

Index Number	Class	Name
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CHIJ ST JOSEPH'S CONVENT

Semestral Assessment 2

Mathematics

4017/1

Paper 1

13th October 2006

Secondary One Express

1 hour

INSTRUCTIONS FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, index number and class on the cover page in the spaces provided.

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue or correction fluid.

The use of calculators is not allowed in this paper.

All working must be shown clearly.

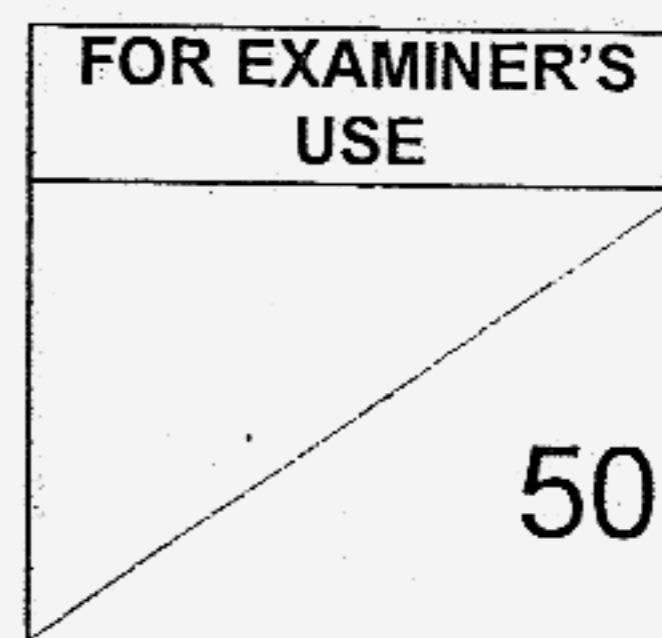
Omission of essential working or units may result in loss of marks.

Working in pencil will not be marked.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

If the degree of accuracy is not specified in the question, and if the answer is not exact, the answer should be given to three significant figures. Answers in degree should be given to one decimal place.



This document consists of 11 printed pages.

CALCULATORS MUST NOT BE USED IN THIS PAPER

For
Examiner's
Use

- 1 (a) Express $\frac{7}{50}$ as a decimal.
(b) Express 0.04 as a percentage.

Answer (a) _____ [1]

(b) _____ % [1]

- 2 (a) Express 0.125 as a fraction in its lowest term.
(b) Evaluate $\frac{2}{3} + \frac{5}{7}$.

Answer (a) _____ [1]

(b) _____ [2]

3. (a) Evaluate $54 \div 0.6$.

Answer (a) _____ [1]

(b) Add brackets to the left hand side of the equation in the answer space to make it correct.

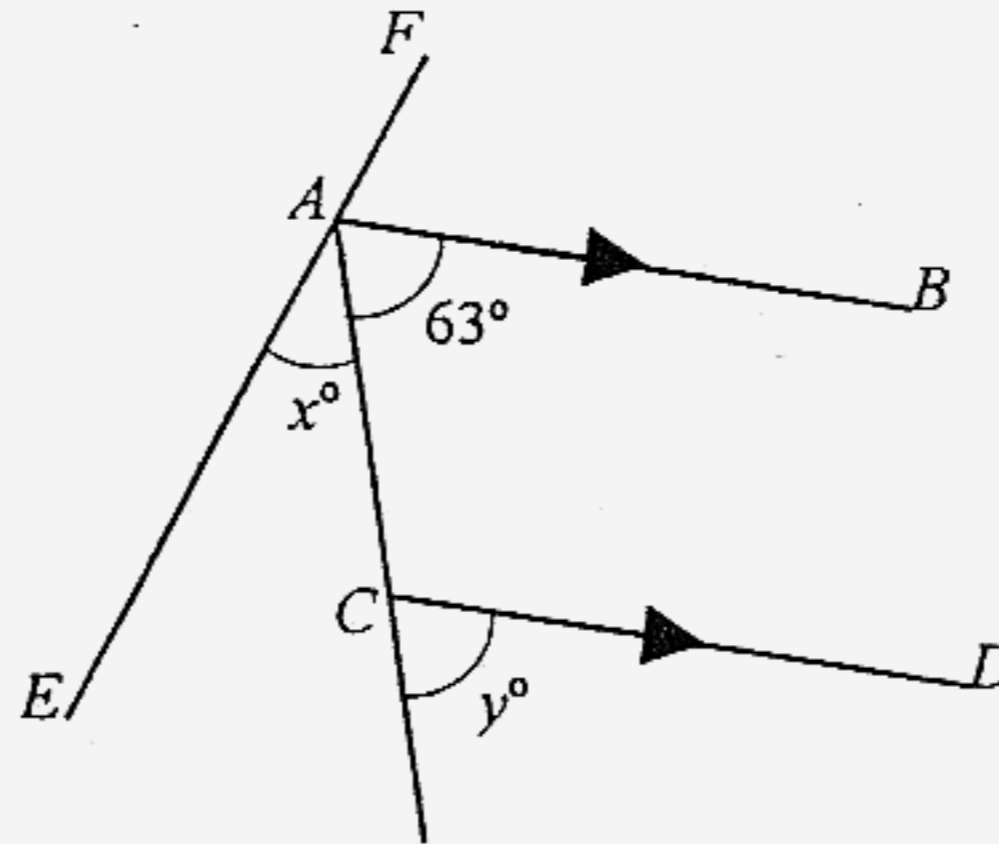
Answer (b) $2 + 36 \div 2 \times 3 = 8$ [1]

- 4 In the diagram, EAF is a straight line and AB is parallel to CD.

AB bisects \widehat{FAC} and $\widehat{CAB} = 63^\circ$.

Find the value of

- (a) x ,
(b) y .



