

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU
Tystysgrif Gyffredinol Addysg Uwchradd

184/05

MATHEMATICS
INTERMEDIATE TIER PAPER 1

P.M. MONDAY, 5 June 2006

(2 Hours)

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

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

Calculators are **not** allowed for this paper.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

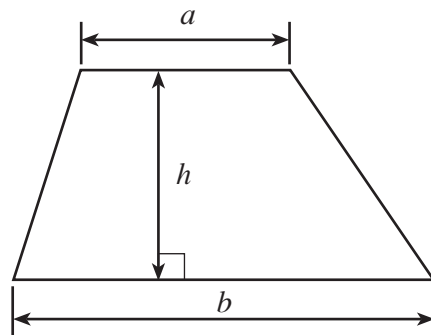
The number of marks is given in brackets at the end of each question or part-question.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

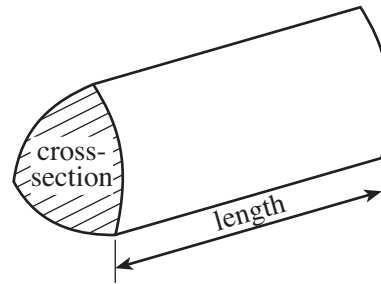
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	3	
3	5	
4	4	
5	7	
6	2	
7	3	
8	2	
9	7	
10	3	
11	2	
12	6	
13	6	
14	4	
15	6	
16	3	
17	4	
18	7	
19	7	
20	4	
21	4	
22	2	
23	4	
TOTAL MARK		

Formula List

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



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



1. Find the value of

(a) 0.4×0.2 ,

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[1]

(b) $5^3 \times 2^3$,

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[2]

(c) $9.43 - 5.6$,

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[1]

(d) the cube root of 27.

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[1]

2. A cone is labelled A.
A cuboid is labelled B.
A cylinder is labelled C.
A hexagon is labelled D.

Complete the following table.

Property of the shape	Label on shape
It has exactly one circular face	
It has six faces	
It is not a 3D shape	
It has two circular faces	

[3]

3. (a) Find the size of the angle marked x .

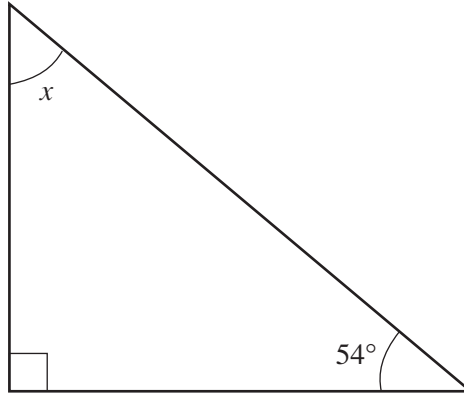


Diagram not drawn to scale.

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 $x = \dots\dots\dots^\circ$

[2]

- (b) Find the size of the angle marked y .

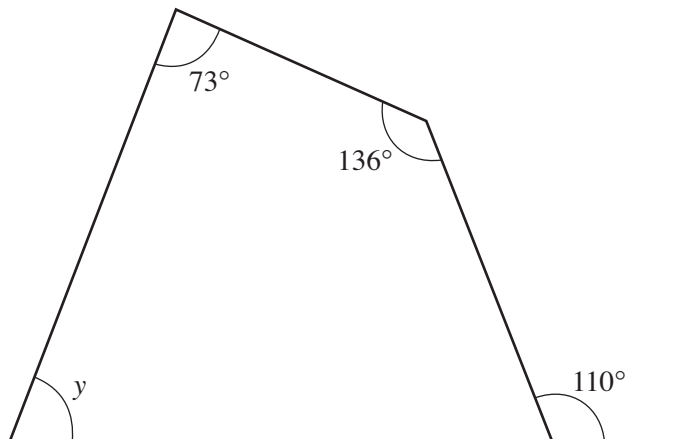


Diagram not drawn to scale.

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 $y = \dots\dots\dots^\circ$

[3]

4. In a white bag there are five balls numbered 3, 4, 5, 6 and 7 respectively and in a black bag there are four balls numbered 3, 5, 7 and 9 respectively. In a game, a player chooses one ball at random from each of the two bags. The score for the game is the sum of the two numbers on the balls.

(a) Complete the following table to show all the possible scores.

White bag	7	10	12	.....	.....
	6	9	11	.....	.....
	5	.....	.....	12	14
	4	.....	.....	11	13
	3	6	8	10	12
		3	5	7	9
		Black bag			

[2]

A player wins a prize by getting a score of 10 or more.

(b) Margaret plays the game once. What is the probability that she wins a prize?

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[2]

5. (a) Write down the next two numbers in the sequence:

23, 20, 16, 11,,

[2]

- (b) If $\frac{x}{4} = 6$, what is the value of x ?

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[1]

- (c) Simplify $5x - 7y + 3x - 4y$.

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[2]

- (d) Find the value of $8a + 4b$ when $a = 2$ and $b = -5$.

