council of Western Australia
- The Northern Territory Board of Studies
- NSW Board of Vocational Education and Training
- New Zealand Qualifications Authority
- Australasian Curriculum, Assessment and Certification Authorities (ACACA)

ACT

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NSW

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Northern Territory

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Queensland

Andrew Ward, Senior Analyst (Quantitative), Queensland Studies Authority, April 2005.

South Australia

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Tasmania

Jim Fitzgerald, Moderation and Assessment Officer, Curriculum Services and Standards Section, Tasmanian Qualifications, August and October 2005

Victoria

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Western Australia

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2000

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2001

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Enrolments, absentees and non-examination candidates in each tertiary entrance examination subject, 2001: http://www.curriculum.wa.edu.au/pages/stats2001/98241_1.pdf

Number of students who completed Year 12 wholly school-assessed subjects*, by sex, 2001: http://www.curriculum.wa.edu.au/pages/stats2001/100937_1.pdf : Graph only

Number and percentages of students awarded grades for Year 12 subjects, by sex, 2001 (Table 3.2): http://www.curriculum.wa.edu.au/pages/stats2001/100834_2.pdf

2002

Number of students who completed Year 12 TEE subjects, by sex, 202: http://www.curriculum.wa.edu.au/pages/Stats2002/114187_1.pdf : Graph only

Number of students who completed Year 12 wholly school-assessed subjects by sex, 200 (Cont): graph only: http://www.curriculum.wa.edu.au/pages/Stats2002/114182_1.pdf : Graph only

Enrolments, absentees and non-examination candidates in each tertiary entrance examination subject, 2002: http://www.curriculum.wa.edu.au/pages/Stats2002/111548_1.pdf

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2003

Enrolments, absentees and non-examination candidates in each tertiary entrance examination subject, 2003: http://www.curriculum.wa.edu.au/pages/stats2003/125032_1.pdf

Number of students who completed year 12 wholly school-assessed subjects, by sex, 2003: numerical data and graph: http://www.curriculum.wa.edu.au/pages/stats2003/130019_1.pdf : Graphs and data

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2004

Enrolments, absentees and non-examination candidates in each tertiary entrance examination subject, 2004: http://www.curriculum.wa.edu.au/pages/stats2004/140085_1.pdf

Number of students who completed year 12 wholly school-assessed subjects*, by sex, 2004: http://www.curriculum.wa.edu.au/pages/stats2004/140988_1.pdf : numerical data and graph

Number of students who completed year 12 TEE subjects, by sex, 2004: http://www.curriculum.wa.edu.au/pages/stats2004/140991_1.pdf : numerical data and graph

National

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FB1007F5A23/$File/42210_table10_2004.xls (WA, 2004)

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Appendix 1

Advanced, intermediate and elementary level mathematics by states and territories 2000-2004

The complete mathematics enrolment data for the period 2000-2004, by level of mathematics course and by gender, for each state/territory (in alphabetical order) that have been used in the main text of this report are presented here. All of the subjects within each of the three levels of mathematics courses developed by Barrington and Brown (2005) are listed. It should be noted that in various states/territories the curricula and often the subject names changed over the five year period. Hence some subject names appear only for particular years. To assist the reader, the table rows have been colour-coded as follows:

Advanced level mathematics courses
Intermediate level mathematics courses
Elementary level mathematics courses

> NB. Mathematics subjects found in tables for each state/territory that are marked with an asterisk indicate that they are not included in tertiary entrance scores.

Australian Capital Territory [ACT]

Table A1.1. ACT: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

ACT Year 12 mathematics enrolments	2000 Male	Female	All	2001 Male	Female	All	2002 Male	Female	All	2003 Male	Female	All	2004 Male	Female	All
Advanced Mathematics Extended	291	182	473	283	193	476	276	189	465	275	197	472	282	206	488
Total Advanced Level	**291**	**182**	**473**	**283**	**193**	**476**	**276**	**189**	**465**	**275**	**197**	**472**	**282**	**206**	**488**
1012 Advanced Mathematics	589	724	1313	583	654	1237	501	675	1176	590	712	1302	573	575	1148
Total Intermediate Level	**589**	**724**	**1313**	**583**	**654**	**1237**	**501**	**675**	**1176**	**590**	**712**	**1302**	**573**	**575**	**1148**
1021 Mathematics T	650	767	1417	626	791	1417	709	780	1489	712	801	1513	648	782	1430
1019 Mathematics - status*	5	6	11	7	2	9	4	6	10	9	4	13	6	3	9
1031 Mathematics A*	372	311	683	350	333	683	367	304	671	336	295	631	388	286	674
1050 Study skills mathematics*	26	22	48	24	12	36	19	18	37	22	21	43	27	15	42
1010 Mathematics 1*				1	1	2							1	0	1
Total Elementary Level	**1053**	**1106**	**2159**	**1008**	**1139**	**2147**	**1099**	**1108**	**2207**	**1079**	**1121**	**2200**	**1070**	**1086**	**2156**

Table A1.2. ACT: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

ACT Total	2000 Male	Female	All	2001 Male	Female	All	2002 Male	Female	All	2003 Male	Female	All	2004 Male	Female	All
Total Year 12	2167	2171	4338	2141	2138	4279	2160	2131	4291	2147	2150	4297	2117	1981	4098
% advanced	13.43	8.38	10.90	13.22	9.03	11.12	12.78	8.87	10.84	12.81	9.16	10.98	13.32	10.40	11.91
% intermediate	27.18	33.35	30.27	27.23	30.59	28.91	23.19	31.68	27.41	27.48	33.12	30.30	27.07	29.03	28.01
% elementary	48.59	50.94	49.77	47.08	53.27	50.18	50.88	51.99	51.43	50.26	52.14	51.20	50.54	54.82	52.61
Total Year 12 mathematics enrolments as a % of Year 12 students	89.20	92.68	90.94	87.53	92.89	90.21	86.85	92.54	89.68	90.54	94.42	92.48	90.93	94.24	92.53

Appendix 1

Advanced, intermediate and elementary level mathematics by states and territories 2000-2004

The complete mathematics enrolment data for the period 2000-2004, by level of mathematics course and by gender, for each state/territory (in alphabetical order) that have been used in the main text of this report are presented here. All of the subjects within each of the three levels of mathematics courses developed by Barrington and Brown (2005) are listed. It should be noted that in various states/territories the curricula and often the subject names changed over the five year period. Hence some subject names appear only for particular years. To assist the reader, the table rows have been colour-coded as follows:

Advanced level mathematics courses
Intermediate level mathematics courses
Elementary level mathematics courses

NB.	Mathematics subjects found in tables for each state/territory that are marked with an asterisk indicate that they are not included in tertiary entrance scores.