Answer (a) $x =$ _____ [1]

Reason : _____ [1]

(b) $y =$ _____ [1]

Reason : _____ [1]

- 5 Simplify $2[y - 3(2y + x)] - 3x$.

Answer _____ [2]

- 6 It is given that $x = -1.5$, $y = 3.5$ and $z = 4.5$.
- (a) Find the value of $x - y$.
- (b) Given also that $(y + z) : t = 2 : 5$. Find the value of t .

Answer (a) _____ [1]

(b) _____ [2]

- 7 The length of each of Vivian's pace is 0.45m. She walks at a constant speed of 2 paces per second. Calculate the distance, in kilometres, that she walks in one hour.

Answer _____ km [2]

8 Solve the equation $\frac{3x+3}{4} - \frac{2x-1}{3} = 1$.

- 9 (a) Express 1764 as the product of prime factors. *Answer* $x =$ _____ [3]
(b) Hence evaluate $\sqrt{1764}$.

Answer (a) _____ [2]

(b) _____ [1]

- 10 (a) Write down the next 2 terms in the sequence 24, 30, 37, 45,
- (b) What is the value of $1 - 2 + 3 - 4 + 5 - \dots + 47 - 48 + 49 - 50$?

Answer (a) _____ [1]

(b) _____ [2]

- 11 Factorise completely $3px - 2py - 15qx + 10qy$.

Answer _____ [2]

- 12 (a) Round off 1.4955 to 3 significant figures.
- (b) Estimate the value of $\frac{70.4 \times 41.45}{4093}$, giving your answer correct to 1 significant figure.

Answer (a) _____ [1]

(b) _____ [1]

- 13 Chloe needs to catch a train that leaves at 1530. She estimates that the journey from home to the train station would take $1\frac{1}{4}$ hours. What time must Chloe leave the house in order to catch the train?

Answer _____ [1]

- 14 Ray and John have \$42 and \$30 respectively. They each spent the same amount of money on a pair of shoes. If Ray had twice as much money as John after buying the pair of shoes, how much was the pair of shoes?

Answer \$ _____ [3]

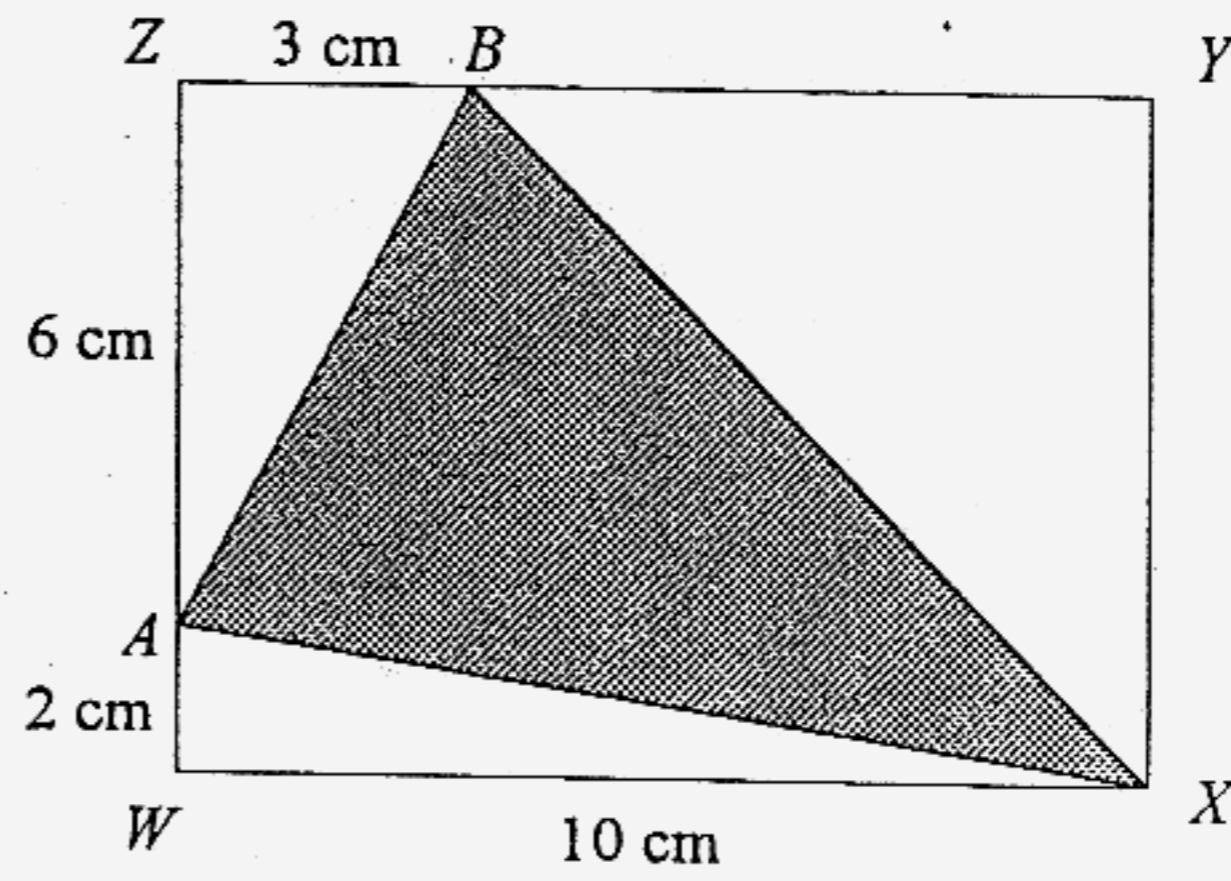
15 The temperature at 07 00 is -8°C and the temperature at 15 00 is 16°C .

- (a) Find the difference between the two temperatures.
- (b) Assuming that the temperature rises at a steady rate, find the time when the temperature is 7°C .

