

# Year 9

## Mathematics

**Higher:** No calculator allowed

Time allowed: 45 minutes

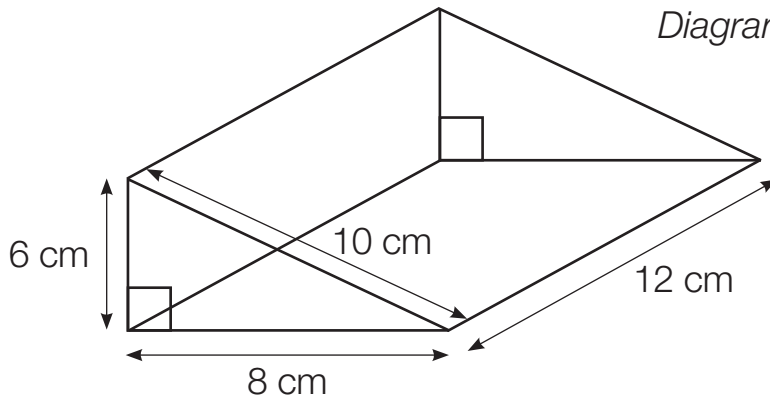
First name						
Middle name						
Last name						
Date of birth	Day		Month		Year	
Teacher						

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For more information, please visit [www.whiterosemaths.com](http://www.whiterosemaths.com)



1

Diagram not drawn accurately.



Work out the volume of the prism.

**cm<sup>3</sup>**

2 marks

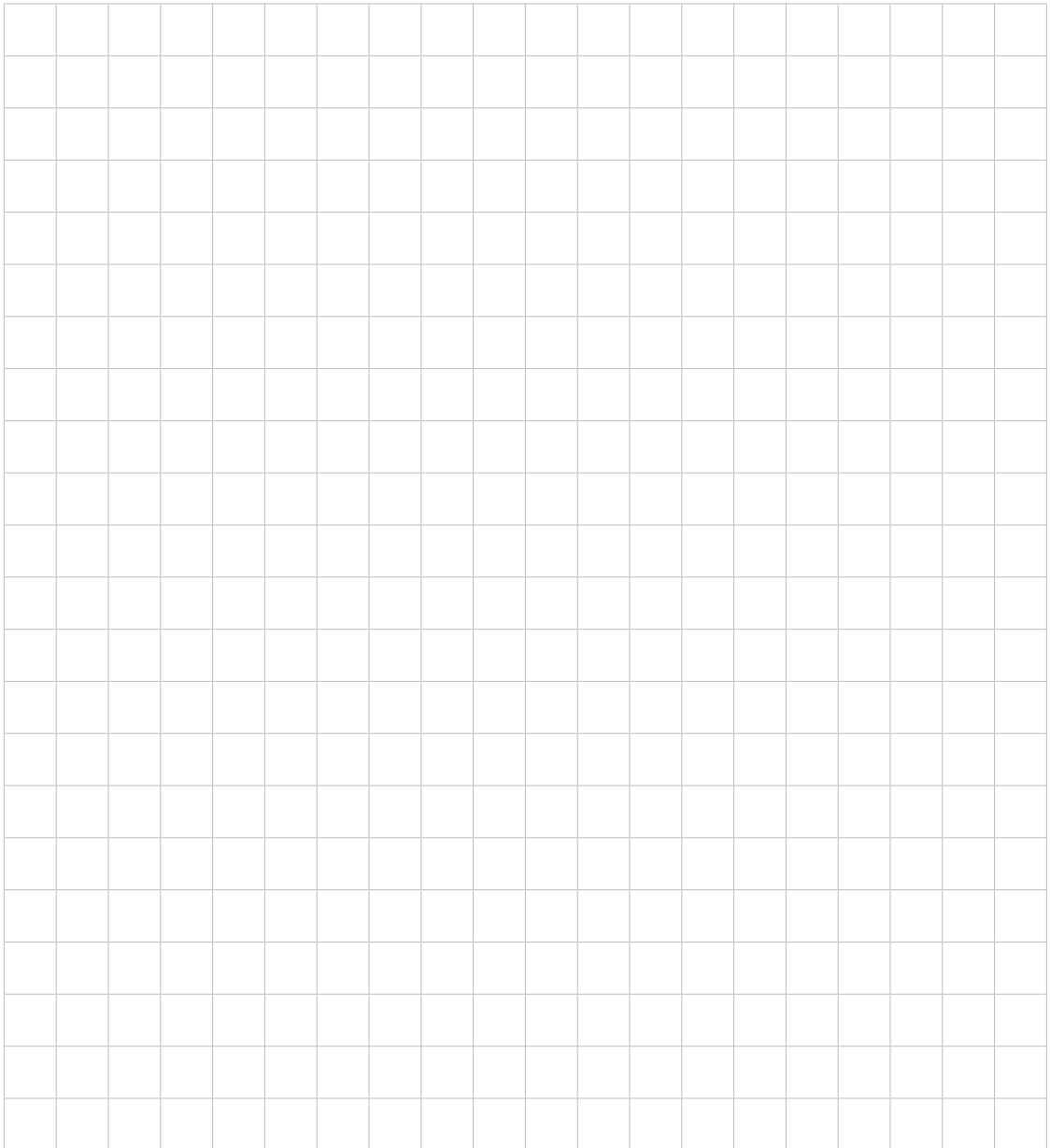
Work out the surface area of the prism.