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ACT Year 12 mathematics enrolments	2000 Male	Female	All	2001 Male	Female	All	2002 Male	Female	All	2003 Male	Female	All	2004 Male	Female	All
Advanced Mathematics Extended	291	182	473	283	193	476	276	189	465	275	197	472	282	206	488
Total Advanced Level	**291**	**182**	**473**	**283**	**193**	**476**	**276**	**189**	**465**	**275**	**197**	**472**	**282**	**206**	**488**
1012 Advanced Mathematics	589	724	1313	583	654	1237	501	675	1176	590	712	1302	573	575	1148
Total Intermediate Level	**589**	**724**	**1313**	**583**	**654**	**1237**	**501**	**675**	**1176**	**590**	**712**	**1302**	**573**	**575**	**1148**
1021 Mathematics T	650	767	1417	626	791	1417	709	780	1489	712	801	1513	648	782	1430
1019 Mathematics - status*	5	6	11	7	2	9	4	6	10	9	4	13	6	3	9
1031 Mathematics A*	372	311	683	350	333	683	367	304	671	336	295	631	388	286	674
1050 Study skills mathematics*	26	22	48	24	12	36	19	18	37	22	21	43	27	15	42
1010 Mathematics 1*				1	1	2							1	0	1
Total Elementary Level	**1053**	**1106**	**2159**	**1008**	**1139**	**2147**	**1099**	**1108**	**2207**	**1079**	**1121**	**2200**	**1070**	**1086**	**2156**

Table A1.2. ACT: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

ACT Total	2000 Male	Female	All	2001 Male	Female	All	2002 Male	Female	All	2003 Male	Female	All	2004 Male	Female	All
Total Year 12	2167	2171	4338	2141	2138	4279	2160	2131	4291	2147	2150	4297	2117	1981	4098
% advanced	13.43	8.38	10.90	13.22	9.03	11.12	12.78	8.87	10.84	12.81	9.16	10.98	13.32	10.40	11.91
% intermediate	27.18	33.35	30.27	27.23	30.59	28.91	23.19	31.68	27.41	27.48	33.12	30.30	27.07	29.03	28.01
% elementary	48.59	50.94	49.77	47.08	53.27	50.18	50.88	51.99	51.43	50.26	52.14	51.20	50.54	54.82	52.61
Total Year 12 mathematics enrolments as a % of Year 12 students	89.20	92.68	90.94	87.53	92.89	90.21	86.85	92.54	89.68	90.54	94.42	92.48	90.93	94.24	92.53

Table A1.3. ACT: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

| ACT | 2000 | | | 2001 | | | 2002 | | | 2003 | | | 2004 | | |
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	155840	159375	315215	157575	161742	319317	158723	163096	321819	159744	163619	323363	160253	163768	324021
% advanced	0.19	0.11	0.15	0.18	0.12	0.15	0.17	0.12	0.14	0.17	0.12	0.15	0.18	0.13	0.15
% intermediate	0.38	0.45	0.42	0.37	0.40	0.39	0.32	0.41	0.37	0.37	0.44	0.40	0.36	0.35	0.35
% elementary	0.68	0.69	0.68	0.64	0.70	0.67	0.69	0.68	0.69	0.68	0.69	0.68	0.67	0.66	0.67
Total Year 12 mathematics enrolments as a % of State population	1.24	1.26	1.25	1.19	1.23	1.21	1.18	1.21	1.20	1.22	1.24	1.23	1.20	1.14	1.17

New South Wales [NSW]

To obtain total Year 12 NSW mathematics students studying mathematics through BOS after 2000, add 'General mathematics', 'Mathematics 2 units', 'Mathematics extension 2' and 'Life skills' as any student doing Extension 1 is enrolled in either Mathematics (code 15240) or Extension 2. Note that some students do 'Pathways to either accelerate or take up to five years for HSC which may show inconsistencies in totals. (Phone calls on 19 April and 5 December 2005 to Information Services Branch, Office of the Board of Studies. 117 Clarence Street, Sydney   NSW   2000.)

Table A1.4. NSW: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

NSW Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
3 unit Mathematics (20171)	5446	4030	9476												
4 unit Mathematics (20172)	1451	770	2221												
Mathematics Extension 1 2 unit (15250)				5166	3628	8794	5378	3775	9153	5947	4253	10200	5737	4222	9959
Mathematics Extension 2 2 unit (15260)				1670	908	2578	1904	1056	2960	2097	1335	3432	2128	1386	3514
Total Advanced Level	**6897**	**4800**	**11697**	**6836**	**4536**	**11372**	**7282**	**4831**	**12113**	**8044**	**5588**	**13632**	**7865**	**5608**	**13473**
2 unit Mathematics (20170)	11459	11026	22485												
Mathematics 2U (15240)				10641	10160	20801	10484	9657	20141	11140	9898	21038	10523	9228	19751
Total Intermediate Level	**11459**	**11026**	**22485**	**10641**	**10160**	**20801**	**10484**	**9657**	**20141**	**11140**	**9898**	**21038**	**10523**	**9228**	**19751**
General Mathematics 2 unit (15230)				13481	15894	29375	14598	16635	31233	14750	16099	30849	14135	15241	29376
Mathematics in Practice 2 unit (20150)*	2465	3586	6051												
Mathematics Life Skills 2 unit (16610)*				396	354	750	435	450	885	511	448	959	553	453	1006
Mathematics in Society 2 unit (20160)	12058	15435	27493												
Total Elementary Level	**14523**	**19021**	**33544**	**13877**	**16248**	**30125**	**15033**	**17085**	**32118**	**15261**	**16547**	**31808**	**14688**	**15694**	**30382**

Table A1.5. NSW: Year 12 mathematics levels as percentages of Year 12 students by gender 2000 to 2004

NSW Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	26420	30424	56844	26860	30128	56988	27980	31105	59085	28129	31010	59139	28552	31391	59943
% advanced	26.11	15.78	20.58	25.45	15.06	19.96	26.03	15.53	20.50	28.60	18.02	23.05	27.55	17.86	22.48
% intermediate	43.37	36.24	39.56	39.62	33.72	36.50	37.47	31.05	34.09	39.60	31.92	35.57	36.86	29.40	32.95
% elementary	54.97	62.52	59.01	51.66	53.93	52.86	53.73	54.93	54.36	54.25	53.36	53.79	51.44	50.00	50.68
Total Year 12 mathematics enrolments as a % of Year 12 students	124.45	114.54	119.14	116.73	102.71	109.32	117.22	101.50	108.95	122.45	103.30	112.41	115.84	97.26	106.11

Note: Total % enrolments in mathematics may exceed 100% when students enrol in more than one course.

Table A1.6. NSW: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

| NSW | 2000 | | | 2001 | | | 2002 | | | 2003 | | | 2004 | | |
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	3219101	3267112	6486213	3264203	3311014	6575217	3296998	3343357	6640355	3321385	3360668	6682053	3346616	3384679	6731295
% advanced	0.21	0.15	0.18	0.21	0.14	0.17	0.22	0.14	0.18	0.24	0.17	0.20	0.24	0.17	0.20
% intermediate	0.36	0.34	0.35	0.33	0.31	0.32	0.32	0.29	0.30	0.34	0.29	0.31	0.31	0.27	0.29
% elementary	0.45	0.58	0.52	0.43	0.49	0.46	0.46	0.51	0.48	0.46	0.49	0.48	0.44	0.46	0.45
Total Year 12 mathematics enrolments as a % of State population	1.02	1.07	1.04	0.96	0.93	0.95	0.99	0.94	0.97	1.04	0.95	0.99	0.99	0.90	0.94

Northern Territory [NT]

Mathematics 1 (Double) is taken by students enrolled in both Mathematics 1 and Mathematics 2. Mathematics 1 (Single is taken by students not enrolled in Mathematics 2.