Answer (a) _____ $^{\circ}\text{C}$ [1]

(b) _____ [3]

- 16 $\triangle ABX$ is enclosed within the rectangle $WXYZ$ as shown in the figure below. Calculate the area of $\triangle ABX$.

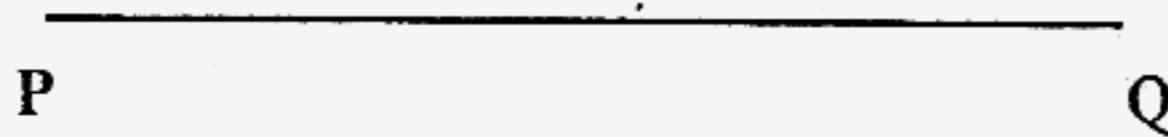


Answer _____ cm^2 [3]

- 17 In the answer space below, the line PQ is the base of a parallelogram PQRS with $\angle PQR = 120^\circ$ and $PR = 10$ cm. Complete the parallelogram PQRS. [2]

On the same diagram,

- (a) construct the perpendicular bisector of PQ, [1]
(b) mark clearly on RS, the point X, where the perpendicular bisector of PQ meets RS, [1]
(c) measure and write down the length of XQ correct to the nearest 0.1 cm.



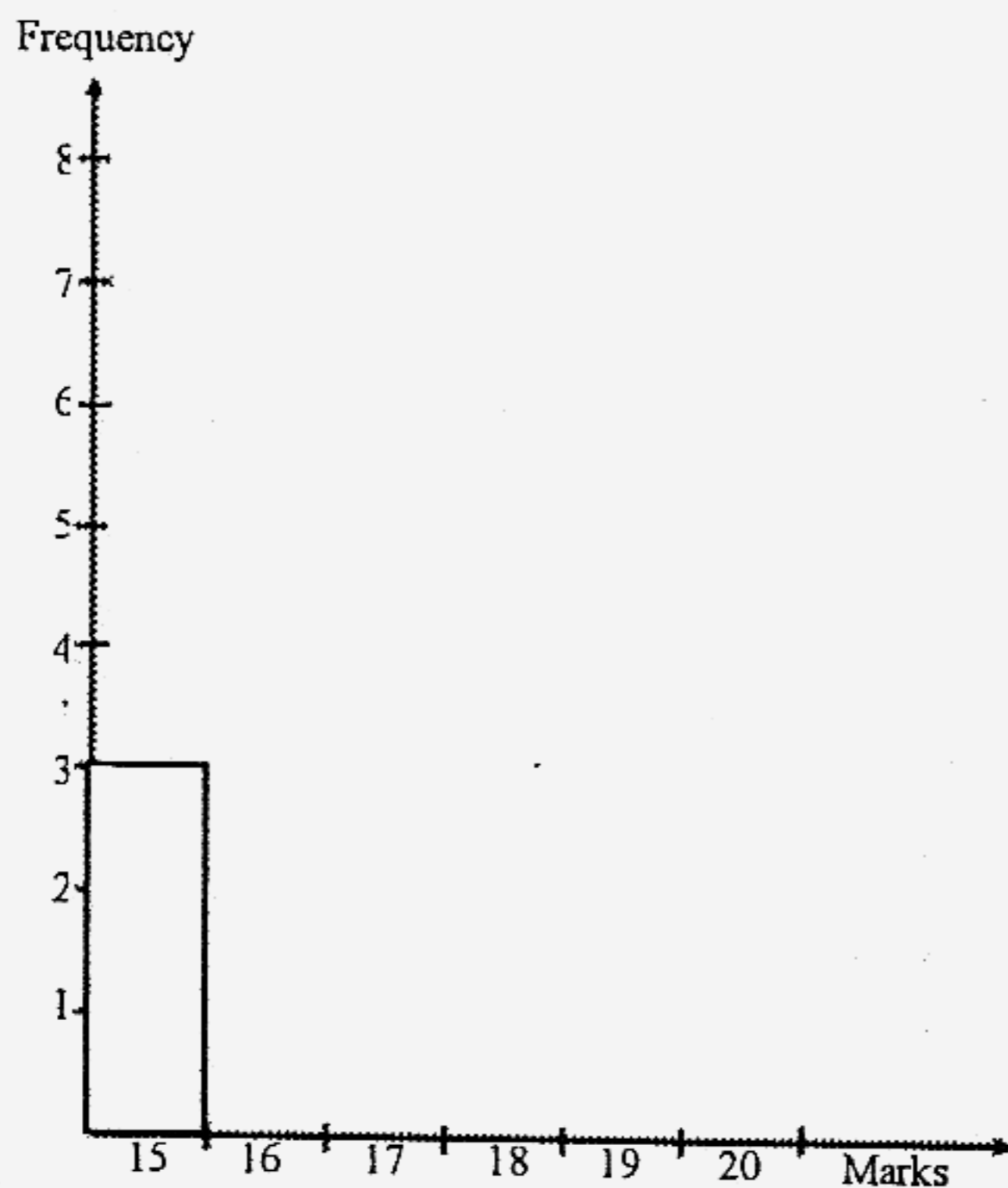
Answer (c) _____ cm [1]

- 18 The following data shows the marks obtained by 24 students in a quiz. The full mark of the quiz is 20.

16	19	18	20	17	19
16	19	18	18	16	15
18	17	15	18	17	18
19	18	20	15	18	16

The data is being entered on the histogram in the answer space. The first bar has already been drawn.

- (a) Complete the histogram.
 (b) If the data is represented on a pie chart, what angle is represented by the students who scored 18 marks?



Answer (a) [1]

(b) _____° [2]

THE END

Index Number	Class	Name
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CHIJ ST JOSEPH'S CONVENT

Semestral Assessment 2

Mathematics

4017/2

Paper 2

13th October 2006

Secondary One Express

1 hour 30 mins

INSTRUCTIONS FOR CANDIDATES

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Write your name, index number and class on the cover page in the spaces provided.