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[2]

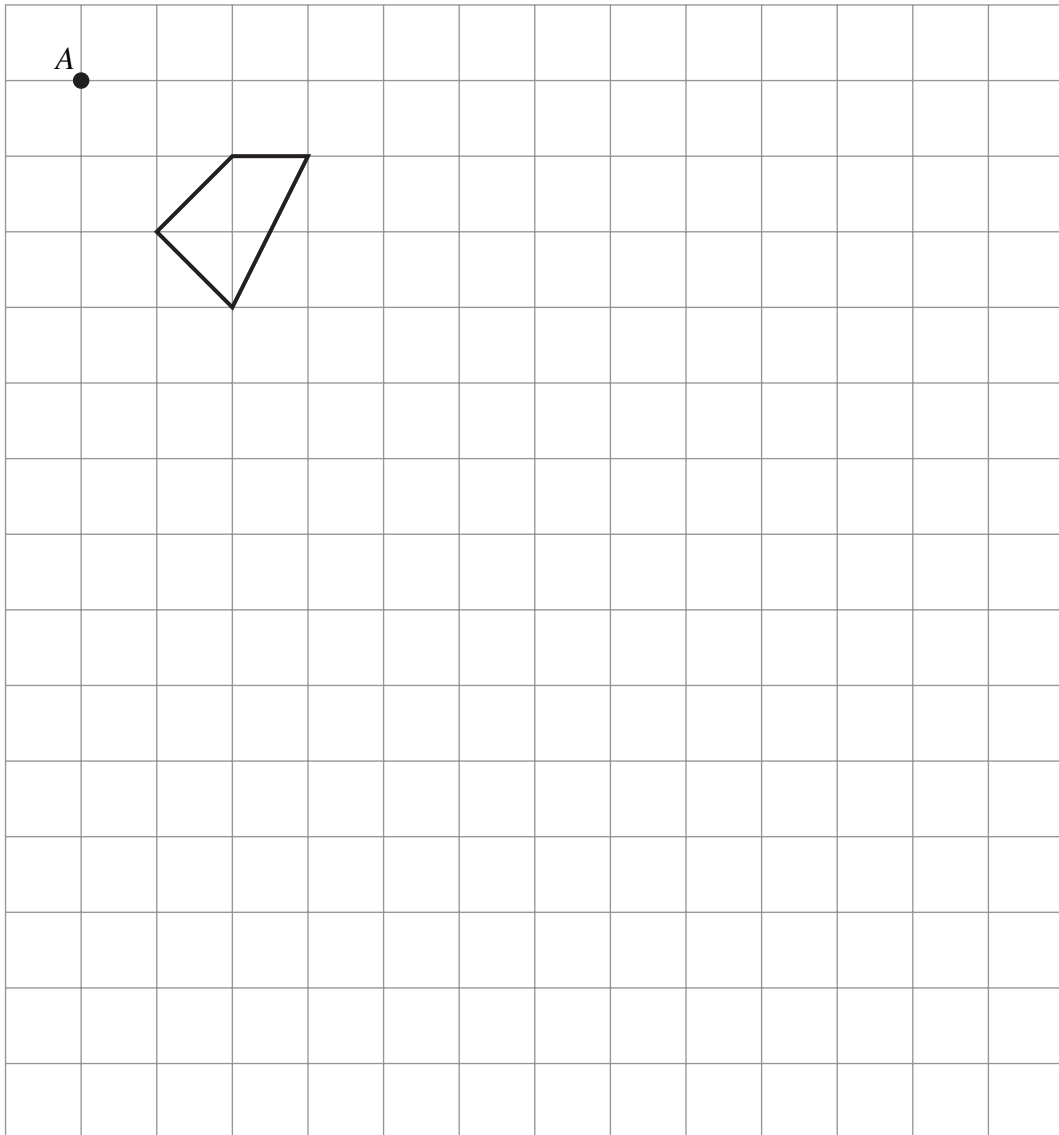
6. Showing clearly how you decide, find which of the following fractions is closest to $\frac{3}{5}$.

$$\frac{13}{20} \quad \frac{3}{4} \quad \frac{7}{10}$$

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[2]

7. On the grid below, draw an enlargement of the given shape, using a scale factor of 3 and the point A as the centre of enlargement. [3]



8. Clearly showing how you obtained your answer, ESTIMATE the value of:

$$\frac{48 \times 1577}{210}$$

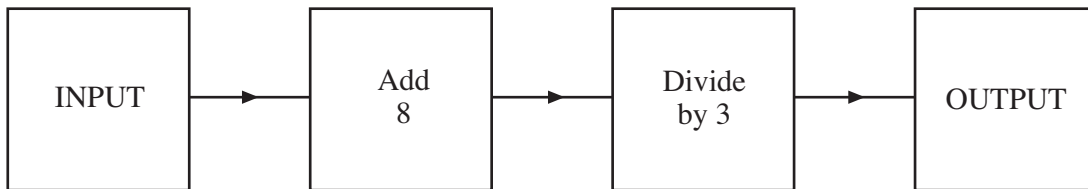
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[2]

9. (a) The diagram below represents a number machine.



Find the OUTPUT when the INPUT is n .

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[2]

- (b) Write down the first three terms of the sequence whose n th term is $n^2 - 3$.

