

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

Leave blank

General Certificate of Secondary Education
November 2006



MATHEMATICS (SPECIFICATION A)
Intermediate Tier
Paper 1 Non-calculator

3301/11

Tuesday 7 November 2006 9.00 am to 11.00 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • mathematical instruments <p>You must not use a calculator.</p>	
---	--

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	
TOTAL	
Examiner's Initials	

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.

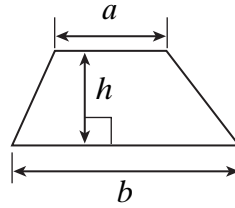
Advice

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

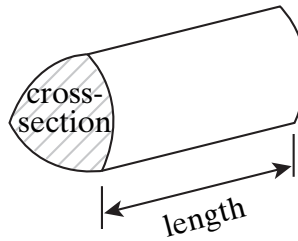
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



Volume of prism = area of cross-section \times length



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

1 Write down the next **two** numbers in the sequence

23, 21, 17, 11, ,

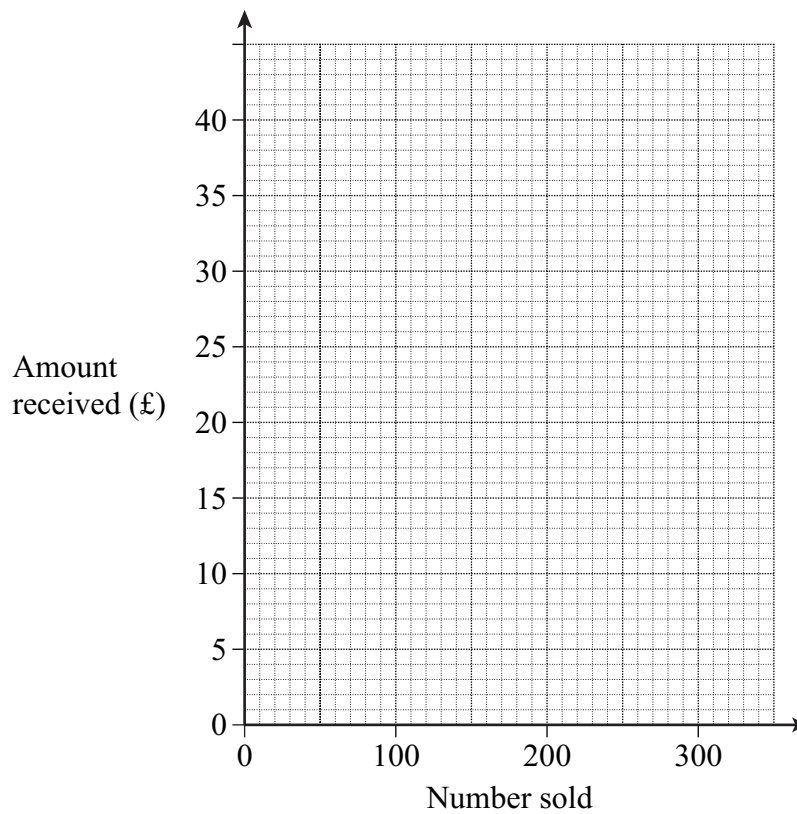
.....
.....
.....

Answer , (2 marks)

2 A school shop sells rulers for 12 pence each.

On the grid draw a graph to show the amount the school receives for selling up to 300 rulers.

.....
.....
.....
.....



(3 marks)

5

Turn over

3 Romana picks a number.



My number has 2 digits
and is a factor of 36.

- (a) One number that she could pick is 36.
Write down the other **two** numbers that Romana could pick.

.....

.....

.....

Answer , , **36** (2 marks)

- (b) Romana gives some more clues about the number.



If I add the digits in my number,
I get a square number.

If I multiply the digits in my number,
I get a cube number.

What number does Romana pick?
You **must** show your working.

.....

.....

.....

.....

Answer (2 marks)

4 In a training session Ben runs 10 km around a 400 m track.

(a) How many 400 m laps does Ben complete?