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue or correction fluid.

The use of calculators is allowed in this paper.

All working must be shown clearly.

Omission of essential working or units may result in loss of marks.

Working in pencil will not be marked.

Answer **all** questions in Section A.

Answer only **one** Question in Section B

Write your answers in the spaces provided on the question paper.

If the degree of accuracy is not specified in the question, and if the answer is not exact, the answer should be given to three significant figures. Answers in degree should be given to one decimal place.

FOR EXAMINER'S USE	
Section A	42
Section B	8
TOTAL	50

This document consists of 10 printed pages.

CALCULATORS MAY BE USED IN THIS PAPER

Section A [42 marks]

Answer **all** the questions in this section.

For
Examiner's
Use

- 1 Evaluate each of the following, giving your answers correct to 2 significant figures.

(a) $\frac{(1.91 \times \sqrt{392})^2}{3.21}$

(b) $\frac{\sqrt[3]{993}}{1.234^3 + 1.23}$

Answer (a) _____ [1]

(b) _____ [1]

- 2 Factorise completely

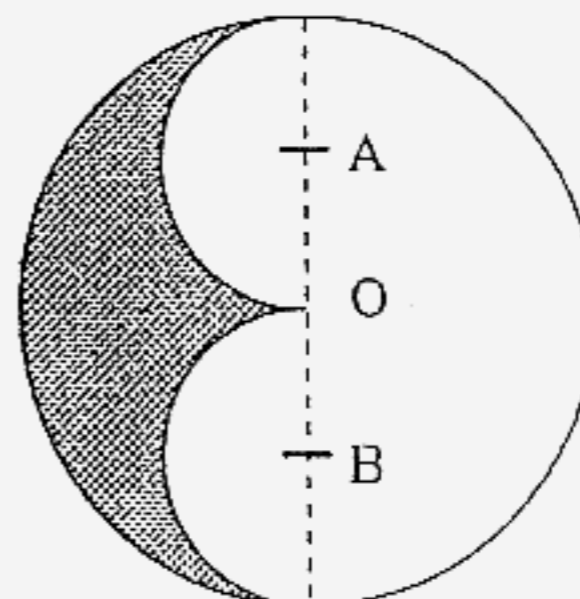
(a) $x^2 - 3x$,

(b) $4cd - 2bd - 6ac + 3ab$.

Answer (a) _____ [1]

(b) _____ [2]

- 3 The diagram shows 2 semicircles of equal radius enclosed by a circle of diameter 16 cm. The centres A and B of the semicircles and the centre O of the outer circle lie on the same straight line. Find,
- (a) the perimeter of the unshaded region,
- (b) the area of the shaded region.



Answer (a) _____ cm [2]

(b) _____ cm² [2]

- 4 If $\frac{1}{a} - \frac{b}{c} = d$, find c when $a = -4$, $b = 2$ and $d = 3$.

Answer _____ [2]

5 Solve the following equations

(a) $4x - 7(2 - 5x) = 64,$

(b) $x - \frac{3x - 1}{4} = 2 + \frac{2x - 9}{3}.$

Answer (a) _____ [2]

(b) _____ [3]

6 The numbers 504 and 3 136, written as the products of their prime factors, are $504 = 2^3 \times 3^2 \times 7$ and $3\ 136 = 2^6 \times 7^2$. Find

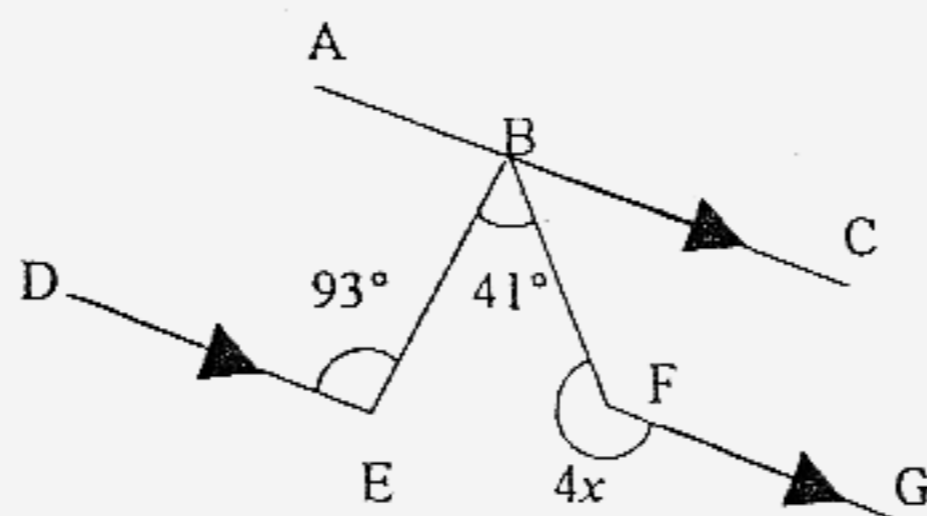
(a) the highest common factor of 504 and 3 136,

(b) the smallest positive integer value of n for which $504n$ is a perfect square.

Answer (a) _____ [1]

(b) _____ [1]

- 7 (a) In the diagram, ABC , DE and FG are parallel. $\angle DEB$ is 93° and $\angle EBF$ is 41° .
Find the value of x .



- (b) A regular polygon has n sides. The size of each interior angle is 4 times the size of each exterior angle.
- Calculate the value of each exterior angle.
 - Calculate the value of n .

Answer (a) _____ $^\circ$ [3]

(b)(i) _____ $^\circ$ [2]

(ii) _____ [1]

- 8 All teachers are offered an increase in salary calculated according to either Scheme A or Scheme B.