[†] The following subjects were redeveloped for 2003:

- Mathematical Applications replaces Applied Mathematics and Business Mathematics

- Mathematical Methods replaces Quantitative Methods

- Mathematical Studies replaces Mathematics 1 (Double) and Mathematics 1 (Single)

- Specialist Mathematics replaces Mathematics 2

In 2003 SSABSA stopped using the terminology SAS (School assessed subject), PAS (Public assessed subject) and PES (Public examination subject). This was due to increases in types of Assessment. Specialist Mathematics, Mathematical Studies, and Mathematical Methods all have public examinations and would have been PES in the old terminology. They are all 2 unit subjects. Mathematical Applications (both 1 and 2 unit) does not have an exam and in the old terminology would have been SAS. The school assessment is Centrally Moderated.

Table A1.7. NT: Year 12 mathematics enrolments by course, level and gender 2000 to 2004

Northern Territory Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Mathematics 2	21	17	38	41	27	68	35	12	47						
Specialist Mathematics[†]										39	13	52	40	5	45
Total Advanced Level	**21**	**17**	**38**	**41**	**27**	**68**	**35**	**12**	**47**	**39**	**13**	**52**	**40**	**5**	**45**
Mathematics 1 (Double)	24	16	40	41	23	64	34	12	46						
Mathematics 1 (Single)	76	111	187	108	85	193	85	98	183						
Mathematical Studies[†]										117	96	213	148	95	243
Total Intermediate Level	**100**	**127**	**227**	**149**	**108**	**257**	**119**	**110**	**229**	**117**	**96**	**213**	**148**	**95**	**243**
Mathematical Methods[†]										36	48	84	75	91	166
Quantitative Methods 2U	13	25	38	27	39	66	50	45	95						
Applied Mathematics - 1U*							2	1	3						
Applied Mathematics - 2U*	114	143	257	140	138	278	108	68	176						
Business Mathematics - 1U*[†]	0	2	2	1	0	1	1	0	1						
Business Mathematics - 2U*[†]	74	119	193	83	125	208	80	130	210						
Mathematical Applications 1-unit*										21	28	49	1	1	2

Northern Territory	2000			2001			2002			2003			2004		
Year 12 mathematics enrolments	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Mathematical Applications 2-unit*										221	195	416	178	197	375
Total Elementary Level	**201**	**289**	**490**	**251**	**302**	**553**	**241**	**244**	**485**	**278**	**271**	**549**	**254**	**289**	**543**

Table A1.8. NT: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

NT	2000			2001			2002			2003			2004		
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	513	674	1187	547	698	1245	583	687	1270	644	651	1295	655	735	1390
% advanced	4.09	2.52	3.20	7.50	3.87	5.46	6.00	1.75	3.70	6.06	2.00	4.02	6.11	0.68	3.24
% intermediate	19.49	18.84	19.12	27.24	15.47	20.64	20.41	16.01	18.03	18.17	14.75	16.45	22.60	12.93	17.48
% elementary	39.18	42.88	41.28	45.89	43.27	44.42	41.34	35.52	38.19	43.17	41.63	42.39	38.78	39.32	39.06
Total Year 12 mathematics enrolments as a % of Year 12 students	62.77	64.24	63.61	80.62	62.61	70.52	67.75	53.28	59.92	67.39	58.37	62.86	67.48	52.93	59.78

Table A1.9. NT: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

NT	2000			2001			2002			2003			2004		
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	102596	92965	195561	103475	94293	197768	103693	94320	198013	104493	94051	198544	105173	94740	199913
% advanced	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.01	0.02	0.04	0.01	0.03	0.04	0.01	0.02
% intermediate	0.10	0.14	0.12	0.14	0.11	0.13	0.11	0.12	0.12	0.11	0.10	0.11	0.14	0.10	0.12
% elementary	0.20	0.31	0.25	0.24	0.32	0.28	0.23	0.26	0.24	0.27	0.29	0.28	0.24	0.31	0.27
Total Year 12 mathematics enrolments as a % of State population	0.31	0.47	0.39	0.43	0.46	0.44	0.38	0.39	0.38	0.42	0.40	0.41	0.42	0.41	0.42

Queensland [QLD]

Table 1.10. Queensland: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

Queensland Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Mathematics C (38)	2233	1009	3242	2298	932	3230	2149	965	3114	2166	1009	3175	2366	1064	3430
Total Advanced Level	**2233**	**1009**	**3242**	**2298**	**932**	**3230**	**2149**	**965**	**3114**	**2166**	**1009**	**3175**	**2366**	**1064**	**3430**
Logic (30)	154	93	247	167	118	285	184	95	279	151	128	279	187	116	303
Mathematics B (37)	8713	8017	16730	8680	7653	16333	8745	7609	16354	8807	7676	16483	8710	7607	16317
Total Intermediate Level	**8867**	**8110**	**16977**	**8847**	**7771**	**16618**	**8929**	**7704**	**16633**	**8958**	**7804**	**16762**	**8897**	**7723**	**16620**
Mathematics A (36)	9069	11393	20462	8918	11164	20082	9207	11548	20755	9589	11651	21240	9485	11761	21246
Applied Mathematics (227)*	4	12	16												
Business Mathematics*	11	8	19												
Career Linked Mathematics (999)*	8	1	9												
Commercial Mathematics (305)*	9	0	9												
Community Mathematics (391)*	24	21	45												
Consumer Mathematics*	2	0	2												
Essential Mathematics (544)*	19	11	30												
Everyday Mathematics (404)*	87	46	133	20	11	31									
Literacy & Numeracy (Consumer Mathematics)*				87	71	158	943	873	1816	831	704	1535	734	720	1454
Literacy & Numeracy (Consumer Mathematics) (Trial-Pilot)*	1233	1037	2270	1187	963	2150									
Literacy & Numeracy (Practical Numeracy)*				1	1	2	85	78	163	161	131	292	172	192	364
Mathematics (939)*	58	59	117												
Mathematics for Life*	1	0	1												
Mathematics for Living (152)*	54	66	120	60	61	121									
Mathematics Studies (625)*	2	14	16												
Personal and Business Mathematics (691)*	21	12	33												
Practical Mathematics (731)*	52	45	97	10	9	19									
Real Life Mathematics (519)*	35	31	66												
Trade & Business Mathematics (Practical) (6143)*	3	7	10	192	202	394	441	339	780	458	371	829	608	529	1137
Trade and Business Mathematics (Trial-Pilot)*	1059	670	1729	1	0	1									
Trade & Business Mathematics (Workplace) (6142)*	641	422	1063	1859	1158	3017	2084	1261	3345	2016	1349	3365	1858	1356	3214

Queensland Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Transitional Mathematics (281)*	21	13	34												
Vocational Mathematics (898)*	12	5	17												
Total Elementary Level	12425	13873	26298	12335	13640	25975	12760	14099	26859	13055	14206	27261	12857	14558	27415

Table A1.11.   Queensland: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

Queensland Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	19208	20616	39824	19241	20227	39468	19928	20815	40743	20043	20896	40939	19738	20854	40592
% advanced	11.63	4.89	8.14	11.94	4.61	8.18	10.78	4.64	7.64	10.81	4.83	7.76	11.99	5.10	8.45
% intermediate	46.16	39.34	42.63	45.98	38.42	42.10	44.81	37.01	40.82	44.69	37.35	40.94	45.08	37.03	40.94
% elementary	64.69	67.29	66.04	64.11	67.43	65.81	64.03	67.73	65.92	65.13	67.98	66.59	65.14	69.81	67.54
Total Year 12 mathematics enrolments as a % of Year 12 students	122.48	111.53	116.81	122.03	110.46	116.10	119.62	109.38	114.39	120.64	110.16	115.29	122.20	111.94	116.93

Note: Total % enrolments in mathematics may exceed 100% when students enrol in more than one course.