**cm<sup>2</sup>**

3 marks

2

Draw the graph of  $y = 4x - 3$  on the grid for values of  $x$  from  $-2$  to  $3$



4 marks

3

Rearrange  $4x + 2y = 12$  to make  $y$  the subject.

2 marks

State the gradient of the straight line with equation  $4x + 2y = 12$

1 mark

**4**

$x$	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>40</b>
$y$	<b>100</b>	<b>50</b>	<b>20</b>	<b>10</b>	<b>2.5</b>

Tick the correct statement.

- $x$  is directly proportional to  $y$
- $x$  is inversely proportional to  $y$
- $x$  is neither directly nor inversely proportional to  $y$

1 mark

Work out the value of  $y$  when  $x = 4$

$y =$

1 mark

5

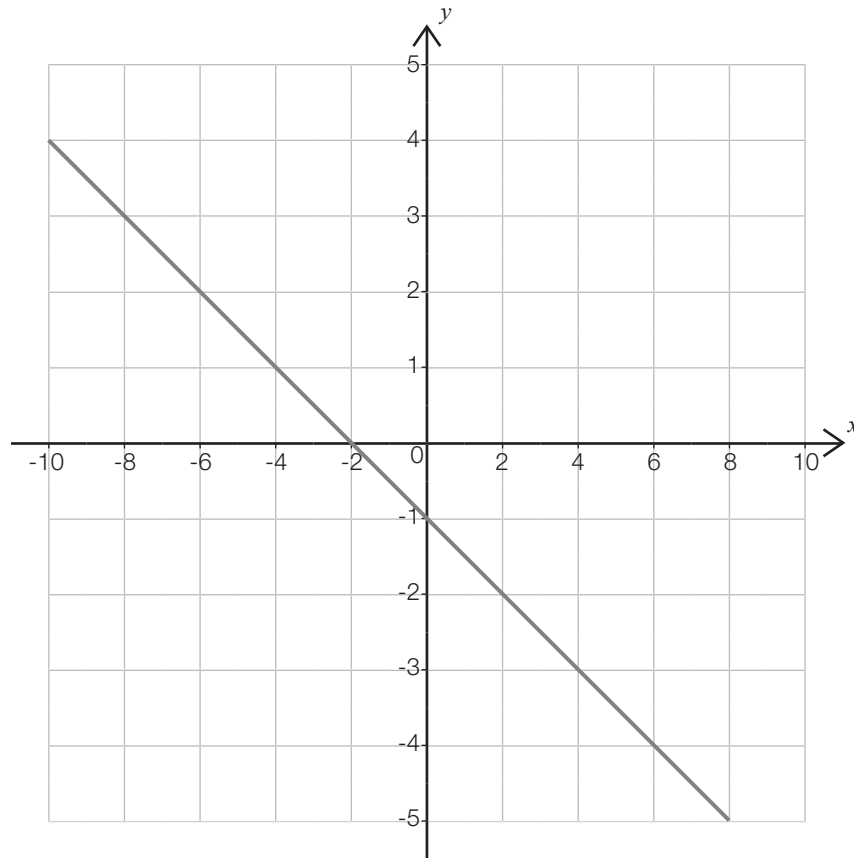
Solve the inequality

$$2(3m + 4) > 7m$$

2 marks

6

Here is a linear graph.



Find the gradient of the line.

\_\_\_\_\_ 2 marks

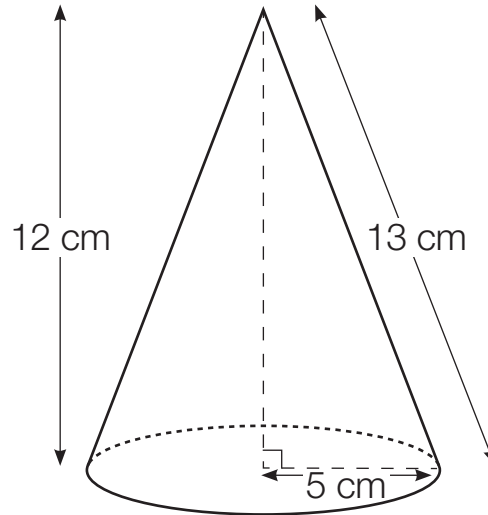
Write down the equation of the line.

\_\_\_\_\_ 1 mark

7

The volume of a cone is given by the formula  $V = \frac{1}{3}\pi r^2 h$ .