Scheme A gives an increase of 10% of their present monthly salary.

Scheme B gives an increase of 8% of their present monthly salary plus an extra \$100.

- (a) Ms Chia earns \$3500 per month at present. Calculate her new monthly salary
- (i) under Scheme A,
 - (ii) under Scheme B,
- (b) Express Ms Chia's increase under Scheme B as a fraction of her present salary in its lowest term.
- (c) Mr Sim calculated that his new monthly salary would be the same under either scheme. Calculate his present salary.

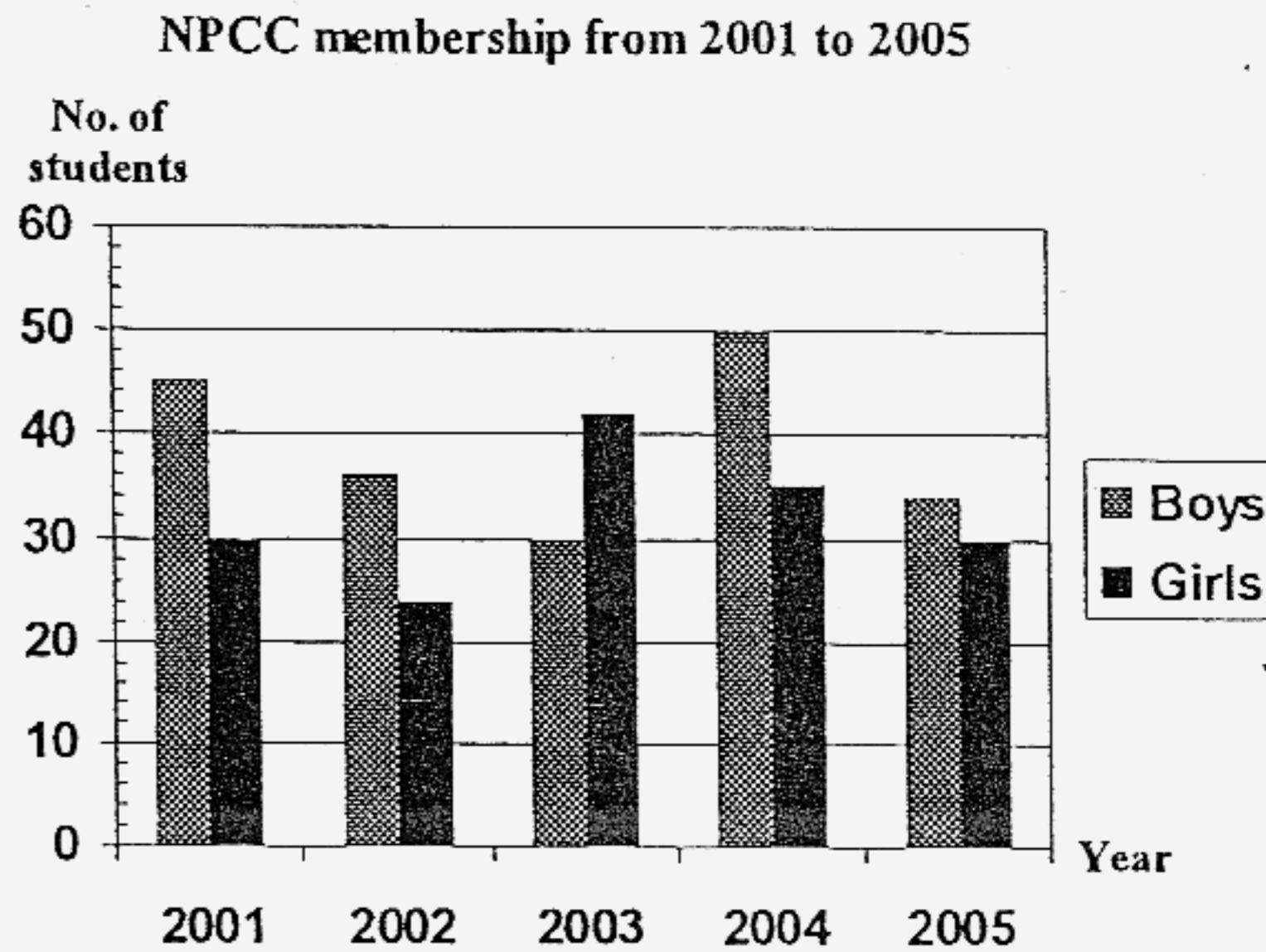
Answer (a)(i) \$ _____ [1]

(ii) \$ _____ [1]

(b) _____ [1]

(c) \$ _____ [2]

- 9 The bar graph below shows the membership of a school's NPCC from the year 2001 to 2005.



- (a) (i) In which year did the number of girls outnumber the number of boys in the uniform group's membership roll?
- (ii) What was the ratio of the number of girls to the number of boys in that year?
- (b) Calculate the percentage of girls in the year 2005, leaving your answer in 1 decimal place?

Answer (a)(i) _____ [1]

(ii) _____ [1]

(b) _____ [1]

- 10 At a veterinary clinic three puppies were weighed. It was found that Mambo was 800 g heavier than Bonus but 300 g lighter than Magnum. Given that Magnum is also thrice as heavy as Bonus and that Mambo has a mass of x kg, form an equation in x and use it to find the mass of Bonus.

Answer _____ [3]

- 11 Answer the whole of this question on a sheet of graph paper.