Table A1.12.   Queensland: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

Queensland Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	1775520	1786017	3561537	1806440	1822506	3628946	1843078	1864097	3707175	1897142	1903897	3801039	1937822	1944215	3882037
% advanced	0.13	0.06	0.09	0.13	0.05	0.09	0.12	0.05	0.08	0.11	0.05	0.08	0.12	0.05	0.09
% intermediate	0.50	0.45	0.48	0.49	0.43	0.46	0.48	0.41	0.45	0.47	0.41	0.44	0.46	0.40	0.43
% elementary	0.70	0.78	0.74	0.68	0.75	0.72	0.69	0.76	0.72	0.69	0.75	0.72	0.66	0.75	0.71
Total Year 12 mathematics enrolments as a % of State population	1.32	1.29	1.31	1.30	1.23	1.26	1.29	1.22	1.26	1.27	1.21	1.24	1.24	1.20	1.22

South Australia [SA]

Mathematics 1 (Double) is taken by students enrolled in both Mathematics 1 and Mathematics 2. Mathematics 1 (Single is taken by students not enrolled in Mathematics 2.

[†] The following subjects were redeveloped for 2003:

- Mathematical Applications† replaces Applied Mathematics and Business Mathematics

- Mathematical Methods replaces Quantitative Methods

- Mathematical Studies replaces Mathematics 1 (Double) and Mathematics 1 (Single)

- Specialist Mathematics† replaces Mathematics 2

In 2003 SSABSA stopped using the terminology SAS (School assessed subject), PAS (Public assessed subject) and PES (Public examination subject). This was due to increases in types of Assessment. Specialist Mathematics, Mathematical Studies, and Mathematical Methods all have public examinations and would have been PES in the old terminology. They are all 2 unit subjects. Mathematical Applications (both 1 and 2 unit) does not have an exam and in the old terminology would have been SAS. The school assessment is Centrally Moderated.

Table 1.13. SA Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

SA Year 12 mathematics enrolments	2000 Male	Female	All	2001 Male	Female	All	2002 Male	Female	All	2003 Male	Female	All	2004 Male	Female	All
Mathematics 2	1040	511	1551	936	430	1366	915	406	1321						
Specialist Mathematics[†]										832	341	1173	841	370	1211
Total Advanced Level	**1040**	**511**	**1551**	**936**	**430**	**1366**	**915**	**406**	**1321**	**832**	**341**	**1173**	**841**	**370**	**1211**
Mathematics 1 (Double)	1023	498	1521	908	412	1320	885	396	1281						
Mathematics 1 (Single)	1357	1462	2819	1352	1342	2694	1432	1402	2834						
Mathematical Studies[†]										2152	1540	3692	1974	1371	3345
Total Intermediate Level	**2380**	**1960**	**4340**	**2260**	**1754**	**4014**	**2317**	**1798**	**4115**	**2152**	**1540**	**3692**	**1974**	**1371**	**3345**
Mathematical Methods[†]										172	231	403	291	327	618
Quantitative Methods	39	45	84	48	48	96	66	29	95						
Applied Mathematics – 1U*	9	1	10	5	3	8	7	4	11						
Applied Mathematics – 2U*	346	245	591	324	227	551	292	192	484						
Business Mathematics – 1U*	11	13	24	12	9	21	12	13	25						
Business Mathematics – 2U*	1596	2054	3650	1550	1904	3454	1499	1763	3262						
Mathematical Applications 1-unit*[†]										21	28	49	21	8	29

SA	2000			2001			2002			2003			2004		
Year 12 mathematics enrolments	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Mathematical Applications 2-unit*[†]										1647	1820	3467	1555	1735	3290
Total Elementary Level	**2001**	**2358**	**4359**	**1939**	**2191**	**4130**	**1876**	**2001**	**3877**	**1840**	**2079**	**3919**	**1867**	**2070**	**3937**

Table 1.14. SA: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

SA	2000			2001			2002			2003			2004		
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	6007	6965	12972	6204	7148	13352	6250	7083	13333	6173	7229	13402	6087	7237	13324
% advanced	17.31	7.34	11.96	15.09	6.02	10.23	14.64	5.73	9.91	13.48	4.72	8.75	13.82	5.11	9.09
% intermediate	39.62	28.14	33.46	36.43	24.54	30.06	37.07	25.38	30.86	34.86	21.30	27.55	32.43	18.94	25.11
% elementary	33.31	33.85	33.60	31.25	30.65	30.93	30.02	28.25	29.08	29.81	28.76	29.24	30.67	28.60	29.55
Total Year 12 mathematics enrolments as a % of Year 12 students	90.24	69.33	79.02	82.77	61.21	71.23	81.73	59.37	69.85	78.15	54.78	65.54	76.92	52.66	63.74

Table 1.15. SA: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

SA	2000			2001			2002			2003			2004		
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	743753	761285	1505038	747262	764466	1511728	751753	768489	1520242	755481	770820	1526301	759773	774477	1534250
% advanced	0.14	0.07	0.10	0.13	0.06	0.09	0.12	0.05	0.09	0.11	0.04	0.08	0.11	0.05	0.08
% intermediate	0.32	0.26	0.29	0.30	0.23	0.27	0.31	0.23	0.27	0.28	0.20	0.24	0.26	0.18	0.22
% elementary	0.27	0.31	0.29	0.26	0.29	0.27	0.25	0.26	0.26	0.24	0.27	0.26	0.25	0.27	0.26
Total Year 12 mathematics enrolments as a % of State population	0.73	0.63	0.68	0.69	0.57	0.63	0.68	0.55	0.61	0.64	0.51	0.58	0.62	0.49	0.55

Tasmania [Tas]

Table A1.16. Tasmania: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

Tasmania Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
MT843 Mathematics Stage 3	108	49	157	135	85	220	153	72	225	184	97	281			
MSP5C Mathematics - Specialised													153	75	228
Total Advanced level	**108**	**49**	**157**	**135**	**85**	**220**	**153**	**72**	**225**	**184**	**97**	**281**	**153**	**75**	**228**
MT841 Mathematics Stage 2	383	338	721	423	327	750	427	361	788	466	360	826			
MME5C Mathematics - Methods													488	335	823
Total Intermediate level	**383**	**338**	**721**	**423**	**327**	**750**	**427**	**361**	**788**	**466**	**360**	**826**	**488**	**335**	**823**
MT730 Mathematics Applied	525	665	1190	486	528	1014	555	669	1224	650	668	1318			
MAP5C Mathematics - Applied													662	678	1340
A MT639 Mathematics Stage 1*	199	58	257	148	73	221	142	86	228	1	0	1			
A MT640 Mathematics Stage1*	557	462	1019	548	487	1035	502	409	911	3	2	5			
B MT719 Mathematics*				25	16	41	18	11	29						
B MT720 Mathematics*	245	220	465	197	213	410	225	203	428	36	90	126			
B MT 721 Mathematics*	679	558	1237	612	589	1201	618	486	1104	21	50	71			
B MT 722 Mathematics*	501	482	983	495	481	976	497	456	953	9	27	36			
C MT729 Mathematics Applied*	253	210	463	279	219	498	189	123	312	79	53	132			
C MT840 Mathematics Stage 2*	150	101	251	146	94	240	131	78	209	41	29	70			
C MT842 Mathematics Stage 3*	19	5	24	14	8	22	20	8	28	4	6	10			
MFL1B Maths for Living 1*										15	23	38	23	32	55
MFL2B Maths for Living 2*										10	25	35	9	8	17
MAC2A Maths after College*										17	17	34	12	14	26
MAC2B Maths after College*										48	31	79	33	24	57
MAC2C Maths after College*										28	23	51	19	15	34
MAC3A Maths after College*										5	3	8	6	14	20
MAC3B Maths after College*										6	7	13	20	28	48
MAC3C Maths after College*										21	21	42	26	31	57
MAP3B Mathematics Applied*										6	1	7	13	9	22
MAP3C Mathematics Applied*										145	113	258	139	60	199
MAP4B Mathematics Applied*										48	28	76	38	21	59
MAP4C Mathematics Applied*										291	267	558	297	363	660

