

Mathematics B

Paper One — Question book

Wednesday 31 October 2012
9 am to 12:10 pm

Time allowed

- Perusal time: 10 minutes
- Working time: 3 hours

Examination materials provided:

- Paper One — Question book
- Paper One — Resource book
- Paper One — Response book

Equipment allowed

- QSA-approved equipment
- ruler graduated in millimetres
- protractor
- graphing calculator (additional calculator allowed)

Not allowed: calculators with computer algebra system (CAS) functionality.

Directions

You may write in this book during perusal time.
Paper One has **six** questions. Attempt **all** questions.

Assessment

Assessment standards are at the end of this book.

After the examination session

Take this book when you leave.

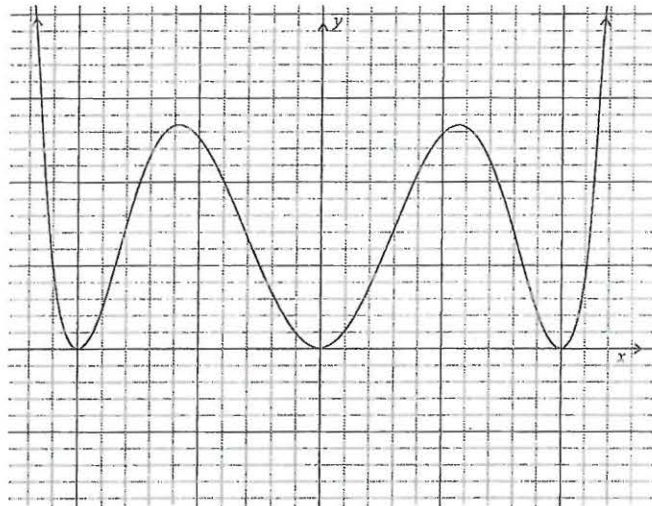
Question 3

a. Identify which of the following are **not** functions.

i. $y = 2x^2 + \sqrt{2}$

ii. $\{(0, -1), (1, 0), (1, 1), (2, 2)\}$

iii.



iv. $y^2 = x + 3$

(KP)

b. Given that $f(x) = 2x^2 - 32$, find:

i. $f(-2)$

ii. x , if $f(x) = 0$

(KP)

c. Given that $f(x) = x^2 - 2x$ and $h(x) = 3x + 4$, find:

i. $f(h(x))$

ii. $h^{-1}(x)$

(KP)

d. State the domain and range for the function $y = 4 - x^2$. Support your decisions with a sketch.

(KP)

e. Solve the equation $x^2 - 6x + 5 = 0$ by the method of completing the square.

(KP)

f. A straight line has a gradient of -3 . The triangle that the line forms with the positive axes has an area of 9 square units.

Select and use suitable strategies and procedures to find the equation of the line.

(MP)

g. A parabola has the equation $y = ax^2 + bx$. The points $(-2, 14)$ and $(3, 9)$ lie on the parabola. Find the equation of this parabola.

(MP)



**Victorian Certificate of Education
2011**

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

Letter

Figures

Words

FURTHER MATHEMATICS

Written examination 2

Monday 7 November 2011

Reading time: 11.45 am to 12.00 noon (15 minutes)

Writing time: 12.00 noon to 1.30 pm (1 hour 30 minutes)

QUESTION AND ANSWER BOOK

Structure of book

Core		
<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
4	4	15
Module		
<i>Number of modules</i>	<i>Number of modules to be answered</i>	<i>Number of marks</i>
6	3	45
		Total 60

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, one bound reference, one approved graphics calculator or approved CAS calculator or CAS software and, if desired, one scientific calculator. Calculator memory DOES NOT need to be cleared.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 38 pages, with a detachable sheet of miscellaneous formulas in the centrefold.
- Working space is provided throughout the book.

Instructions

- Detach the formula sheet from the centre of this book during reading time.
- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

Question 2

Tom and Patty both decided to invest some money from their savings. Each chose a different investment strategy.

Tom's investment strategy

- Deposit \$5 600 into an account with an interest rate of 7.2% per annum, compounding monthly.
 - Immediately after interest is paid into his investment account on the last day of each month, deposit a further \$200 into the account.
- a. Determine the total amount in Tom's investment account at the end of the first month.

1 mark

Patty's investment strategy

- Invest \$8 000 at the start of the year at an interest rate of 7.2% per annum, compounding **annually**.
- b. The following expression can be used to determine the value of Patty's investment at the end of the first year. Complete the expression by filling in the box.

$$\text{Value of investment} = 8\,000 \times (1 + \boxed{})$$

1 mark

At the end of twelve months, Patty has more money in her investment account than Tom.

- c. How much more does she have?

Write your answer to the nearest cent.

2 marks

- d. What annual compounding rate of interest would Patty need in order to earn \$1000 interest in one year on her \$8 000 investment?

Write your answer correct to one decimal place.

1 mark