The following table shows the value of $y = 2x - 7$.

x	-1	0	1	2	3	4
y	a	-7	-5	-3	b	1

- (a) Find the values of a and b . [1]
- (b) Using a scale of 2 cm to represent 1 unit on both axes, draw the graph $y = 2x - 7$ for $-1 \leq x \leq 4$. [3]
- (c) Write down the coordinates of the point where the line intersects the y -axis. [1]
- (d) From your graph, find
- (i) the value of y when $x = 1.6$, and [1]
- (ii) the value of x when $y = -5.8$. [1]

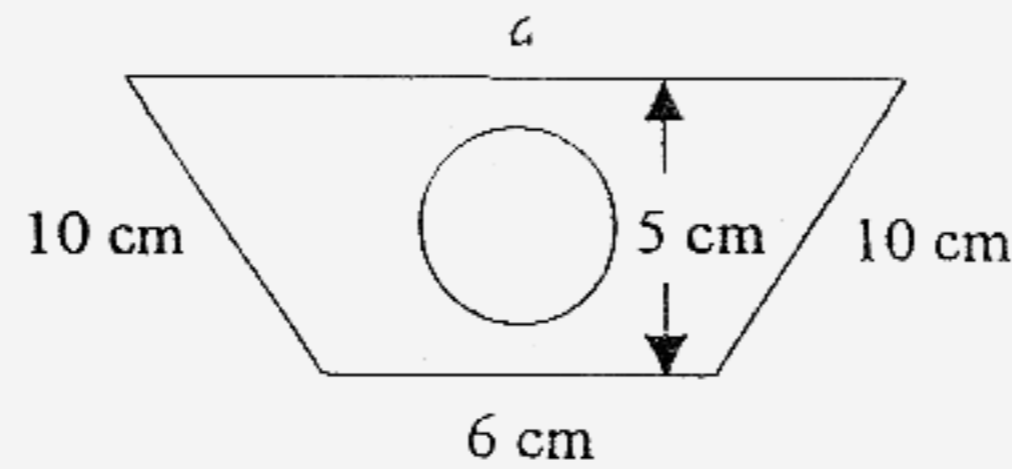
Section B [8 marks]

Answer **ONE** question in this section.

EITHER

12 The diagram below shows the trapezoidal cross-section of a solid of length 8 cm. The solid is formed by drilling a hole of radius 2 cm through the prism.

- (a) Given that the cross-sectional area of the trapezoidal prism before the hole is drilled is 70 cm^2 , find a .
- (b) Find the volume of the solid, leaving your answer in 2 decimal places.
- (c) Find the total surface area of the solid, leaving your answer in 2 decimal places.



Answer (a) _____ cm [2]

(b) _____ cm^3 [3]

(c) _____ cm^2 [3]

OR

- 13 The table below shows a series of odd numbers, the number of terms (n) in the series and the sum of the series (S).

Series	No. of terms (n)	Sum (S)
1	1	1
1 + 3	2	4
1 + 3 + 5	3	9
1 + 3 + 5 + 7	4	16
1 + 3 + 5 + 7 + 9	a	b
1 + 3 + 5 + 7 + 9 + ... + $(2k + 1)$	c	d

Study the number pattern in the table and then answer the following questions.

- Write down the numerical values of a and b .
- Write down the values of c and d in terms of k .
- Write down a formula connecting S and n .
- Find the numerical value of $1 + 3 + 5 + 7 + \dots + 199$.
- Given that $1 + 3 + 5 + 7 + \dots + x = 3600$, find the value of x .

Answer (a) $a =$ _____ $b =$ _____ [1]

(b) $c =$ _____ $d =$ _____ [2]

(c) _____ [1]

(d) _____ [2]

(e) _____ [2]