| Tasmania | 2000 | | | 2001 | | | 2002 | | | 2003 | | | 2004 | | |
Year 12 mathematics enrolments	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
MAW2A Maths at Work*										25	8	33	33	25	58
MAW2B Maths at Work*										116	88	204	83	51	134
MAW2C Maths at Work*										85	55	140	83	76	159
MAW3A Maths at Work*										13	2	15	21	24	45
MAW3B Maths at Work*										62	30	92	55	73	128
MAW3C Maths at Work*										200	155	355	231	171	402
MMX4B Mathematics Methods*										275	174	449	133	72	205
MME4B Mathematics Methods*										555	330	885	333	244	577
MME4C Mathematics Methods*										169	121	290	158	121	279
Total Elementary level	**3128**	**2761**	**5889**	**2950**	**2708**	**5658**	**2897**	**2529**	**5426**	**2984**	**2447**	**5431**	**2427**	**2154**	**4581**

Table A1.17. Tasmania: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

| Tasmania | 2000 | | | 2001 | | | 2002 | | | 2003 | | | 2004 | | |
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	2288	2673	4961	2296	2633	4929	2383	2793	5176	2257	2767	5024	1901	2260	4161
% advanced	4.72	1.83	3.16	5.88	3.23	4.46	6.42	2.58	4.35	8.15	3.51	5.59	8.05	3.32	5.48
% intermediate	16.74	12.64	14.53	18.42	12.42	15.22	17.92	12.93	15.22	20.65	13.01	16.44	25.67	14.82	19.78
% elementary	136.71	103.29	118.71	128.48	102.85	114.79	121.57	90.55	104.83	132.21	88.44	108.10	127.67	95.31	110.09
Total Year 12 mathematics enrolments as a % of Year 12 students	158.17	117.77	136.40	152.79	118.50	134.47	145.91	106.05	124.40	161.01	104.95	130.14	161.39	113.45	135.35

Note: Total % enrolments in mathematics may exceed 100% when students enrol in more than one course.

Table A1.18. Tasmania: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

| Tasmania | 2000 | | | 2001 | | | 2002 | | | 2003 | | | 2004 | | |
Total	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	232380	239029	471409	232470	239325	471795	232788	239937	472725	235498	241807	477305	237918	244210	482128
% advanced	0.05	0.02	0.03	0.06	0.04	0.05	0.07	0.03	0.05	0.08	0.04	0.06	0.06	0.03	0.05
% intermediate	0.16	0.14	0.15	0.18	0.14	0.16	0.18	0.15	0.17	0.20	0.15	0.17	0.21	0.14	0.17
% elementary	1.35	1.16	1.25	1.27	1.13	1.20	1.24	1.05	1.15	1.27	1.01	1.14	1.02	0.88	0.95
Total Year 12 mathematics enrolments as a % of State population	1.56	1.32	1.44	1.51	1.30	1.40	1.49	1.23	1.36	1.54	1.20	1.37	1.29	1.05	1.17

Victoria [Vic]

Table A1.19.   Victoria: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

Victoria Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Mathematics - Specialist Mathematics	3777	2123	5900	3642	2314	5956	3744	2394	6138	3961	2411	6372	3831	2462	6293
Total Advanced Level	**3777**	**2123**	**5900**	**3642**	**2314**	**5956**	**3744**	**2394**	**6138**	**3961**	**2411**	**6372**	**3831**	**2462**	**6293**
Mathematics - Mathematical Methods	9310	7793	17103	9393	8234	17627	9586	8318	17904	9797	8349	18146	9769	8216	17985
Mathematics - Mathematical Methods (CAS)							25	53	78	181	90	271	247	151	398
Total Intermediate Level	**9310**	**7793**	**17103**	**9393**	**8234**	**17627**	**9611**	**8371**	**17982**	**9978**	**8439**	**18417**	**10016**	**8367**	**18383**
Mathematics - Further Mathematics	8107	8913	17020	8928	9903	18831	9425	10700	20125	10694	11424	22118	10866	11893	22759
Total Elementary Level	**8107**	**8913**	**17020**	**8928**	**9903**	**18831**	**9425**	**10700**	**20125**	**10694**	**11424**	**22118**	**10866**	**11893**	**22759**

Table A1.20.   Victoria: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

Victoria Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	21507	24996	46503	22560	25744	48304	22977	26554	49531	23468	26409	49877	23543	26432	49975
% advanced	17.56	8.49	12.69	16.14	8.99	12.33	16.29	9.02	12.39	16.88	9.13	12.78	16.27	9.31	12.59
% intermediate	43.29	31.18	36.78	41.64	31.98	36.49	41.83	31.52	36.30	42.52	31.96	36.92	42.54	31.65	36.78
% elementary	37.69	35.66	36.60	39.57	38.47	38.98	41.02	40.30	40.63	45.57	43.26	44.35	46.15	44.99	45.54
Total Year 12 mathematics enrolments as a % of Year 12 students	98.54	75.33	86.07	97.35	79.44	87.81	99.14	80.84	89.33	104.96	84.34	94.05	104.97	85.96	94.92

Note: Total % enrolments in mathematics may exceed 100% when students enrol in more than one course.

Table A1.21.   Victoria: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

Victoria Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	2335506	2405833	4741339	2366295	2438431	4804726	2401089	2471449	4872538	2422065	2489360	4911425	2453147	2519632	4972779
% advanced	0.16	0.09	0.12	0.15	0.09	0.12	0.16	0.10	0.13	0.16	0.10	0.13	0.16	0.10	0.13
% intermediate	0.40	0.32	0.36	0.40	0.34	0.37	0.40	0.34	0.37	0.41	0.34	0.37	0.41	0.33	0.37
% elementary	0.35	0.37	0.36	0.38	0.41	0.39	0.39	0.43	0.41	0.44	0.46	0.45	0.44	0.47	0.46
Total Year 12 mathematics enrolments as a % of State population	0.91	0.78	0.84	0.93	0.84	0.88	0.95	0.87	0.91	1.02	0.89	0.96	1.01	0.90	0.95

Western Australia [WA]

Table A1.22.   WA: Year 12 mathematics enrolments by course, level and gender, 2000 to 2004

WA Year 12 mathematics enrolments	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Calculus	1387	570	1957	1285	516	1801	1232	470	1702	1311	514	1825	1176	452	1628
Total Advanced Level	**1387**	**570**	**1957**	**1285**	**516**	**1801**	**1232**	**470**	**1702**	**1311**	**514**	**1825**	**1176**	**452**	**1628**
Applicable Mathematics	2803	2177	4980	2636	2084	4720	2656	1990	4646	2707	1961	4668	2524	1759	4283
Total Intermediate Level	**2803**	**2177**	**4980**	**2636**	**2084**	**4720**	**2656**	**1990**	**4646**	**2707**	**1961**	**4668**	**2524**	**1759**	**4283**
Discrete Mathematics	3120	4145	7265	3123	4236	7359	3354	4394	7748	3440	4346	7786	3397	4382	7779
Modelling with Mathematics*	1989	1976	3965	2141	2063	4204	2344	2195	4539	2391	2359	4750	2532	2474	5006
Total Elementary Level	**5109**	**6121**	**11230**	**5264**	**6299**	**11563**	**5698**	**6589**	**12287**	**5831**	**6705**	**12536**	**5929**	**6856**	**12785**