.....
.....
.....
.....
.....
.....

Answer (3 marks)

(b) On average Ben completes each 400 m lap in 80 seconds.
Calculate Ben's average speed in metres per second.

.....
.....
.....
.....

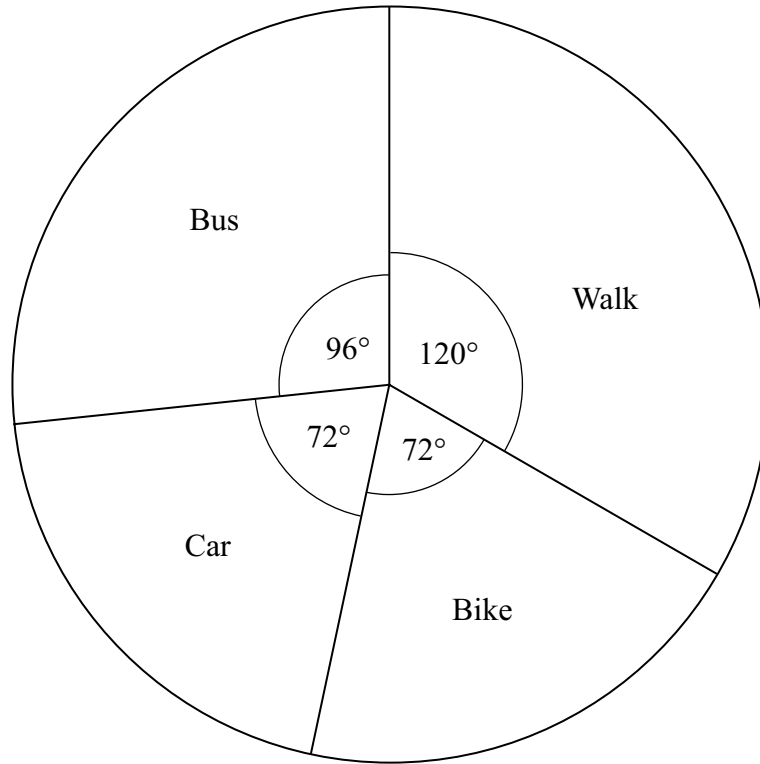
Answer m/s (2 marks)

(c) What is the total time that Ben takes to complete the 10 km training session?
Give your answer in minutes and seconds.

.....
.....
.....
.....
.....
.....

Answer minutes seconds (3 marks)

5 (a) The pie chart shows the ways that 30 pupils travel to school.



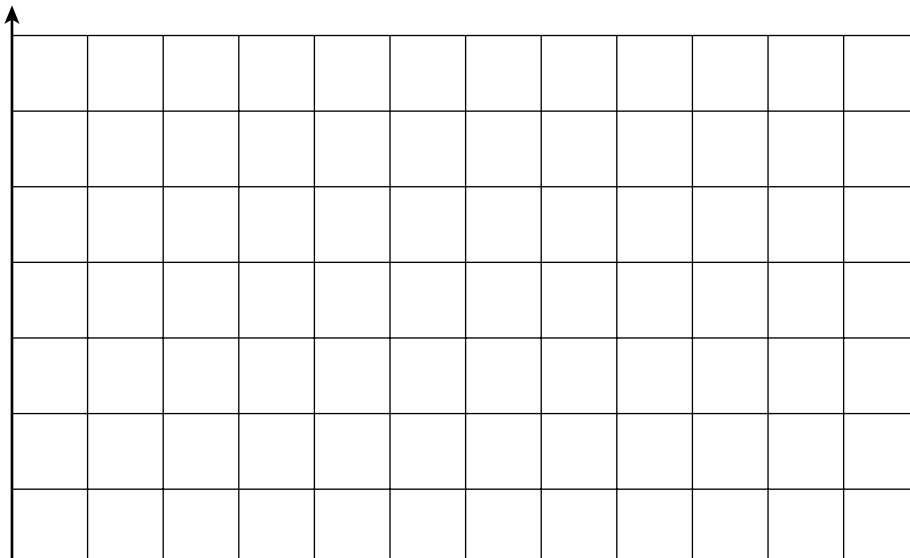
On the grid below, draw and label a bar chart to represent the same information.

