Surname		Other Names	
Centre Number			Candidate Number					
Candidate Signature									

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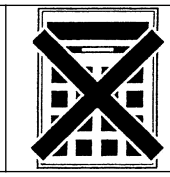
General Certificate of Secondary Education
June 2006

MATHEMATICS (SPECIFICATION A) **3301/1I**
Intermediate Tier
Paper 1 Non-Calculator

Monday 5 June 2006 1.30 pm to 3.30 pm

For this paper you must have:
- mathematical instruments

You must **not** use a calculator.



Time allowed: 2 hours

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this booklet.

Information

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer booklet.

Advice

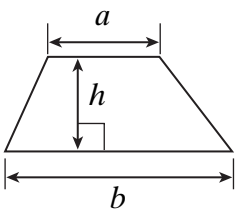
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
TOTAL	
Examiner's Initials	

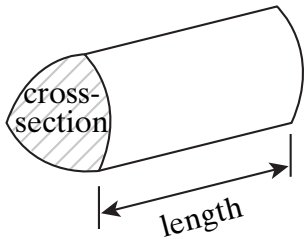
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross-section × length



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Answer **all** questions in the spaces provided.

1 Write the following in order, starting with the smallest.

0.22 $\frac{3}{20}$ 19%

You **must** show your working.

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Answer ....., ..., ... *(3 marks)*

2 The table shows a way of writing numbers using powers of 10.
Complete the table.

200	2×100	2×10^2
5000	5×1000	.....
70 000	$7 \times$	.....

(3 marks)

Turn over for the next question

6

3 (a) Work out the value of 1.3 – 0.71

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Answer ..... *(1 mark)*

(b) The value of 632 × 47 is 29 704
Write down the value of 297.04 ÷ 47

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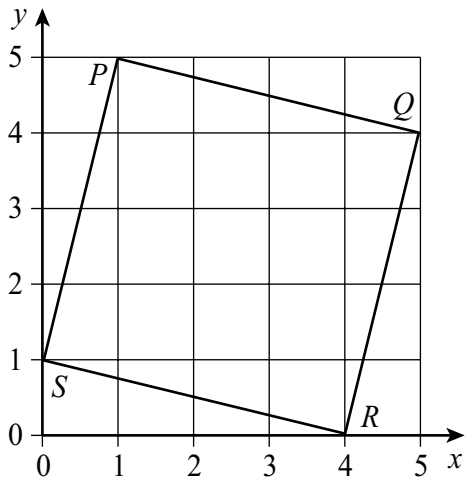
Answer ..... *(1 mark)*

4 The square *PQRS* is drawn on a centimetre square grid.



Calculate the area of square *PQRS*.
You **must** show your working.
State the units of your answer.

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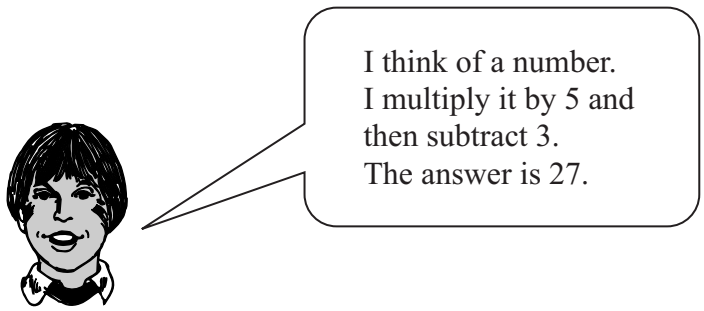
Answer ..... *(4 marks)*

5 (a) Suki is playing a 'Think of a Number' game.



What number does Suki think of?

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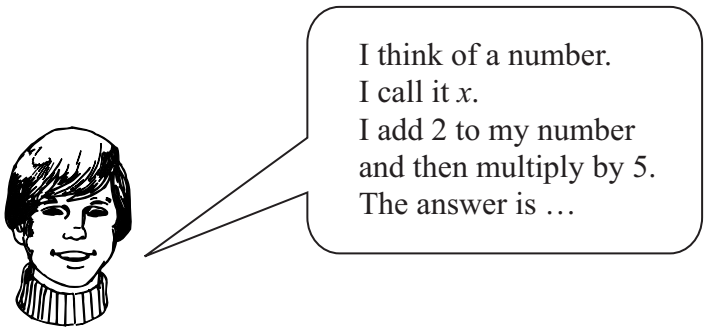
Answer ..... *(2 marks)*

(b) Tim is also playing a 'Think of a Number' game.