Table A1.23.   WA: Year 12 mathematics levels as percentages of Year 12 students by gender, 2000 to 2004

WA Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Total Year 12	9108	10073	19181	9391	10154	19545	9698	10545	20243	9535	10108	19643	9515	10277	19792
% advanced	15.23	5.66	10.20	13.68	5.08	9.21	12.70	4.46	8.41	13.75	5.09	9.29	12.36	4.40	8.23
% intermediate	30.78	21.61	25.96	28.07	20.52	24.15	27.39	18.87	22.95	28.39	19.40	23.76	26.53	17.12	21.64
% elementary	56.09	60.77	58.55	56.05	62.03	59.16	58.75	62.48	60.70	61.15	66.33	63.82	62.31	66.71	64.60
Total Year 12 mathematics enrolments as a % of Year 12 students	102.10	88.04	94.71	97.81	87.64	92.52	98.85	85.81	92.06	103.29	90.82	96.87	101.20	88.23	94.46

Note: Total % enrolments in mathematics may exceed 100% when students enrol in more than one course.

Table A1.24.   WA: Year 12 mathematics levels as percentages of population by gender, 2000 to 2004

WA Total	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
Population	939216	935243	1874459	951556	949603	1901159	964313	963009	1927322	976250	973698	1949948	992452	989752	1982204
% advanced	0.15	0.06	0.10	0.14	0.05	0.09	0.13	0.05	0.09	0.13	0.05	0.09	0.12	0.05	0.08
% intermediate	0.30	0.23	0.27	0.28	0.22	0.25	0.28	0.21	0.24	0.28	0.20	0.24	0.25	0.18	0.22
% elementary	0.54	0.65	0.60	0.55	0.66	0.61	0.59	0.68	0.64	0.60	0.69	0.64	0.60	0.69	0.64
Total Year 12 mathematics enrolments as a % of State population	0.99	0.95	0.97	0.97	0.94	0.95	0.99	0.94	0.97	1.01	0.94	0.98	0.97	0.92	0.94

Appendix 2

Year 12 enrolments in tertiary level and IB mathematics

Year 12 student enrolments in tertiary level mathematics courses

Tertiary level mathematics subjects are offered as extension/enhancement/enrichment course options for Year 12 students only in Victoria by Monash University and the University of Melbourne (since 1994). The tertiary level studies in mathematics can be included in Victorian students' tertiary entrance scores. By completing these tertiary level courses, students receive credit towards a degree.

Enrolment data for tertiary level participation were provided by the Victorian Curriculum and Assessment Authority [VCAA] and are reproduced in Table A2.1 below.

Table A2.1. Mathematics extension studies enrolments by gender 1994 to 2004

Year	Female	Male	All
1994	39	60	99
1995	79	94	173
1996	72	139	211
1997	108	274	382
1998	91	222	313
1999	101	214	315
2000	81	212	293
2001	89	164	253
2002	163	251	414
2003	125	261	386
2004	87	212	299
2005	99	277	376

Source: Glenn Rowley, Policy Measurement and Research, VCAA

As can be seen in Table A2.1, enrolment numbers have fluctuated over time, peaking at 414 in 2002. A higher proportion of males than females have taken these courses, an enrolment pattern consistent with those for "Advanced" level Year 12 mathematics courses.

Year 12 student enrolments in the International Baccalaureate [IB]

The International Baccalaureate Organisation offers a two year Diploma Program for students in Years 11 and 12 in 39 schools around Australia. Students in the IB Diploma Program are required to study one subject from each of six subject groups Normally three subjects are studied at higher level [HL] – courses representing 240 teaching hours – and the remaining three subjects are studied at standard level [SL] – courses representing 150 teaching hours.

All candidates in the Diploma Program are required to complete a mathematics course (one of the six subject groups). There are four options available to cater for different levels of student interest and ability. Each course aims to deepen a student's understanding of mathematics as a discipline and to promote confidence and facility in the use of mathematical language.

- *Mathematics HL* is designed for students with competence and a strong background in mathematics. Some students will choose to study the subject because they have a genuine interest in mathematics and enjoy meeting its challenges and problems. Others

elect the higher-level course to prepare for additional mathematics studies at university or because they need mathematics for related subjects such as physics, engineering and technology.

- *Further mathematics SL* is designed for students who intend to specialize in mathematics at the university level. This course requires a high degree of competence and interest in the subject. It is usually taken in addition to mathematics HL.
- *Mathematical methods SL* is designed to provide a background of mathematical thought and a reasonable level of technical ability for those not wishing to take mathematics at the higher level. It is intended to provide a sound mathematical basis for those students planning to pursue further studies in fields such as chemistry, economics, geography and business administration. It is a demanding course containing a variety of mathematical topics.
- *Mathematical studies SL* is designed to provide a realistic option for students with varied backgrounds and abilities who are not likely to require mathematics beyond the Diploma Programme. Students develop the skills needed to cope with the mathematical demands of a technological society; they also apply mathematics to real-life situations. A substantial piece of personal research, in the form of a project, is a requirement of the course.

At the end of the two-year programme, students are assessed internally and externally in ways that measure individual performance against stated objectives for each subject.

There were over 1000 IB students in Australia and we were informed that 60% of IB students were likely to be females taking one SL mathematics subject.

Enrolment numbers in the IB across Australia from 1990 to 2005 were gathered from the IB Organisation in Australia and are shown in Table A2.2. No data were available on the enrolment numbers in the various IB mathematics options.

Table A2.2.   IBO enrolments 1990 to 2005

Year	Number of students
1990	61
1991	85
1992	103
1993	182
1994	311
1995	319
1996	397
1997	479
1998	498
1999	649
2000	821
2001	833
2002	967
2003	1154
2004	1111
2005	1256

Source: Greg Valentine, Regional Representative IBO

The data in Table A2.2 clearly reveal that IB enrolments are growing across Australia. In future analyses of Year 12 mathematics enrolment trends, it is likely that these data will be come more important in mapping trends.

Appendix 3

Justification for examining enrolment data expressed as percentages of Year 12 cohort sizes rather than as percentages of national/state/territory population sizes

In order to make meaningful comparisons of Year 12 mathematics enrolments across Australia and its states/territories, it was necessary to gather relevant Australian and state/territory population data (Table A3.1), and Australian and state/territory Year 12 student numbers (Table A3.2).

The data in Table A3.1 reveal that the Australian population grew steadily over the period 2000-2004 and that the pattern was similar for each state/territory. For each year, across Australia, there were more females in the population than males. In 2004, females comprised 50.30% of the entire Australian population.