.....

.....

.....

.....



(4 marks)

(b) The pupils who walked to school took these times in minutes.

5 12 7 14 23 11 18 10 8 11

Draw an ordered stem and leaf diagram to show this information.

.....

.....

.....

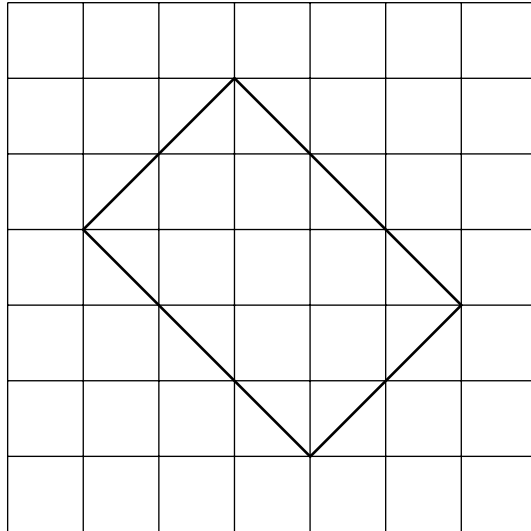
.....

Key: | 1 | 2 represents 12 minutes

(3 marks)

Turn over for the next question

- 6 (a) This quadrilateral has **exactly** two lines of symmetry.



- (i) Draw the lines of symmetry on the diagram.

(1 mark)

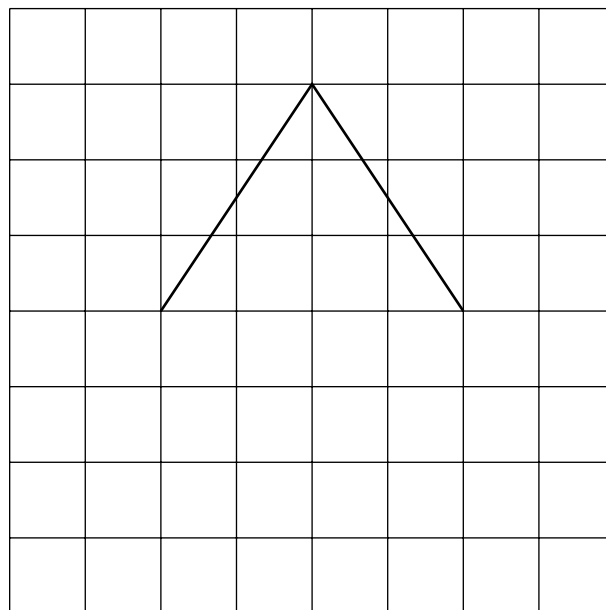
- (ii) Write down the name of this type of quadrilateral.

Answer

(1 mark)

- (b) A different type of quadrilateral also has **exactly** two lines of symmetry.

- (i) Complete this quadrilateral on the grid below.



(1 mark)

- (ii) Write down the name of this type of quadrilateral.

Answer

(1 mark)

(c) Write down **one** difference between the quadrilaterals in parts (a) and (b).

.....
.....

(1 mark)

7 Meg's lucky number is x .

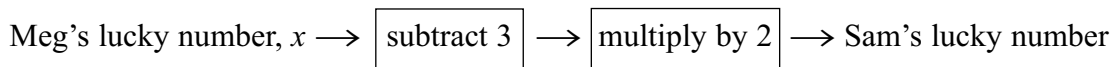
(a) Tim's lucky number is 1 more than Meg's lucky number.
Write down an expression for Tim's lucky number in terms of x .

Answer (1 mark)

(b) Jenny's lucky number is double Meg's lucky number.
Write down an expression for Jenny's lucky number in terms of x .

Answer (1 mark)

(c) This flow diagram shows how Sam's lucky number is connected to Meg's lucky number.