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[2]

- (c) Solve the following equation.

$$5x - 9 = 11 + x$$

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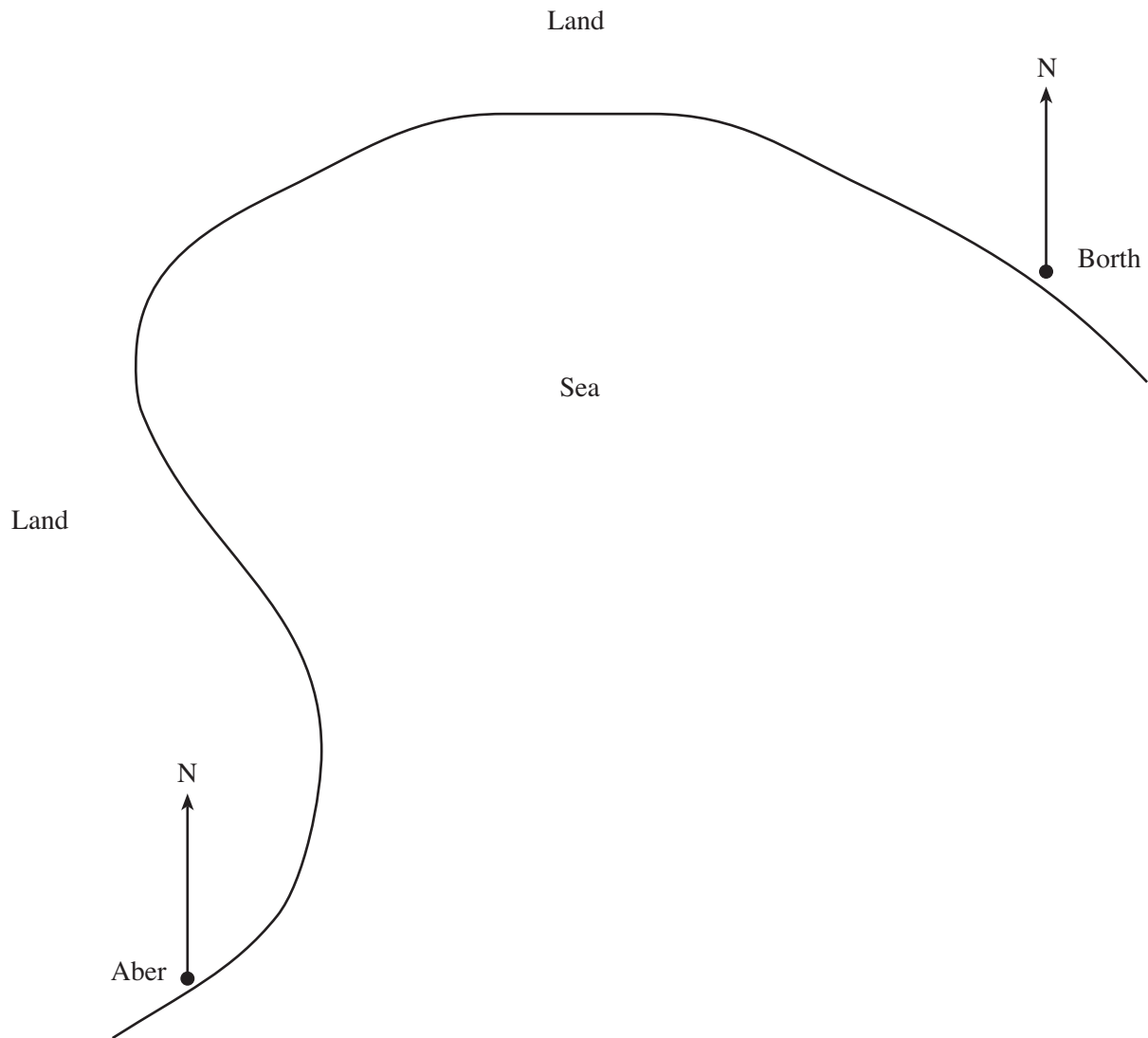
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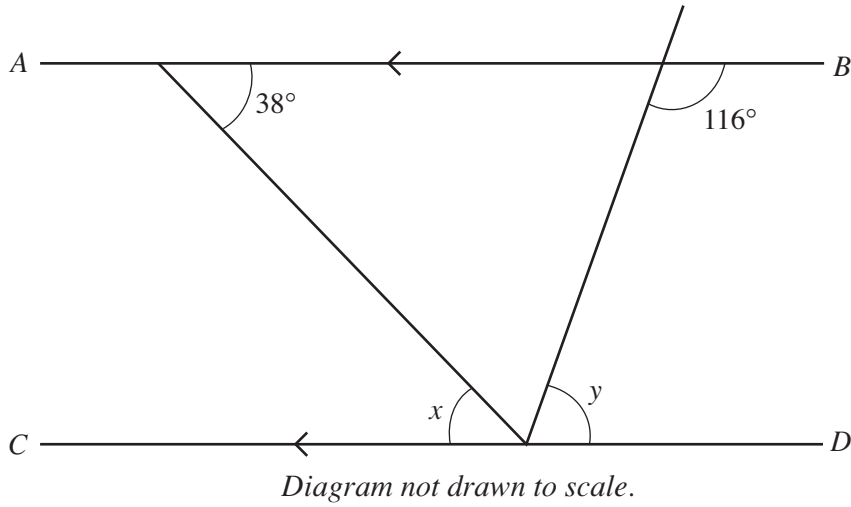
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[3]