The percentages of the Australian population represented by Year 12 students for the years 2000-2004 by gender are illustrated in Figure A3.1.
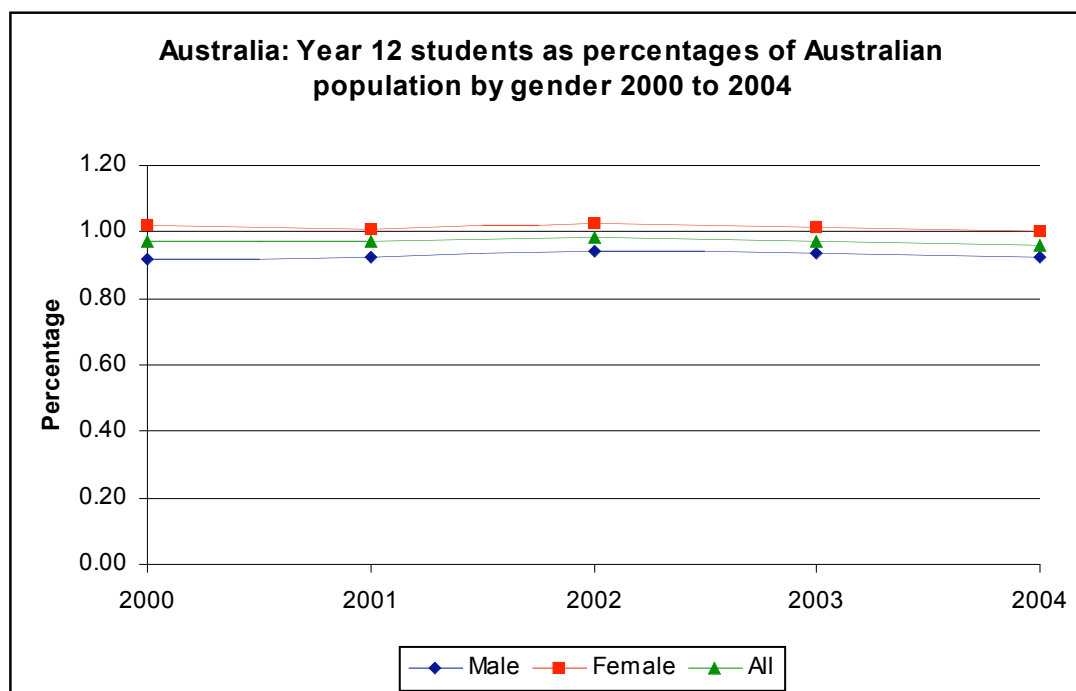

Figure A3.1. Year 12 students as percentages of Australian population by gender 2000 to 2004

As can be seen in Figure A3.1, there was very little variation over the five year period with Year 12 students representing approximately 1% of the population.

With respect to Year 12 student numbers, the data in Table A3.2 indicate a small growth in Year 12 student numbers from the year 2000 to 2002 with numbers remaining fairly stable from 2002-2004. The pattern varies somewhat for each state/territory. The Australian Capital Territory [ACT], for example, shows an overall decline in Year 12 numbers from 2000-2004. For each year, across Australia, there were more female than male Year 12 students. In 2004, females comprised 52.4% of the Year 12 student cohort.

Table A3.1.   Australia and state/territory populations 2000 to 2004

		AUSTRALIA	ACT	NSW	NT	Qld	SA	Tas	Vic	WA
	Male	9503912	155840	3219101	102596	1775520	743753	232380	2335506	939216
2000	Female	9646859	159375	3267112	92965	1786017	761285	239029	2405833	935243
	All	19150771	315215	6486213	195561	3561537	1505038	471409	4741339	1874459
	Male	9629276	157575	3264203	103475	1806440	747262	232470	2366295	951556
2001	Female	9781380	161742	3311014	94293	1822506	764466	239325	2438431	949603
	All	19410656	319317	6575217	197768	3628946	1511728	471795	4804726	1901159
	Male	9752435	158723	3296998	103693	1843078	751753	232788	2401089	964313
2002	Female	9907754	163096	3343357	94320	1864097	768489	239937	2471449	963009
	All	19660189	321819	6640355	198013	3707175	1520242	472725	4872538	1927322
	Male	9872058	159744	3321385	104493	1897142	755481	235498	2422065	976250
2003	Female	9997920	163619	3360668	94051	1903897	770820	241807	2489360	973698
	All	19869978	323363	6682053	198544	3801039	1526301	477305	4911425	1949948
	Male	9993154	160253	3346616	105173	1937822	759773	237918	2453147	992452
2004	Female	10115473	163768	3384679	94740	1944215	774477	244210	2519632	989752
	All	20108627	324021	6731295	199913	3882037	1534250	482128	4972779	1982204

Source: ABS Cat. No. 3105 0.65.001 Australian historical population statistics

Table A3.2.   Australia and state/territory Year 12 student numbers by gender, 2000-2004

	2000			2001			2002			2003			2004		
	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All
AUSTRALIA	87218	98592	185810	89240	98870	188110	91959	101713	193672	92396	101220	193616	92108	101167	193275
ACT	2167	2171	4338	2141	2138	4279	2160	2131	4291	2147	2150	4297	2117	1981	4098
NSW	26420	30424	56844	26860	30128	56988	27980	31105	59085	28129	31010	59139	28552	31391	59943
NT	513	674	1187	547	698	1245	583	687	1270	644	651	1295	655	735	1390
Qld	19208	20616	39824	19241	20227	39468	19928	20815	40743	20043	20896	40939	19738	20854	40592
SA	6007	6965	12972	6204	7148	13352	6250	7083	13333	6173	7229	13402	6087	7237	13324
Tas	2288	2673	4961	2296	2633	4929	2383	2793	5176	2257	2767	5024	1901	2260	4161
Vic	21507	24996	46503	22560	25744	48304	22977	26554	49531	23468	26409	49877	23543	26432	49975
WA	9108	10073	19181	9391	10154	19545	9698	10545	20243	9535	10108	19643	9515	10277	19792

Source: ABS Cat. No. 4221.0 Schools, Australia, 2004

For each state/territory, the percentages of the state/territory populations represented by all Year 12 students for the years 2000-2004 are shown in Figure A3.2.
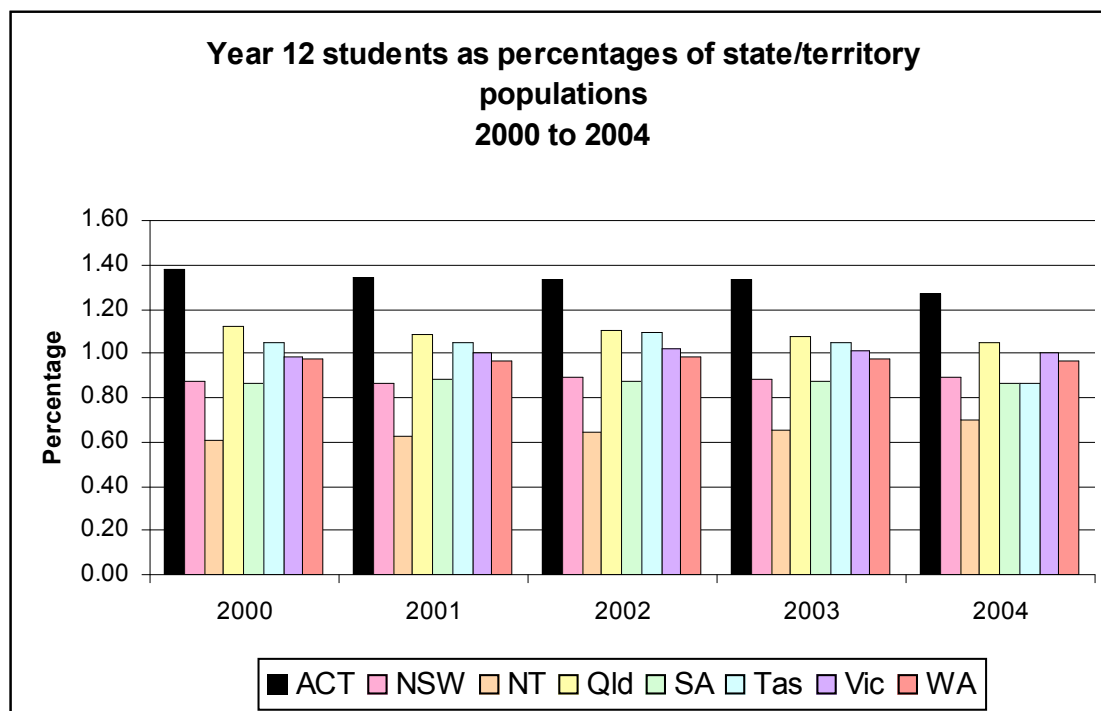