Write down an expression for Sam's lucky number in terms of x .

.....
.....

Answer (2 marks)

8 (a) A sequence has n th term $4n + 1$

(i) Write down the first three terms of this sequence.

.....
.....

Answer 1st term, 2nd term, 3rd term (2 marks)

(ii) Tom says that 2006 is a term in this sequence.
Explain why he is wrong.

.....
.....
.....

(1 mark)

(b) A different sequence has n th term $(n + 3)^2 - 9$
Show that the first term of this sequence is 7.

.....
.....
.....

(1 mark)

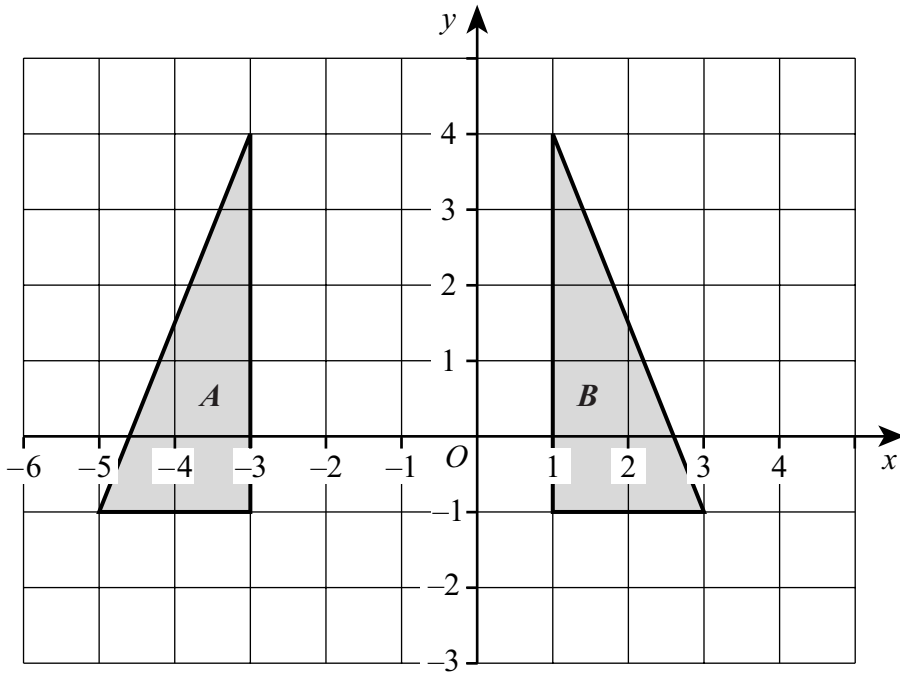
9 Use approximations to estimate the value of $\frac{59.2 \times 303.7}{21.7}$

You **must** show your working.

.....
.....
.....
.....
.....

Answer (2 marks)

10 The diagram shows two triangles *A* and *B* drawn on a centimetre square grid.



Describe fully the transformation that maps triangle *A* onto triangle *B*.

.....

.....

.....

(2 marks)

11 Write $22\frac{1}{2}\%$ as a fraction in its simplest form.

.....

.....

.....

.....