10. Aber and Borth are two towns near the coast. A buoy is sighted on a bearing of 074° from Aber and on a bearing of 217° from Borth. Draw these bearings and mark the position of the buoy as X. [3]



11. In the diagram below, the lines AB and CD are parallel.
Find the size of each of the angles marked x and y .



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$x = \dots\dots\dots^\circ$ $y = \dots\dots\dots^\circ$ [2]

12. (a) Calculate, in m.p.h., the average speed of a train that travels 200 miles in 2 hours 30 minutes.

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[3]

- (b) Expand and simplify

$$4(3a - 2b) - 3(2a - 3b).$$

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[2]

- (c) Simplify $\frac{w^8}{w^4}$.

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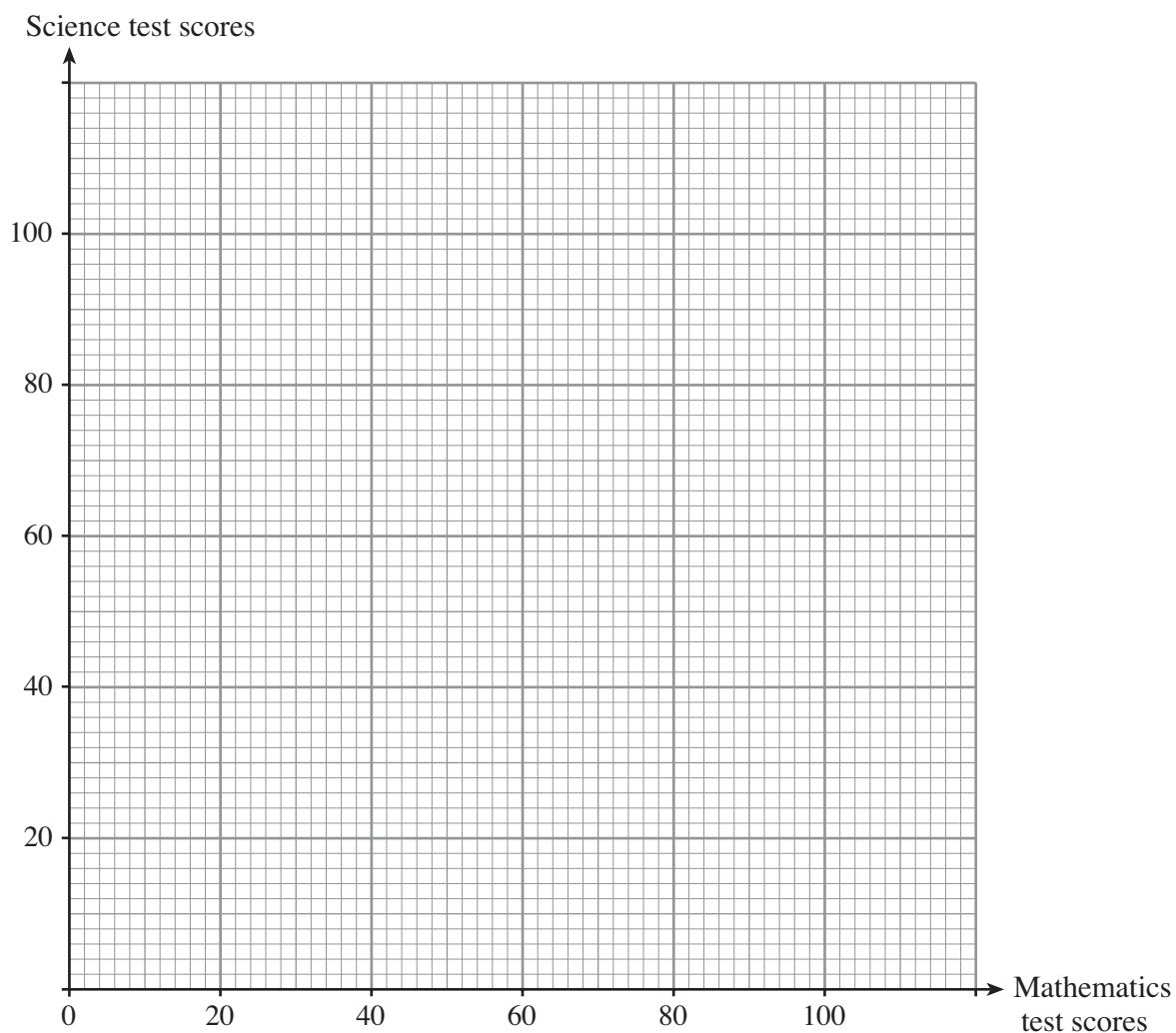
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[1]

13. The table shows the scores obtained by 7 pupils in a mathematics test and their corresponding scores on a science test.