Write down an expression in terms of x for Tim's answer.

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Answer ..... *(2 marks)*

10

6 A supermarket sells 500 kg of potatoes.

$\frac{3}{10}$ of the potatoes are sold in 5 kg bags.

How many 5 kg bags of potatoes does the supermarket sell?

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Answer ..... bags *(4 marks)*

7 A bag contains blue, red and green cards only.
One card is taken at random from the bag.
The table shows the probabilities of taking a blue card and a red card.

Colour	Blue	Red	Green
Probability	0.3	0.5	

(a) What is the probability of taking a yellow card from the bag?

Answer ..... *(1 mark)*

(b) What is the probability of taking a card that is **not** blue from the bag?

.....

Answer ..... *(1 mark)*

(c) Complete the table to show the probability of taking a green card from the bag.

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(1 mark)

8 A supermarket sells jars of coffee of the same brand in two different sizes.

Regular

Large

Which jar gives the better value for money?
You **must** show your working.

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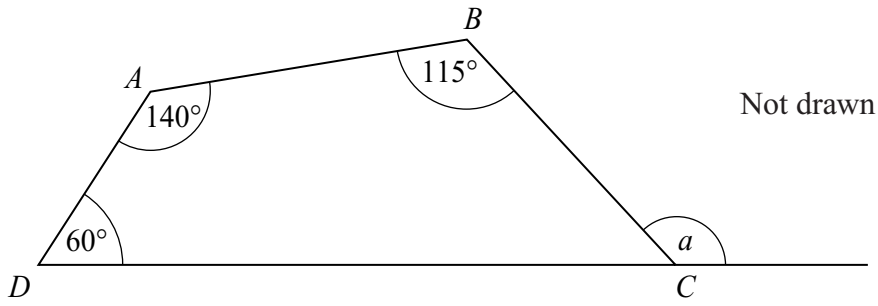
Answer ..... *(3 marks)*

Turn over for the next question

10

9 (a) *ABCD* is a quadrilateral.



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Work out the size of the exterior angle *a*.

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Answer ..... degrees *(3 marks)*

(b) Tim says he can draw a quadrilateral with **exactly** three right angles.
Explain why this is not possible.

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(2 marks)

10 Tina records this data in a survey about how students travel to school.

Gender	Method of travel
Girl	Bus
Boy	Walk
Girl	Car
Boy	Bus
Girl	Walk
Boy	Car
Girl	Bike
Boy	Walk
Girl	Walk
Girl	Walk

(a) Complete this two-way table to show Tina's data.

	Walk	Other
Boy	2	
Girl		

(2 marks)

(b) Tina looks at her data.
She says it shows that girls are more likely to walk to school than boys.
Is this true?
Give a reason for your answer.