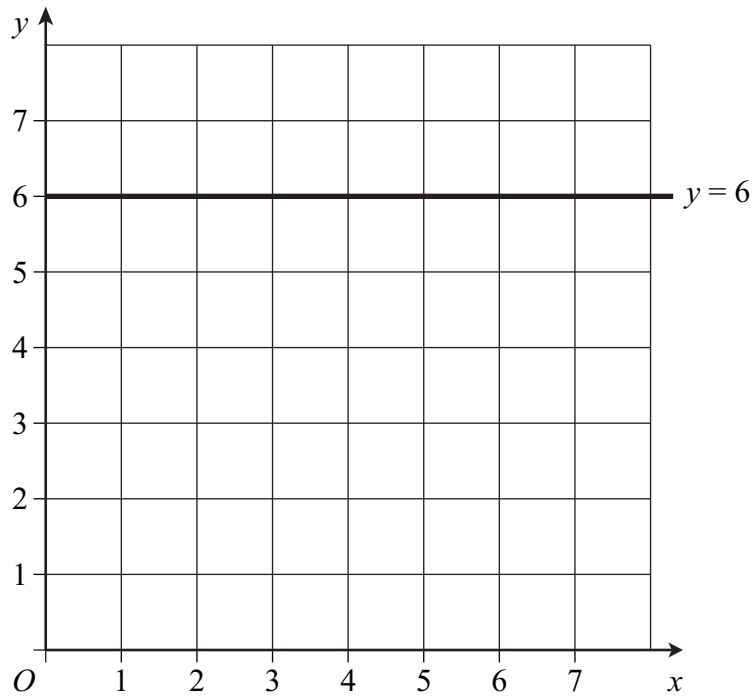
.....

Answer

(3 marks)

Turn over

12 The line $y = 6$ is drawn on a centimetre square grid.



- (a) The point P lies on the line $y = 6$
 P is equal in distance from both the x -axis and the y -axis.

Mark and label P on the grid.

(1 mark)

- (b) The point Q also lies on the line $y = 6$
 Q is twice the distance from the x -axis as it is from the y -axis.

Mark and label Q on the grid.

(1 mark)

- (c) Calculate the area of triangle OPQ , where O is the origin.
 State the units of your answer.

.....

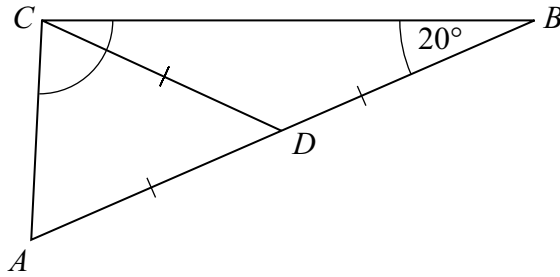
.....

.....

.....

Answer (3 marks)

- 13 The diagram shows a triangle ABC .
 D is a point on AB such that $DB = DA = DC$
 Angle $ABC = 20^\circ$.



Not drawn accurately

Work out the size of angle ACB .
 You **must** show your working.

.....

.....

.....

.....

.....

.....

.....

Answer degrees (3 marks)

Turn over for the next question

- 14 A recipe for 12 small cakes uses 240 g of flour.
A bag contains 3 kg of flour.
What percentage of the flour in the bag is used to make 30 small cakes?

.....

.....

.....

.....

.....

.....

Answer % (4 marks)

- 15 (a) Poppy the dog has two meals a day.
At each meal Poppy eats $\frac{2}{5}$ of a tin of dog food.
On Monday morning there are 5 tins of dog food in the cupboard.
Is this enough dog food to feed Poppy for one week?
You **must** show your working.

.....

.....

.....

.....

.....

(3 marks)

- (b) Work out $4\frac{2}{3} \div 1\frac{3}{4}$

.....

.....