Mathematics test scores	18	74	56	26	88	81	42
Science test scores	26	65	45	40	73	61	54

- (a) On the graph paper below draw a scatter diagram for these results. [2]



- (b) Describe the correlation between the mathematics and science scores.

- (c) The mean score for the pupils on the mathematics test is 55 and the mean score on the science test is 52. [1]
Draw a line of best fit on your scatter diagram. [2]

- (d) John sat the mathematics test and had a score of 68, but he was absent from the science test. Use your line of best fit to find an estimate for John's score on the science test.

[1]

14. (a) Express 2100 as a product of prime numbers in index form.

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[3]

(b) Write down the least whole number by which 2100 should be divided to make the result a perfect square.

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[1]

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15. The table shows some of the values of $y = 2x^2 - 5x - 4$ for values of x from -1 to 4 .

(a) Complete the table by finding the value of y for $x = 2$.

x	-1	0	1	2	3	4
$y = 2x^2 - 5x - 4$	3	-4	-7		-1	8

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[1]

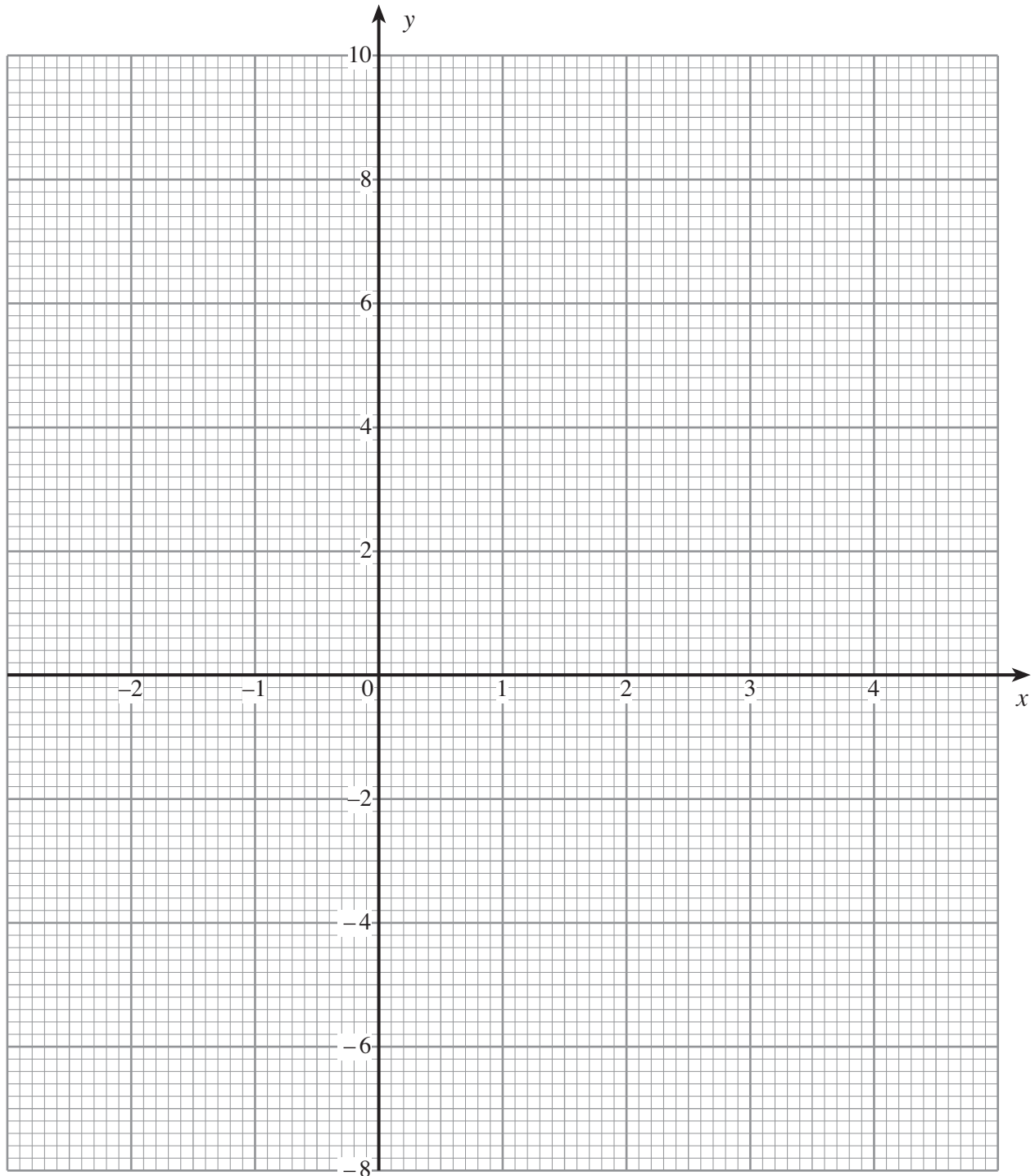
(b) On the graph paper opposite, draw the graph of $y = 2x^2 - 5x - 4$ for values of x between -1 and 4 . [3]

(c) Draw the line $y = -2$ on your graph paper and write down the x -values of the points where your two graphs intersect.