Find the volume of the cone, giving your answer in terms of  $\pi$ .



cm<sup>3</sup>

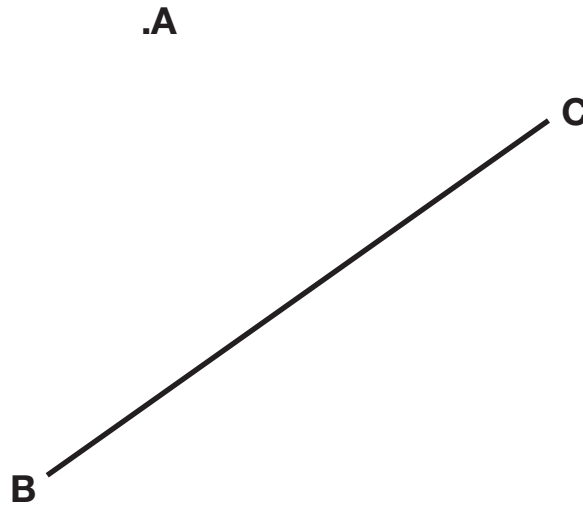
2 marks



8

Use a ruler and pair of compasses to construct a perpendicular from the point A to the line segment BC.

You must show all your construction lines.



2 marks

9

Make  $b$  the subject of the formula  $a^2 + b^2 = c^2$

2 marks

Amir is investigating the difference between the products of the numbers in the opposite corners of a 2 by 3 rectangle placed on a hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

$$22 \times 14 = 308$$

$$12 \times 24 = 288$$

$$308 - 288 = 20$$

Amir calls the top left number in his rectangle  $x$ .

Write expressions to complete the rectangle.

$x$	$x + 1$	
	$x + 11$	

1 mark

It doesn't matter where I place this rectangle on a hundred square. The difference between the products of the numbers in the opposite corners will always be 20



Show that Amir is correct.