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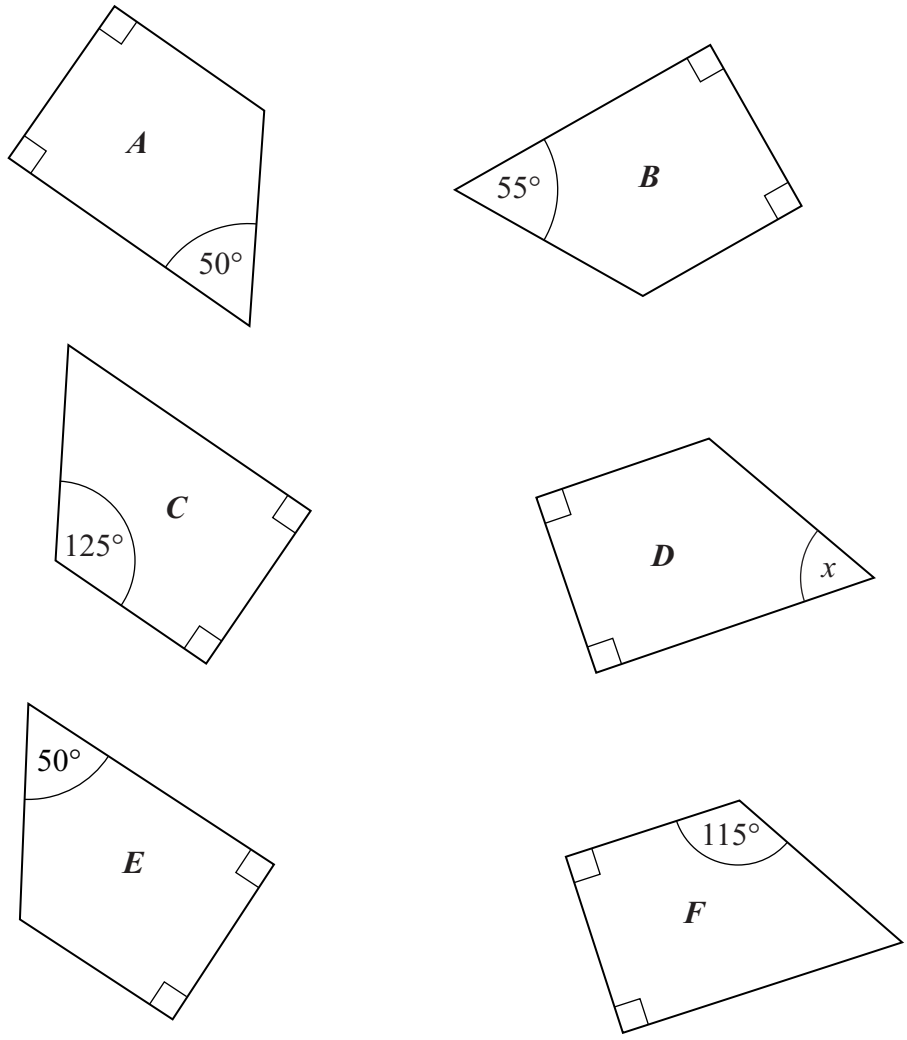
(2 marks)

9

11 Rebecca has three rectangular sheets of paper.
She cuts each sheet into two pieces.
She now has the six pieces, ***A*** to ***F***, shown below.

Not drawn accurately



(a) Which piece is part of the same rectangle as ***A***?

Answer ..... *(1 mark)*

(b) Which piece is part of the same rectangle as ***B***?

Answer ..... *(1 mark)*

(c) Calculate the size of angle x on piece ***D***.

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Answer $x =$ ..... degrees *(2 marks)*

12 (a) Simplify $2x + 8 + 4x - 3$

.....

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Answer ..... *(2 marks)*

(b) Solve the equation $\frac{x}{3} = 5$

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Answer $x =$ ..... *(1 mark)*

(c) Tom is investigating the two expressions $ab + c$ and $a(b + c)$

(i) He finds that both expressions have the same value when $a = 1$, $b = 3$ and $c = 4$
Show that this is true.

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(3 marks)

(ii) Tom says that this means that $a(b + c) = ab + c$
Explain why Tom is wrong.

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(2 marks)

12

13 (a) x is an odd number.

(i) Write down, in terms of x, the odd number after x.

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Answer ..... *(1 mark)*

(ii) Write down, in terms of x, the odd number before x.

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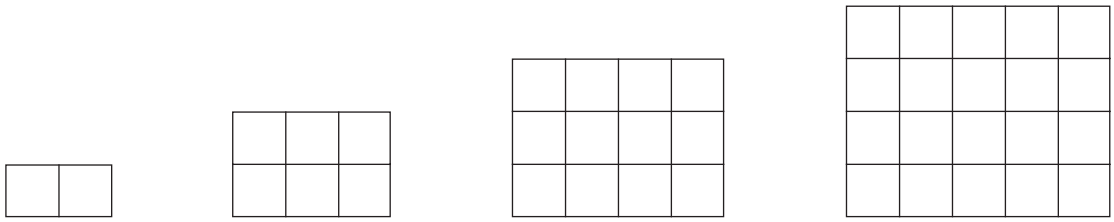
Answer ..... *(1 mark)*

(b) The diagrams show a sequence of rectangles.