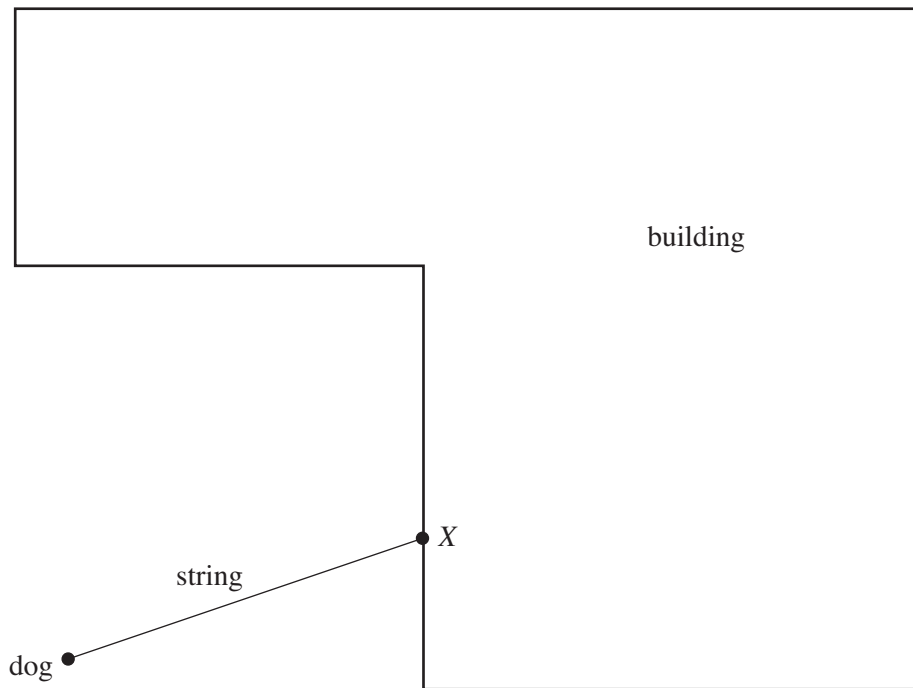
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[2]