2 marks

11

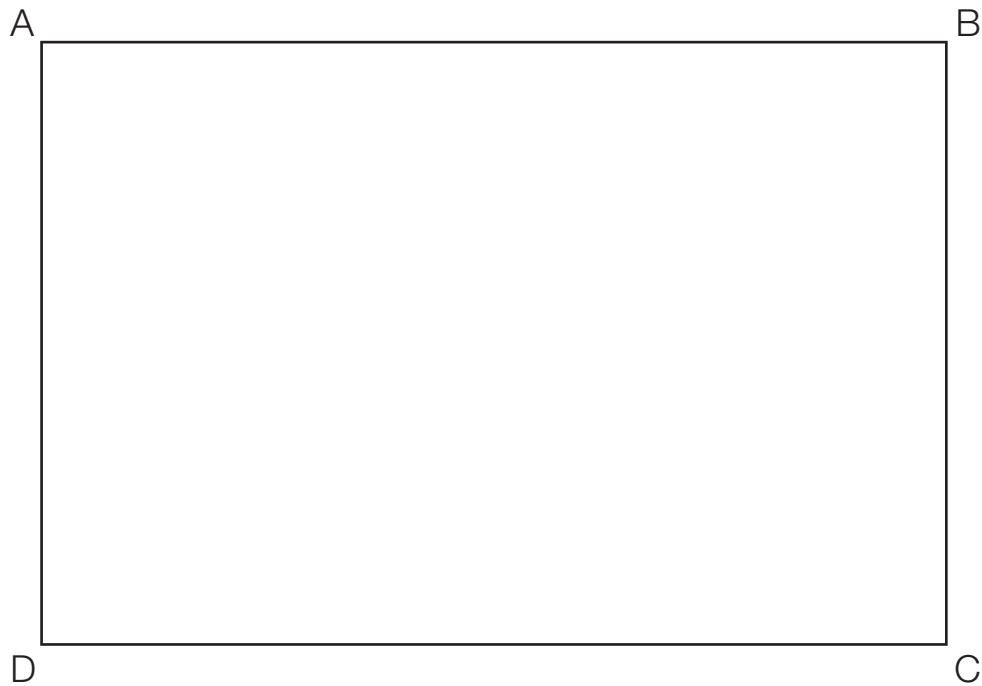
ABCD is the plan view of a garden.

A tree is to be planted so that it is more than 5 m away from D, and closer to CD than BC.

Shade the region where the tree could be planted.

You must use a ruler and a pair of compasses.

Show all your construction lines.



Scale 1 cm stands for 1 m.

3 marks

12

The line  $y = 3x + 7$  is perpendicular to the line  $y = 4 - \frac{1}{3}x$

Is the statement true or false? Circle your answer.

**True**    **False**

Explain your reasoning.

1 mark

13

The volume of a cylinder of height 8 cm is  $72\pi \text{ cm}^3$

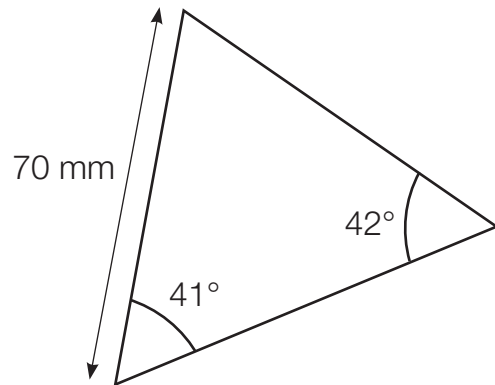
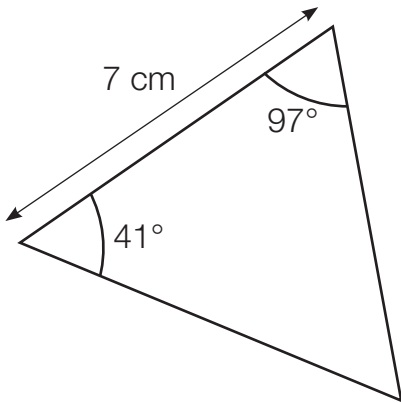
Find the radius of the cylinder.

cm

2 marks

14

Determine whether the triangles are congruent.



*Diagrams not drawn accurately.*

3 marks

**15**Find the range of values of  $x$  for which the fraction is improper.

$$\frac{7 - 5x}{3x + 4}$$

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3 marks

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