THE END

Marking Scheme for Sec 1 Exp E Maths Paper 1 SA 2 2006

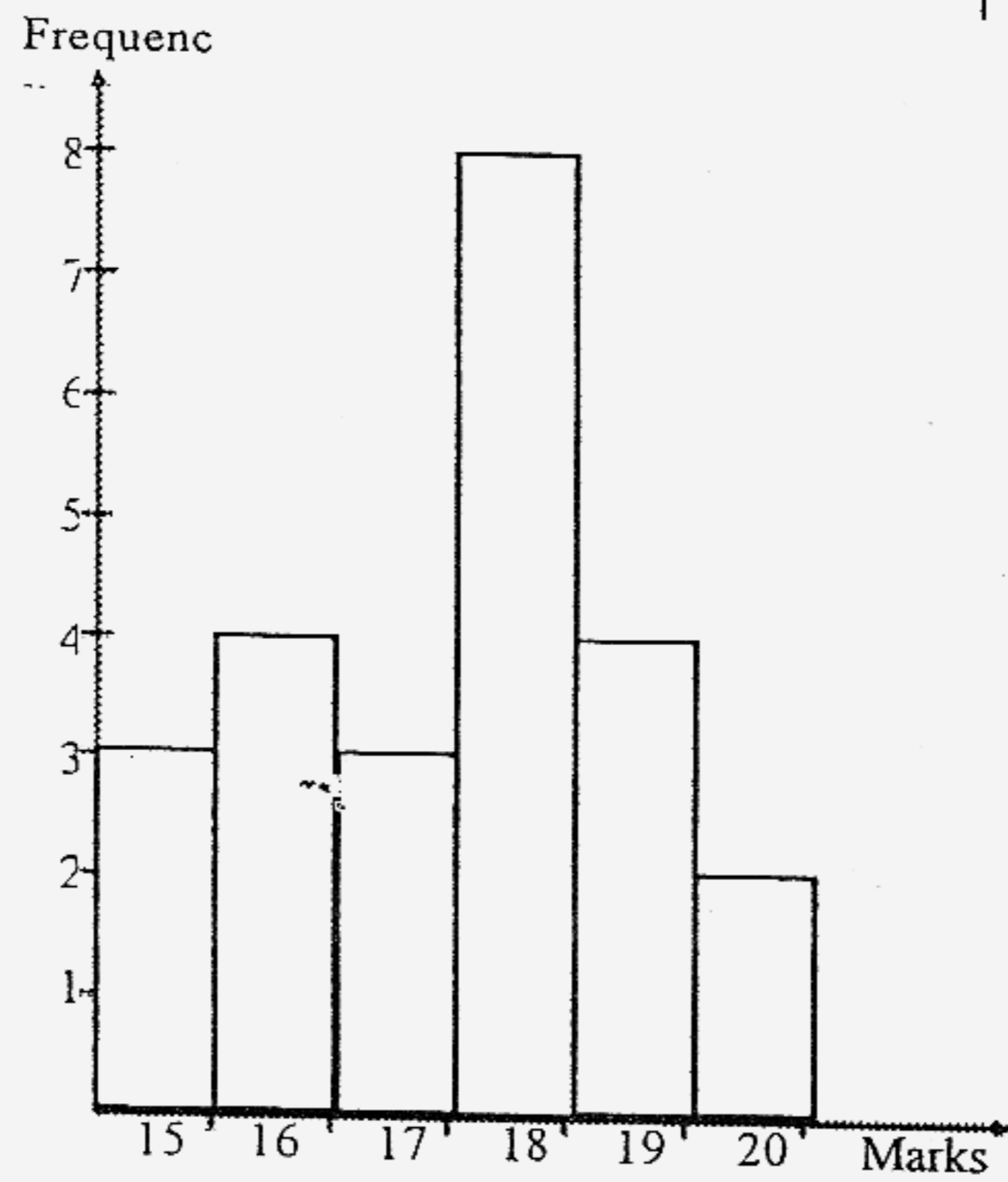
Qn No.	Marking Scheme	Remarks
1	a) 0.14 (B1) b) 4 (B1)	
2	a) $\frac{125}{1000} = \frac{1}{8}$ (B1) b) $\frac{2}{3} + \frac{5}{7}$ $= \frac{14}{21} + \frac{15}{21}$ $= \frac{29}{21}$ (M1) $= 1\frac{8}{21}$ (A1)	
3	a) 90 (B1) b) $2 + 36 \div (2 \times 3) = 8$ (B1)	
4	a) $180^\circ - 63^\circ - 63^\circ$ $= 54^\circ$ (B1) (adj. angles on a st. line) (B1) b) 63° (B1) (corr. angles) (B1)	
5	$2[y - 3(2y + x)] - 3x$ $= 2[y - 6y - 3x] - 3x$ $= 2(-5y - 3x) - 3x$ (M1) $= -10y - 6x - 3x$ $= -10y - 9x$ (A1)	
6	a) $-1.5 - 3.5$ $= -5$ (B1) b) $(3.5 + 4.5) : t = 2 : 5$ $8 : t = 2 : 5$ $24 : 3t = 8 : 20$ (M1) $t = 20$ (A1)	

7	$3600 \times 2 \times 0.45$ $= 3\,240 \text{ m (M1)}$ $= 3.24 \text{ km (A1)}$	
8	$\frac{9x+9}{12} - \frac{8x-4}{12} = 1 \text{ (M1)}$ $\frac{9x+9-8x+4}{12} = 1 \text{ (M1)}$ $x+13 = 12$ $x = -1 \text{ (A1)}$	
9	<p>a) $\begin{array}{r} 2 \overline{) 1764} \\ 2 \overline{) 882} \\ 3 \overline{) 441} \\ 3 \overline{) 147} \\ 7 \overline{) 49} \\ \underline{7} \end{array} \text{ (M1)}$</p> $1764 = 2 \times 2 \times 3 \times 3 \times 7 \times 7 \text{ (A1)}$ <p>b) $\sqrt{1764} = 2 \times 3 \times 7 = 42 \text{ (B1)}$</p>	Accept $2^2 \times 3^2 \times 7^2 \text{ (A1)}$
10	<p>a) 54, 64 (B1)</p> <p>b) $1 + 49$</p> $-2 - 48$ $3 + 47$ $-4 - 46$ <p>.....</p> $23 + 27$ $-24 - 26$ $25 - 50 = -25 \text{ (B2)}$	
11	$3px - 2py - 15qx + 10qy$ $= p(3x - 2y) - 5q(3x - 2y) \text{ (M1)}$ $= (p - 5q)(3x - 2y) \text{ (A1)}$	

12	<p>a) 1.50 (B1)</p> <p>b) $\frac{70 \times 41}{4100} = \frac{70}{100} = 0.7$ (B1)</p>	
13	<p>15 30 – 1 15</p> <p>= 14 15 (B1)</p>	Accept 2.15pm
14	<p>$42 - x = 2(30 - x)$ (M1)</p> <p>$42 - x = 60 - 2x$</p> <p>$2x - x = 60 - 42$ (M1)</p> <p>$x = 18$ (A1)</p>	
15	<p>a) $16 - (-8)$</p> <p>= 24 (B1)</p> <p>b) 8 hrs – 24°C</p> <p>1 hr – 3°C (M1)</p> <p>$7 - (-8) = 15^\circ$</p> <p>$15 \div 3 = 5$ hrs (M1)</p> <p>Time = 07 00 + 5 hrs</p> <p>= 12 00 (A1)</p>	Accept 12pm.
16	<p>Area of $WXYZ = 8 \times 10 = 80$</p> <p>Area of $\triangle ABZ = \frac{1}{2} \times 3 \times 6 = 9$</p> <p>Area of $\triangle AWX = \frac{1}{2} \times 2 \times 10 = 10$ } (M1)</p> <p>Area of $\triangle BXY = \frac{1}{2} \times 7 \times 8 = 28$ }</p> <p>Area of $\triangle ABX = 80 - 9 - 10 - 28$ (M1)</p> <p>= 33 (A1)</p>	
17	c) 5.2 cm (B1)	Accept 5.1 5.3cm

18

a)



b) $\frac{8}{24} \times 360$ (M1)
 $= 120^\circ$ (A1)