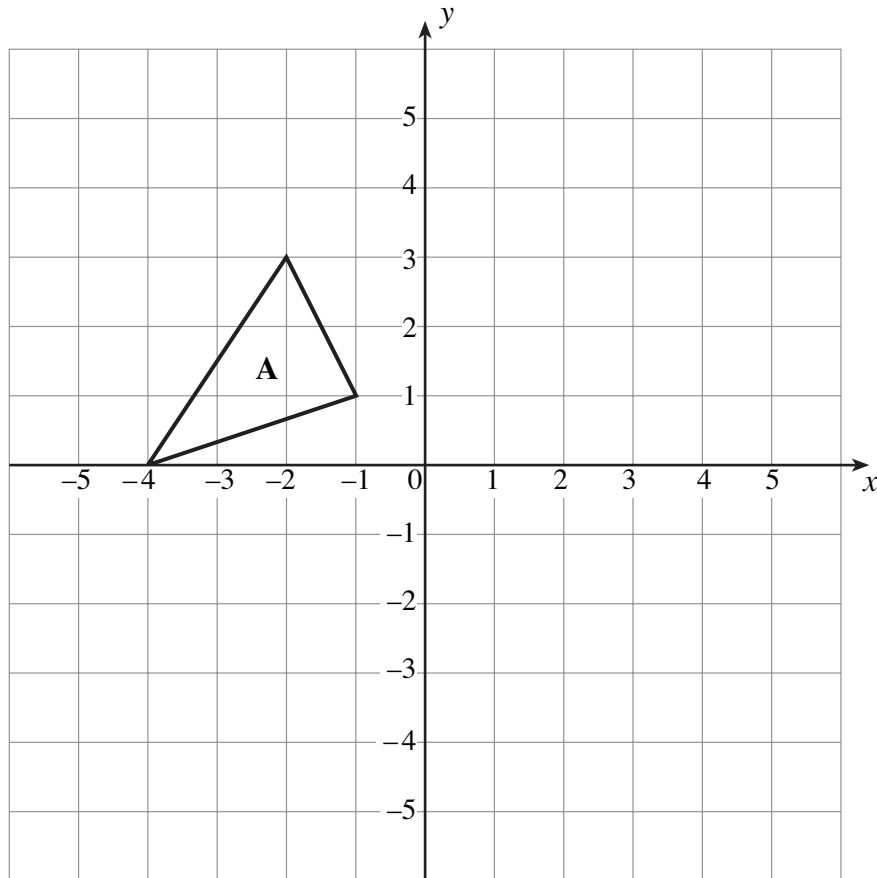
For use with question 15



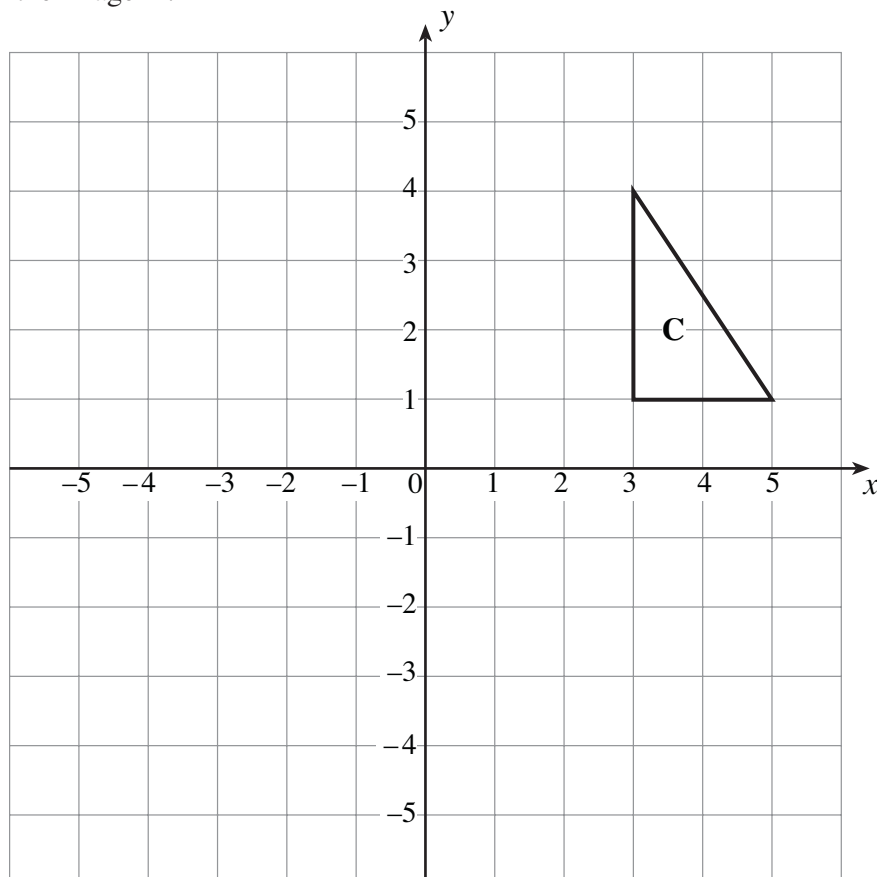
16. The diagram represents an aerial view of a building. A dog is tied, by means of a string, to a side of the building at X .
Draw the boundary of the region in which the dog can roam. [3]



17. (a) Draw the image of the triangle **A** after a translation of 4 units in the x -direction and -3 in the y -direction. Label the image **B**. [2]



- (b) Rotate the triangle **C** through 90° clockwise about the point $(-1, 2)$. Label the image **D**. [2]



18. Square tiles are manufactured. The length of each tile is 300mm, measured correct to the nearest millimetre.

(a) Write down the least and greatest possible values of the length of the tile.

Least length mm Greatest length mm

[2]

(b) The distance between two walls in a passageway is 302 cm, measured correct to the nearest centimetre.

The tiles are laid end to end between the walls. Explain, showing all your calculations and reasoning, why it is always possible to lay 10 tiles between the walls.

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[5]

19. (a) Expand the following expression, simplifying your answer as far as possible.

$$(x - 7)(x + 4)$$

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[2]

- (b) Make r the subject of the formula

$$3d - 2r = 4(7 - 2r).$$

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[3]

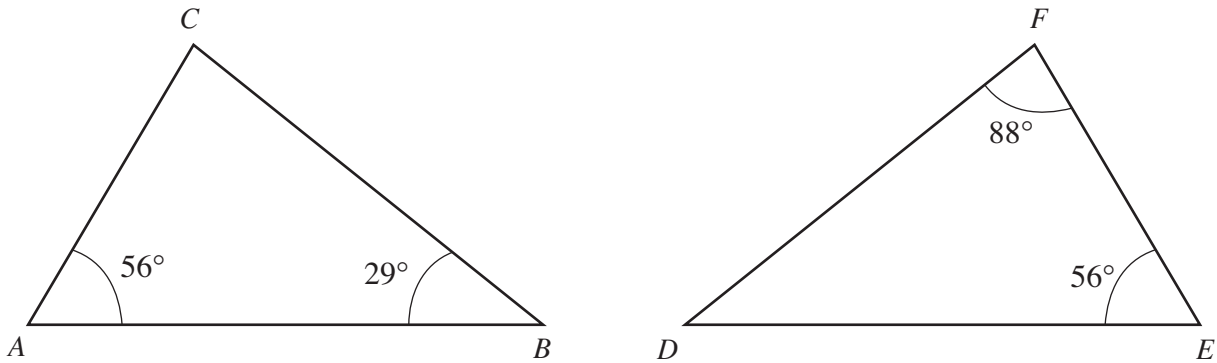
- (c) Factorise $6x^2 + 2x$.

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[2]

20. (a) Explain clearly why the following triangles are **not** similar.



Diagrams not drawn to scale.