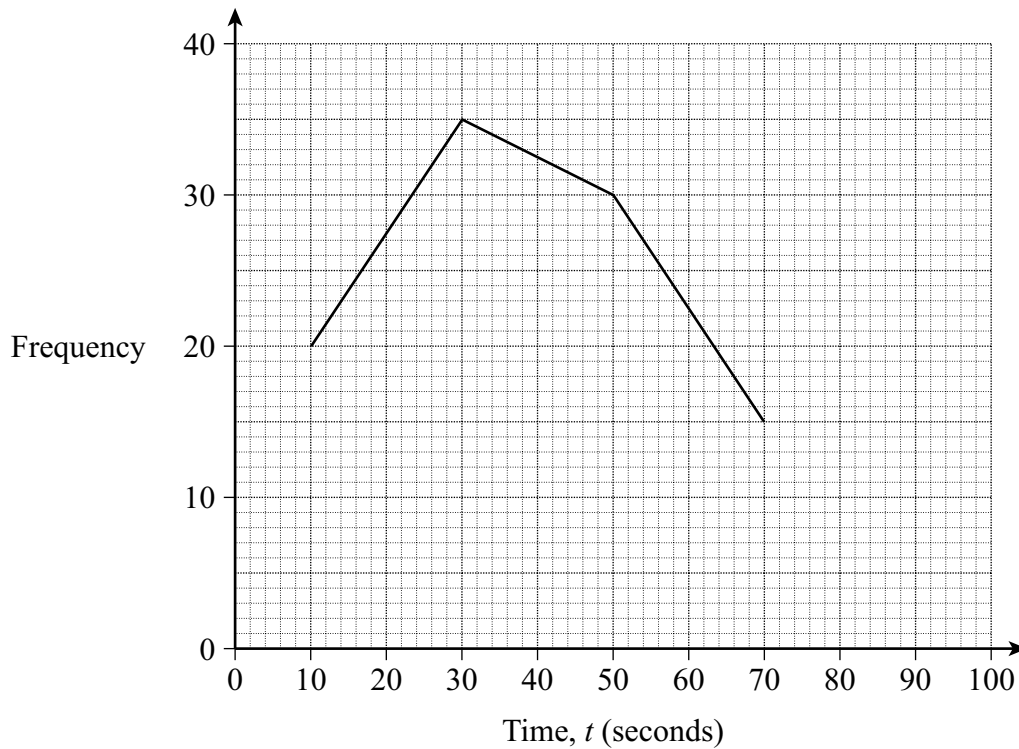
.....

.....

.....

Answer (3 marks)

16 The frequency polygon shows the times taken by 100 girls to solve a puzzle.



(a) The table shows the times taken by 100 boys to solve the same puzzle.

Time, t (seconds)	Frequency
$0 < t \leq 20$	24
$20 < t \leq 40$	30
$40 < t \leq 60$	36
$60 < t \leq 80$	10

Draw a frequency polygon to show this information on the diagram above.

(2 marks)

(b) Use the midpoints of the class intervals to calculate an estimate of the mean time taken by the boys to solve the puzzle.

.....

.....

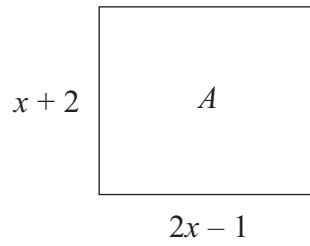
.....

.....

Answer seconds

(3 marks)

17 Rectangle A has length $(2x - 1)$ cm and width $(x + 2)$ cm.



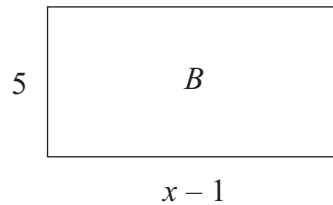
Not drawn accurately

(a) Show that the perimeter of rectangle A is $(6x + 2)$ cm.

.....

(1 mark)

(b) Rectangle B has length $(x - 1)$ cm and width 5 cm.



Not drawn accurately

The perimeter of rectangle A is equal to the perimeter of rectangle B .
 Write down and solve an equation in x .

.....

Answer $x =$ (4 marks)

(c) Find the **area** of rectangle A .

.....

Answer cm^2 (2 marks)

18 The table shows Emma’s spelling test scores for 8 weeks.

Week	1	2	3	4	5	6	7	8
Score	5	6	6	6	7	6	6	7

Emma’s first two 5-point moving average scores are shown in this table.

Week	1	2	3	4	5	6	7	8
Score	5	6	6	6	7	6	6	7
5-point moving average			6.0	6.2				

Complete the table to show **all** the possible 5-point moving average scores.
You **must** show your working.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

Turn over for the next question

19 You are given that $n = 2^2 \times 5$

(a) Calculate $40n$

.....