Figure A3.2.   Year 12 students as percentages of state/territory populations 2000 to 2004

Figure A3.2 is useful for noting changes in the percentages of the population in Year 12 within each State over the period 2000-2004, but the apparent percentage differences between NSW, QLD, SA, TAS, VIC, and WA may be partly or even principally explained by the various Boards of Studies counting their students at different times of the year and in different manner. In particular, the NSW percentages for 2000-2004 would be higher (more or less matching those for VIC) if an alternative set of Year 12 numbers quoted on the NSW Board of Studies website were to be used.

As can be seen in Figure A3.2, for each state/territory, the Year 12 students represented a fairly constant proportion of the state/territory population. Although Year 12 students in each state/territory represented approximately the same percentages of the state/territory populations (around 0.9%), there were some small differences. In the ACT, for example, the percentage of the population represented by Year 12 students was higher than in the other locations (approximately 1.3% with a very slight decrease over the five year period); the percentage was lowest in the Northern Territory [NT] (approximately 0.6% with a slight increase over the five year period). In the other states the percentages were more similar, around the 0.9% mark. The extremes noted for the ACT and the NT may reflect the composition of the populations in the two territories. The ACT is known for its professional, highly educated population, while the NT has many Indigenous citizens whose educational opportunities have been limited.

Australian total Year 12 enrolments in Advanced, Intermediate, and Elementary level mathematics subjects as well as total Australian mathematics enrolments expressed as percentages of Australian/state/territory populations by gender are shown in Table A3.3.

Table A3.3.   Year 12 mathematics course level enrolments as percentages of national/state/territory populations by gender, 2000 to 2004

	2000			2001			2002			2003			2004		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Advanced															
AUSTRALIA	0.17	0.10	0.13	0.16	0.09	0.13	0.16	0.09	0.13	0.17	0.10	0.14	0.17	0.10	0.13
ACT	0.19	0.11	0.15	0.18	0.12	0.15	0.17	0.12	0.14	0.17	0.12	0.15	0.18	0.13	0.15
NSW	0.21	0.15	0.18	0.21	0.14	0.17	0.22	0.14	0.18	0.24	0.17	0.20	0.24	0.17	0.20
NT	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.01	0.02	0.04	0.01	0.03	0.04	0.01	0.02
Qld	0.13	0.06	0.09	0.13	0.05	0.09	0.12	0.05	0.08	0.11	0.05	0.08	0.12	0.05	0.09
SA	0.14	0.07	0.10	0.13	0.06	0.09	0.12	0.05	0.09	0.11	0.04	0.08	0.11	0.05	0.08
Tas	0.05	0.02	0.03	0.06	0.04	0.05	0.07	0.03	0.05	0.08	0.04	0.06	0.06	0.03	0.05
Vic	0.16	0.09	0.12	0.15	0.09	0.12	0.16	0.10	0.13	0.16	0.10	0.13	0.16	0.10	0.13
WA	0.15	0.06	0.10	0.14	0.05	0.09	0.13	0.05	0.09	0.13	0.05	0.09	0.12	0.05	0.08
Intermediate															
AUSTRALIA	0.38	0.33	0.36	0.36	0.32	0.34	0.36	0.31	0.33	0.37	0.31	0.34	0.35	0.29	0.32
ACT	0.38	0.45	0.42	0.37	0.40	0.39	0.32	0.41	0.37	0.37	0.44	0.40	0.36	0.35	0.35
NSW	0.36	0.34	0.35	0.33	0.31	0.32	0.32	0.29	0.30	0.34	0.29	0.31	0.31	0.27	0.29
NT	0.10	0.14	0.12	0.14	0.11	0.13	0.11	0.12	0.12	0.11	0.10	0.11	0.14	0.10	0.12
Qld	0.50	0.45	0.48	0.49	0.43	0.46	0.48	0.41	0.45	0.47	0.41	0.44	0.46	0.40	0.43
SA	0.32	0.26	0.29	0.30	0.23	0.27	0.31	0.23	0.27	0.28	0.20	0.24	0.26	0.18	0.22
Tas	0.16	0.14	0.15	0.18	0.14	0.16	0.18	0.15	0.17	0.20	0.15	0.17	0.21	0.14	0.17
Vic	0.40	0.32	0.36	0.40	0.34	0.37	0.40	0.34	0.37	0.41	0.34	0.37	0.41	0.33	0.37
WA	0.30	0.23	0.27	0.28	0.22	0.25	0.28	0.21	0.24	0.28	0.20	0.24	0.25	0.18	0.22
Elementary															
AUSTRALIA	0.49	0.56	0.53	0.48	0.54	0.51	0.50	0.55	0.53	0.52	0.55	0.53	0.50	0.54	0.52
ACT	0.68	0.69	0.68	0.64	0.70	0.67	0.69	0.68	0.69	0.68	0.69	0.68	0.67	0.66	0.67
NSW	0.45	0.58	0.52	0.43	0.49	0.46	0.46	0.51	0.48	0.46	0.49	0.48	0.44	0.46	0.45
NT	0.20	0.31	0.25	0.24	0.32	0.28	0.23	0.26	0.24	0.27	0.29	0.28	0.24	0.31	0.27
Qld	0.70	0.78	0.74	0.68	0.75	0.72	0.69	0.76	0.72	0.69	0.75	0.72	0.66	0.75	0.71
SA	0.27	0.31	0.29	0.26	0.29	0.27	0.25	0.26	0.26	0.24	0.27	0.26	0.25	0.27	0.26
Tas	1.35	1.16	1.25	1.27	1.13	1.20	1.24	1.05	1.15	1.27	1.01	1.14	1.02	0.88	0.95
Vic	0.35	0.37	0.36	0.38	0.41	0.39	0.39	0.43	0.41	0.44	0.46	0.45	0.44	0.47	0.46
WA	0.54	0.65	0.60	0.55	0.66	0.61	0.59	0.68	0.64	0.60	0.69	0.64	0.60	0.69	0.64

As can be seen in Table A3.3, while the percentages varied from one state /territory to another, and were different for each of the three mathematics course levels, the patterns were fairly consistent across the years. The means of Australia's total Year 12 mathematics enrolments as percentages of Australian populations over the five year period in the three course levels were: Advanced: .13%; Intermediate: .34%; and Elementary: .52%.

Since there would appear to be a fairly direct relationship between Year 12 cohort sizes and Australian and state/territory population sizes, subsequent comparisons are made with respect to Year 12 cohort sizes and not national and state/territory populations.