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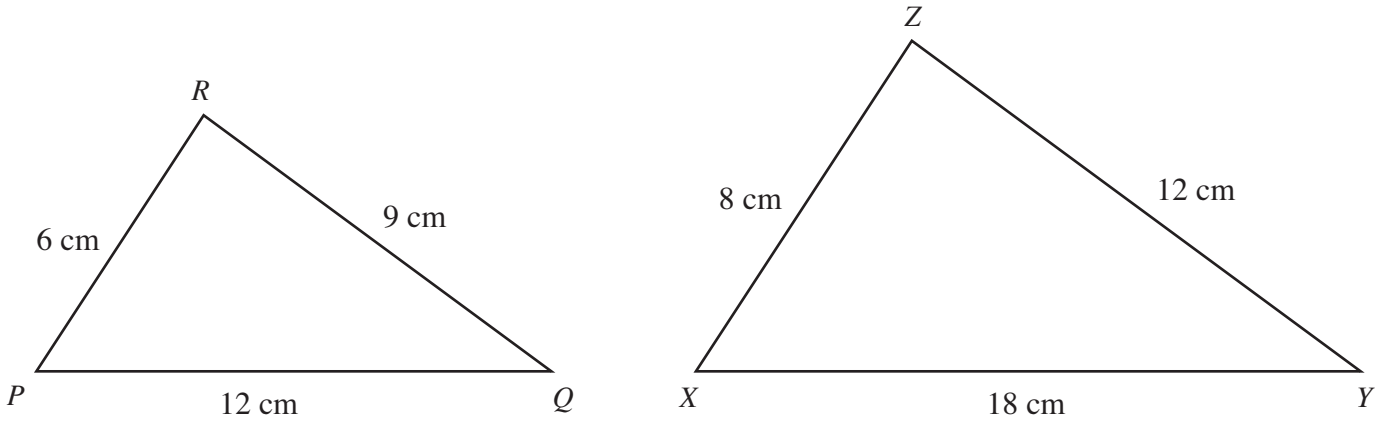
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[2]

(b) Explain clearly why the following triangles are **not** similar.



Diagrams not drawn to scale.

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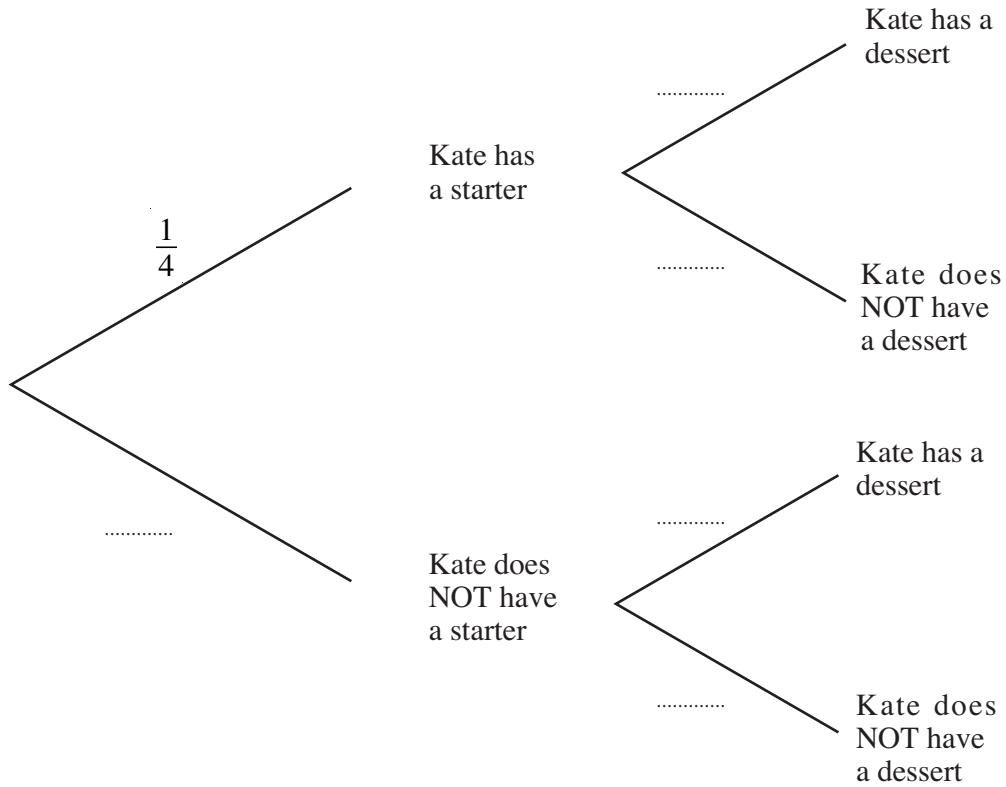
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[2]

21. When Kate has lunch, the probability of her having a starter course is $\frac{1}{4}$. Whether or not she has a starter, the probability of her having a dessert is $\frac{2}{3}$.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that Kate has a starter or a dessert, but not both.

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[2]

22. Each of the following quantities has a particular number of dimensions. Give the number of dimensions of each quantity. The first one has been done for you.

Quantity	Number of dimensions
The distance travelled in two laps of a circuit.	1
The volume of a cuboid.	
The area of the curved surface of a cylinder.	
The perimeter of a rectangle.	
The area of a circle.	

[2]

23. Solve the following equation.

$$\frac{5x + 3}{6} - \frac{x + 10}{3} = \frac{2}{3}$$

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[4]