Area = 2
Diagram 1

Area = 6
Diagram 2

Area = 12
Diagram 3

Area = 20
Diagram 4

(i) Write down an expression for the area of Diagram n.

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Answer ..... *(2 marks)*

(ii) A rectangle in the sequence has an area of 110 cm^2.
What is its perimeter?

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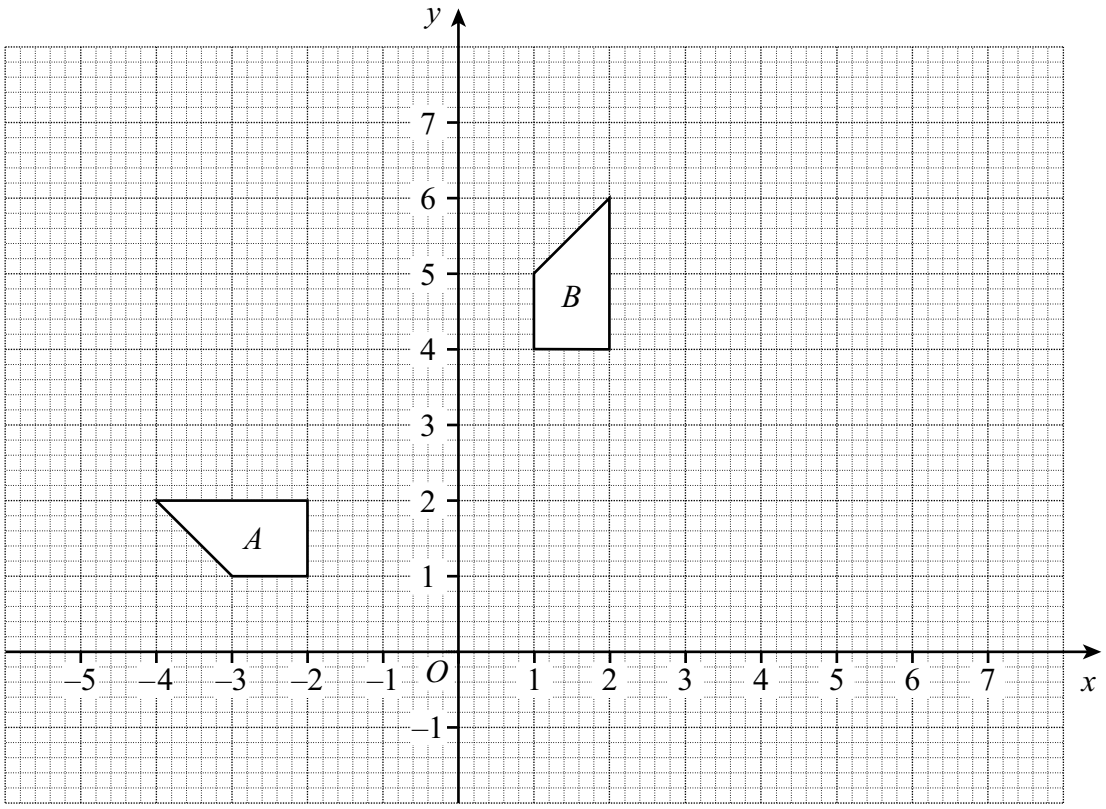
Answer ..... cm *(2 marks)*

14 The diagram shows two shapes, *A* and *B*.



(a) Describe fully the single transformation that takes shape *A* onto shape *B*.

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(3 marks)

(b) Enlarge shape *B* by scale factor 2, with (0, 7) as the centre of enlargement.

(3 marks)

12

15 Work out $4\frac{1}{5} - 1\frac{2}{3}$

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Answer ..... *(3 marks)*

16 Use approximations to estimate the value of $\sqrt{\frac{9.98}{0.203}}$

You **must** show your working.

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Answer ..... *(3 marks)*

17 (a) Which one of $\frac{5}{6}$, $\frac{7}{8}$ and $\frac{9}{10}$ is a recurring decimal?
Show clearly how you made your decision.

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Answer ..... *(2 marks)*

(b) Change $\frac{3}{11}$ to a recurring decimal.