Marking Scheme for Sec 1 Exp E Maths Paper 2 SA2 2006

Qn No.	Marking Scheme	Remarks
1	a) 450 (B1) b) 3.2 (B1)	
2	a) $x(x - 3)$ (B1) b) $4cd - 2bd - 6ac + 3ab$ $= 2d(2c - b) - 3a(2c - b)$ (M1) $= (2d - 3a)(2c - b)$ (A1)	
3	a) Perimeter of outer semicircle $= \frac{1}{2} \times 2 \times 3.14 \times 8$ $= 25.12$ Perimeter of inner semicircle $= \frac{1}{2} \times 2 \times 3.14 \times 4$ $= 12.56$ Perimeter of unshaded region $= 25.12 + 2 \times 12.56$ (M1) $= 50.24$ (A1) Area of outer semicircle $= \frac{1}{2} \times 3.14 \times 8^2$ $= 100.48$ Area of inner semicircle $= \frac{1}{2} \times 3.14 \times 4^2$ $= 25.12$ Area of the shaded region $= 100.48 - 2(25.12)$ (M1) $= 50.24$ (A1)	
4	$\frac{1}{-4} - \frac{2}{c} = 3$ $-\frac{2}{c} = 3 + \frac{1}{4}$ (M1) $-\frac{2}{c} = \frac{13}{4}$ $-8 = 13c$ $c = -\frac{8}{13}$ (A1)	

5	<p>a) $4x - 7(2 - 5x) = 64$ $4x - 14 + 35x = 64$ (M1) $39x = 78$ $x = 2$ (A1)</p> <p>b) $\frac{4x}{4} - \frac{3x-1}{4} = \frac{6}{3} + \frac{2x-9}{3}$ $\frac{4x-3x+1}{4} = \frac{6+2x-9}{3}$ (M1) $3(x+1) = 4(2x-3)$ $3x+3 = 8x-12$ (M1) $5x = 15$ $x = 3$ (A1)</p>	
6	<p>a) $2^3 \times 7 = 56$ (B1)</p> <p>b) $2 \times 7 = 14$ (B1)</p>	
7	<p>a) $\angle FBC = 93^\circ - 41^\circ = 52^\circ$ $\angle BFG = 180^\circ - 52^\circ = 128^\circ$ (M1) $4x = 360^\circ - 128^\circ = 232^\circ$ (M1) $x = 58^\circ$ (A1)</p> <p>b) i) Let x be 1 exterior angle. $4x + x = 180^\circ$ (M1) $5x = 180^\circ$ $x = 36^\circ$ (A1)</p> <p>ii) $n = \frac{360}{36} = 10$ (B1)</p>	
8	<p>a) i) $3500 \times \frac{110}{100} = 3850$ (B1)</p> <p>ii) $3500 \times \frac{108}{100} + 100 = 3880$ (B1)</p> <p>b) $\frac{3880 - 3500}{3500} = \frac{19}{175}$ (B1)</p>	

	<p>c) $x \times 1.1 = x \times 1.08 + 100$ (M1)</p> $0.02x = 100$ $x = 5000$ (A1)	
9	<p>a) i) 2003 (B1)</p> <p>ii) 42 : 30 7 : 5 (B1)</p> <p>b) $\frac{30}{64} \times 100 = 46.9$ (B1)</p>	
10	<p>Bonus = $x - 0.8$ kg</p> <p>Magnum = $x + 0.3$ kg</p> $3(x - 0.8) = x + 0.3$ (M1) $3x - 2.4 = x + 0.3$ $2x = 2.7$ $x = 1.35$ (M1) <p>Bonus = $1.35 - 0.8 = 0.55$ kg (A1)</p>	
11	<p>a) $a = -9, b = -1$ (B1)</p> <p>c) $(0, -7)$ (B1)</p> <p>d) i) 3.7 3.9 (B1)</p> <p>ii) 0.5 0.7 (B1)</p>	a) Award marks only if both are correct.
12	<p>a) $\frac{1}{2}(a+6) \times 5 = 70$ (M1)</p> $a + 6 = 28$ $a = 14$ (A1) <p>b) Volume of cylinder = $3.14 \times 2 \times 2 \times 8 = 100.48$ (M1)</p> <p>Volume of trapezoidal prism = $70 \times 8 = 560$ (M1)</p> <p>Volume of solid = $560 - 100.48 = 459.52 \text{ cm}^3$ (A1)</p>	

	<p>c) Area of circle = $3.14 \times 2 \times 2 = 12.56$</p> <p>Curved surface area of cylinder =</p> $2 \times 3.14 \times 2 \times 8 = 100.48 \text{ (M1)}$ <p>Surface area of trapezoidal prism</p> $= 70 \times 2 + (14 + 10 + 10 + 6) \times 8$ $= 140 + 320 = 460 \text{ (M1)}$ <p>Total surface area = $460 - (12.56 \times 2) + 100.48$</p> $= 535.36 \text{ cm}^2 \text{ (A1)}$	
13	<p>a) $a = 5, b = 25 \text{ (B1)}$</p> <p>b) $c = \frac{1 + (2k + 1)}{2}$</p> $= \frac{2k + 2}{2} = k + 1 \text{ (B1)}$ $d = (k + 1)^2 \text{ (B1)}$ <p>c) $S = n^2 \text{ (B1)}$</p> <p>d) $\frac{1 + 199}{2} = 100 \text{ (M1)}$</p> $\text{Sum} = 100^2 = 10000 \text{ (A1)}$ <p>e) $\sqrt{3600} = 60$</p> $\frac{1 + x}{2} = 60 \text{ (M1)}$ $1 + x = 120$ $x = 119 \text{ (A1)}$	<p>a) Award marks only if both are correct.</p> <p>d) 10000 (B2)</p>