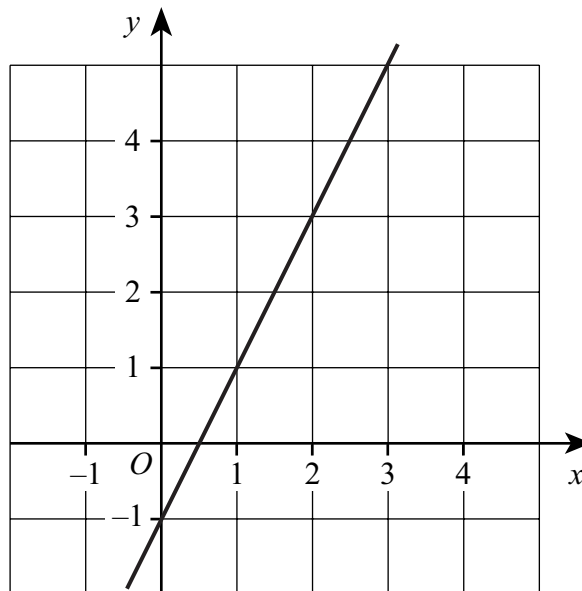
Answer (2 marks)

(b) Write $40n$ as the product of its prime factors.

.....

Answer (2 marks)

20 The diagram shows the graph of the equation $y = ax + b$

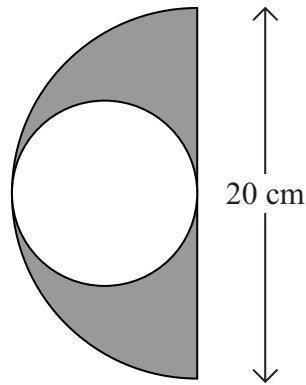


Find the values of a and b .

.....

Answer $a = \dots\dots\dots$, $b = \dots\dots\dots$ (3 marks)

21 A circle fits exactly inside a semi-circle of diameter 20 cm.



Not drawn accurately

The shaded area is $a \times \pi$ square centimetres.
Work out the value of a .
You **must** show your working.

.....

.....

.....

.....

.....

.....

Answer $a =$ (4 marks)

Turn over for the next question

22 (a) Expand and simplify $3(2x - 1) + 2(3x + 5)$

.....
.....
.....

Answer (2 marks)

(b) (i) Expand and simplify $(y + 5)(y - 1)$

.....
.....
.....

Answer (2 marks)

(ii) When y is an odd number, explain why $(y + 5)(y - 1)$ is an even number.

.....
.....
.....
.....
.....

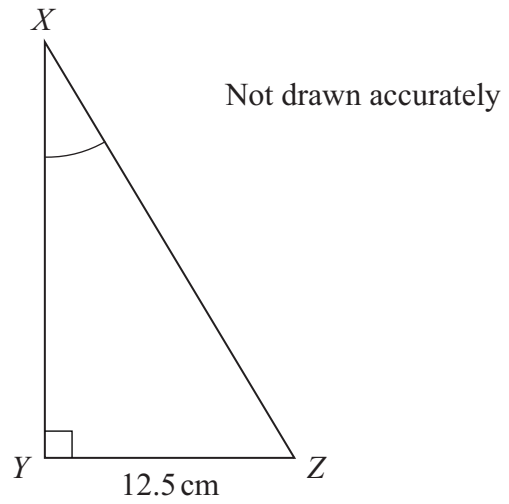
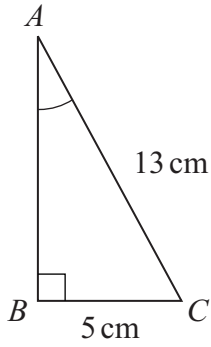
(1 mark)

(c) Factorise $2xy - 6y^2$

.....
.....
.....
.....

Answer (2 marks)

- 23 ABC and XYZ are similar triangles with right angles at B and Y .
 $AC = 13$ cm, $BC = 5$ cm and $YZ = 12.5$ cm



Work out the length of XY .

.....

.....

.....

.....

.....

.....

.....

Answer cm (5 marks)

END OF QUESTIONS

There are no questions printed on this page

There are no questions printed on this page

There are no questions printed on this page