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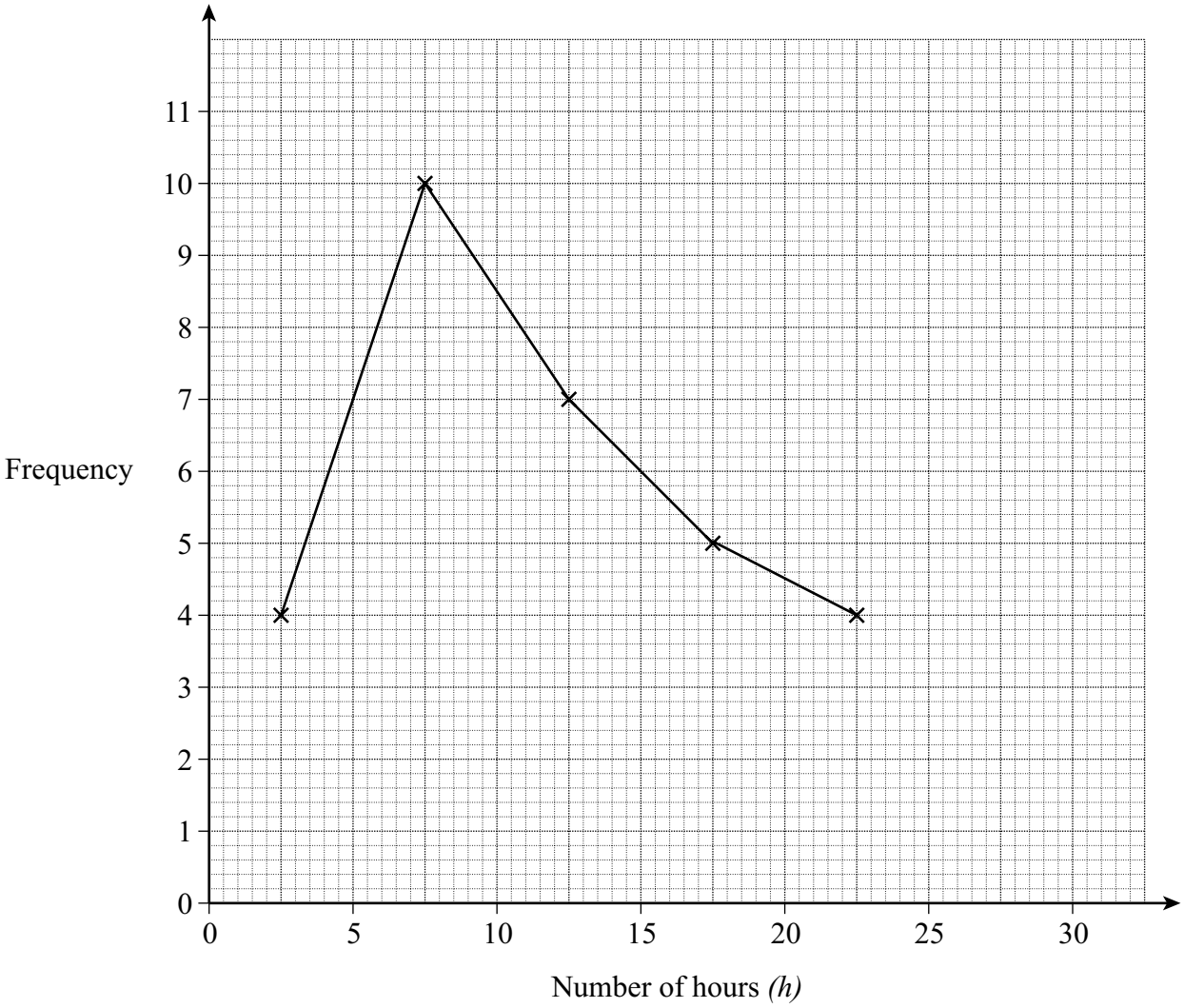
Answer ..... *(2 marks)*

Turn over for the next question

10

18 The frequency polygon shows the number of hours of television watched each week by 30 teachers.



(a) One of the teachers is picked at random.
What is the probability that this teacher watches more than 15 hours of television each week?

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Answer ..... *(2 marks)*

(b) The number of hours of television watched each week by 30 students is shown below.

Number of hours (h)	Frequency
$0 < h \leqslant 5$	1
$5 < h \leqslant 10$	2
$10 < h \leqslant 15$	7
$15 < h \leqslant 20$	9
$20 < h \leqslant 25$	7
$25 < h \leqslant 30$	4

On the same grid draw a frequency polygon to show this information.

(2 marks)

(c) Give **two** comparisons between the number of hours of television watched by these teachers and students.

Comparison 1

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Comparison 2

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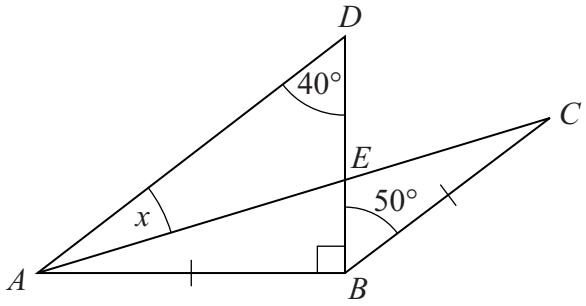
(2 marks)

6

19 (a) *ABC* is an isosceles triangle.
Triangle *ABD* has a right angle at *B*.
Angle *ADB* = 40°
Angle *CBE* = 50°



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Work out the size of angle *x*.

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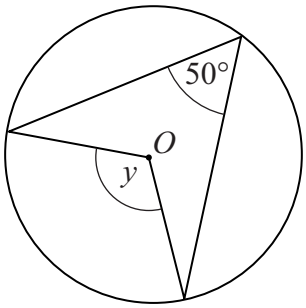
Answer ..... degrees *(3 marks)*

(b) (i) The diagram shows a circle centre O.



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Work out the size of angle y.

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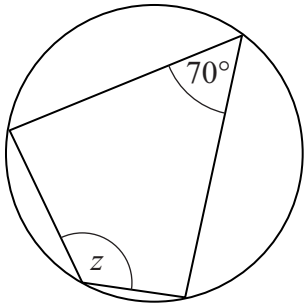
Answer ..... degrees *(1 mark)*

(ii) The diagram shows a cyclic quadrilateral.



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Work out the size of angle z.

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Answer ..... degrees *(1 mark)*

5

20 (a) Expand and simplify $7(x - 2y) - 3(2x - y)$

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Answer ..... *(2 marks)*

(b) Simplify

(i) $w^2 \times w^6$

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Answer ..... *(1 mark)*

(ii) $w^{10} \div w^4$

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Answer ..... *(1 mark)*

(iii) $(w^4)^3$

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Answer ..... *(1 mark)*

(c) (i) Factorise $y^2 - 5y + 6$

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Answer ..... *(2 marks)*

(ii) Hence solve the equation $y^2 - 5y + 6 = 0$

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Answer ..... *(1 mark)*

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21 (a) The ratio 35 000 000 : 50 can be written in the form n : 1
Work out the value of n.
Give your answer in standard form.

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Answer n = ... *(2 marks)*

(b) Solve the equation $y \times 10^6 = 3.5 \times 10^3$
Give your answer in standard form.

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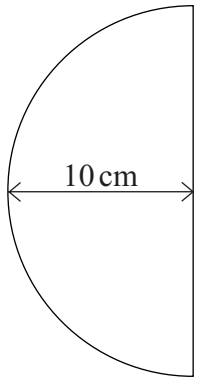
Answer y = ... *(2 marks)*

Turn over for the next question

12

22 The diagram shows a semi-circle of radius 10 cm.



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Show that the perimeter of the semi-circle is 10 (π + 2) cm.

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(4 marks)

23 Match each of the **shaded** regions to one of these inequalities.

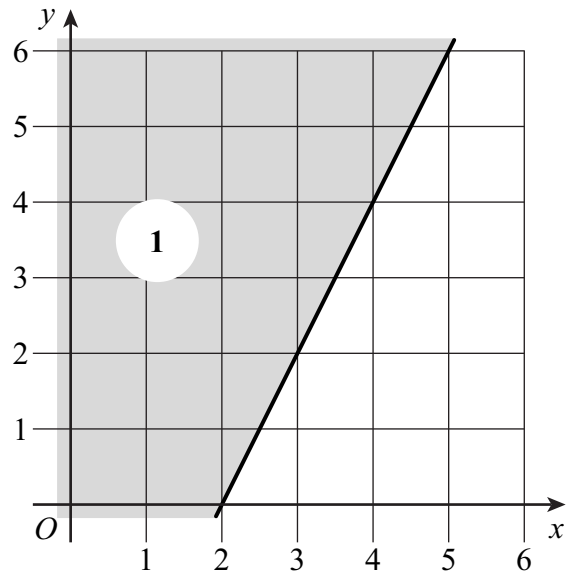
A $y \leqslant -\frac{1}{2}x + 2$

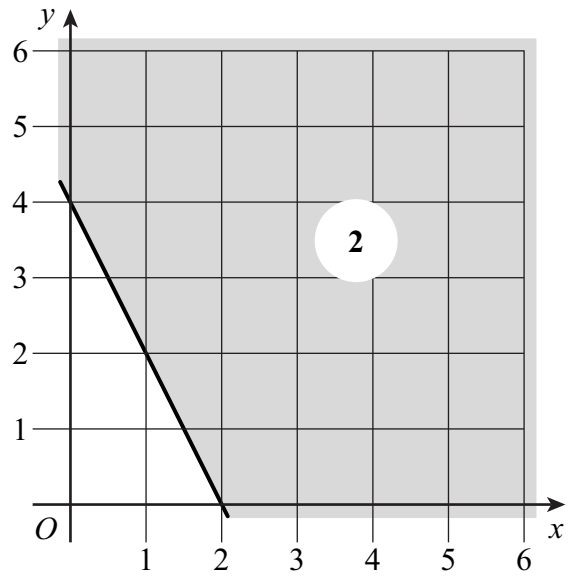
B $y \leqslant \frac{1}{2}x + 2$

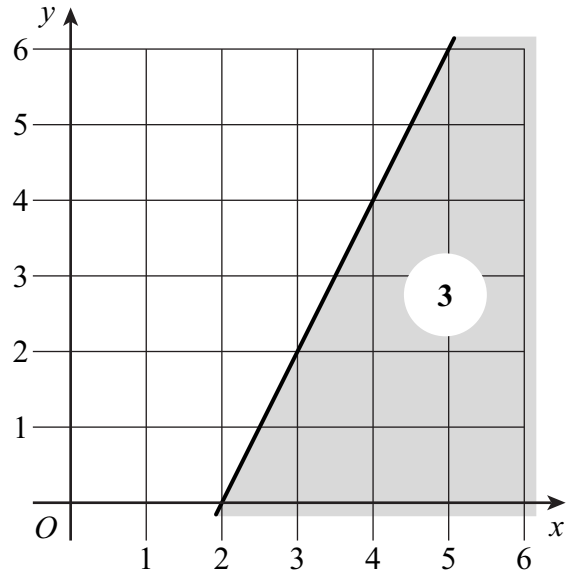
C $y \geqslant -2x + 4$

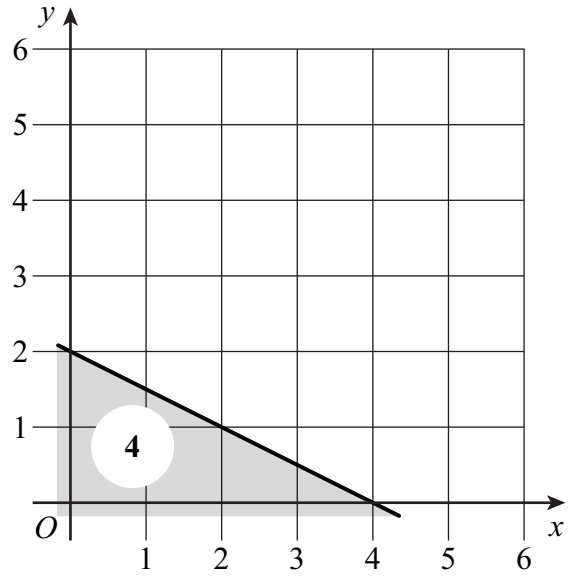
D $y \geqslant 2x - 4$

E $y \leqslant 2x - 4$









Region **1** .....

Region **2** .....

Region **3** .....

Region **4** ..... *(4 marks)*

END OF QUESTIONS

8

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