

**General Certificate of Secondary Education**

**GCSE AQA  
Mathematics (Grade 9-1)  
Higher Tier**

Centre name				
Centre number				
Candidate number				

**Practice Set 1  
Paper 1: Non-calculator**

**Time allowed: 1 hour 30 minutes**

Surname
Other names
Candidate signature

In addition to this paper you should have:

- A pen, pencil and eraser.
- A ruler.
- A protractor.
- A pair of compasses.

Calculators may **not** be used.



**Instructions to candidates**

- Write your name and other details in the spaces provided above.
- Answer all questions in the spaces provided.
- In calculations show clearly how you worked out your answers.

**Information for candidates**

- There are 80 marks available for this paper.
- The marks available are given in brackets at the end of each question.
- You may get marks for method, even if your answer is incorrect.

**Advice to candidates**

- Work steadily through the paper.
- Don't spend too long on one question.
- If you have time at the end, go back and check your answers.

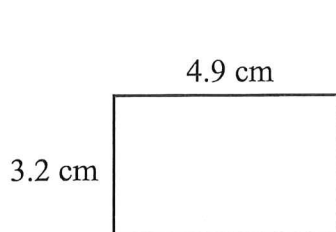
For examiner's use			
Q	Mark	Q	Mark
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	
<b>Total</b>			

Answer ALL the questions.

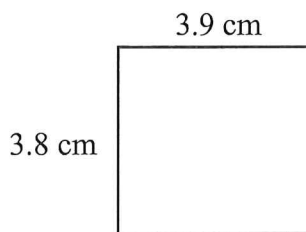
Write your answers in the spaces provided.

You must show all of your working.

- 1 Circle the letter of the rectangle with the longest perimeter.

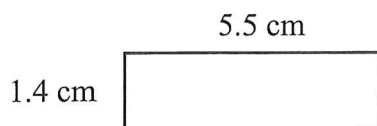


A

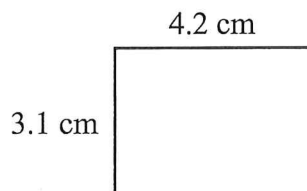


B

Not drawn  
accurately



C



D

[Total 1 mark]

- 2 40% of  $x$  is 12.  
What is the value of  $x$ ? Circle your answer.

3

48

0.3

30

[Total 1 mark]

- 3  $\mathbf{a}$  and  $\mathbf{b}$  are column vectors such that  $\mathbf{a} = \begin{pmatrix} 8 \\ 3 \end{pmatrix}$  and  $\mathbf{b} = \begin{pmatrix} 1 \\ -7 \end{pmatrix}$ .

- (a) Circle the vector  $3\mathbf{a}$

$$\begin{pmatrix} 11 \\ 6 \end{pmatrix}$$

$$\begin{pmatrix} 24 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} 8 \\ 1 \end{pmatrix}$$

$$\begin{pmatrix} 24 \\ 9 \end{pmatrix}$$

[1]

- (b) Circle the vector  $\mathbf{a} + \mathbf{b}$

$$\begin{pmatrix} 9 \\ -4 \end{pmatrix}$$

$$\begin{pmatrix} 9 \\ 10 \end{pmatrix}$$

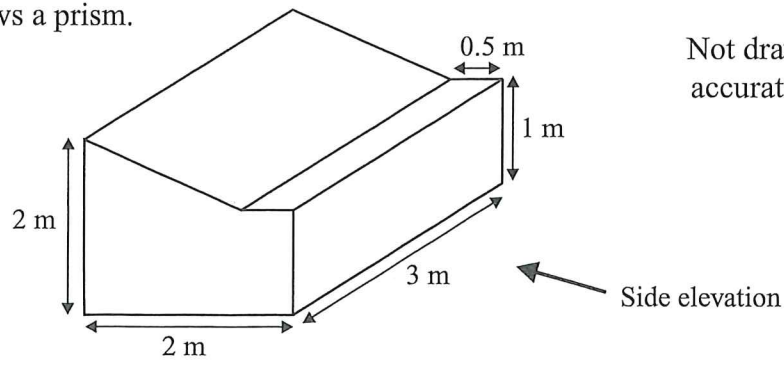
$$\begin{pmatrix} -8 \\ -3 \end{pmatrix}$$

$$\begin{pmatrix} 7 \\ -4 \end{pmatrix}$$

[1]

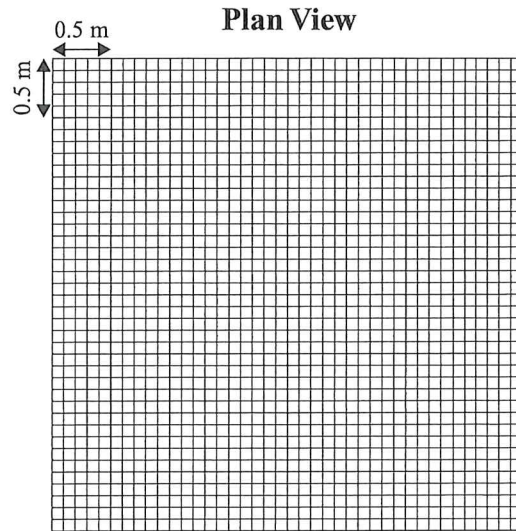
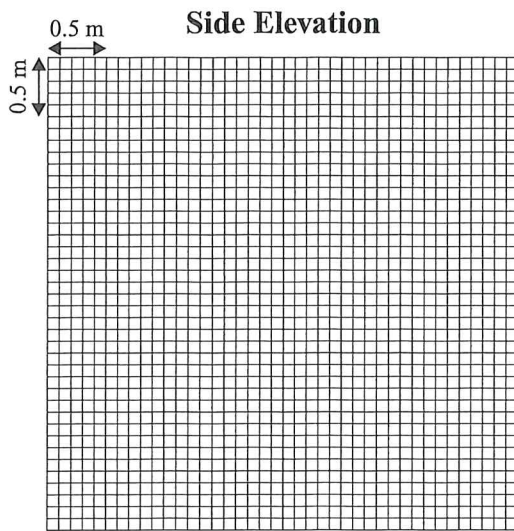
[Total 2 marks]

- 4 The diagram shows a prism.



Leave blank

Using the scale shown on the grids, accurately draw the side elevation and plan view of the prism.



[Total 2 marks]

- 5 (a) Make  $y$  the subject of the formula  $x = 3y - 5$

..... [2]

- (b) Factorise the expression  $8x^2 - 12xy$

..... [2]

[Total 4 marks]

6 The sets  $\xi$ , P and Q are shown below.

$$\xi = \{\text{positive integers less than or equal to } 20\}$$

$$P = \{\text{prime numbers}\}$$

$$Q = \{1, 2, 3, 4, 6, 8, 12\}$$

(a) List the members of the set  $P \cap Q$

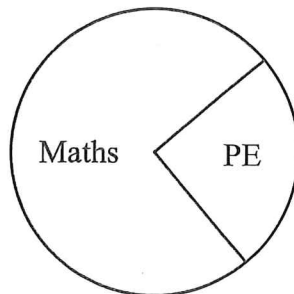
.....  
[2]

(b) Find  $n(P \cup Q)$

.....  
[2]

**[Total 4 marks]**

7 Mathilde asks her group of friends whether they like Maths, PE or History lessons the most. She puts her results in a pie chart.



She claims that, "No one in my school likes History the most."

Do you agree with her statement? Tick a box.

Yes

No

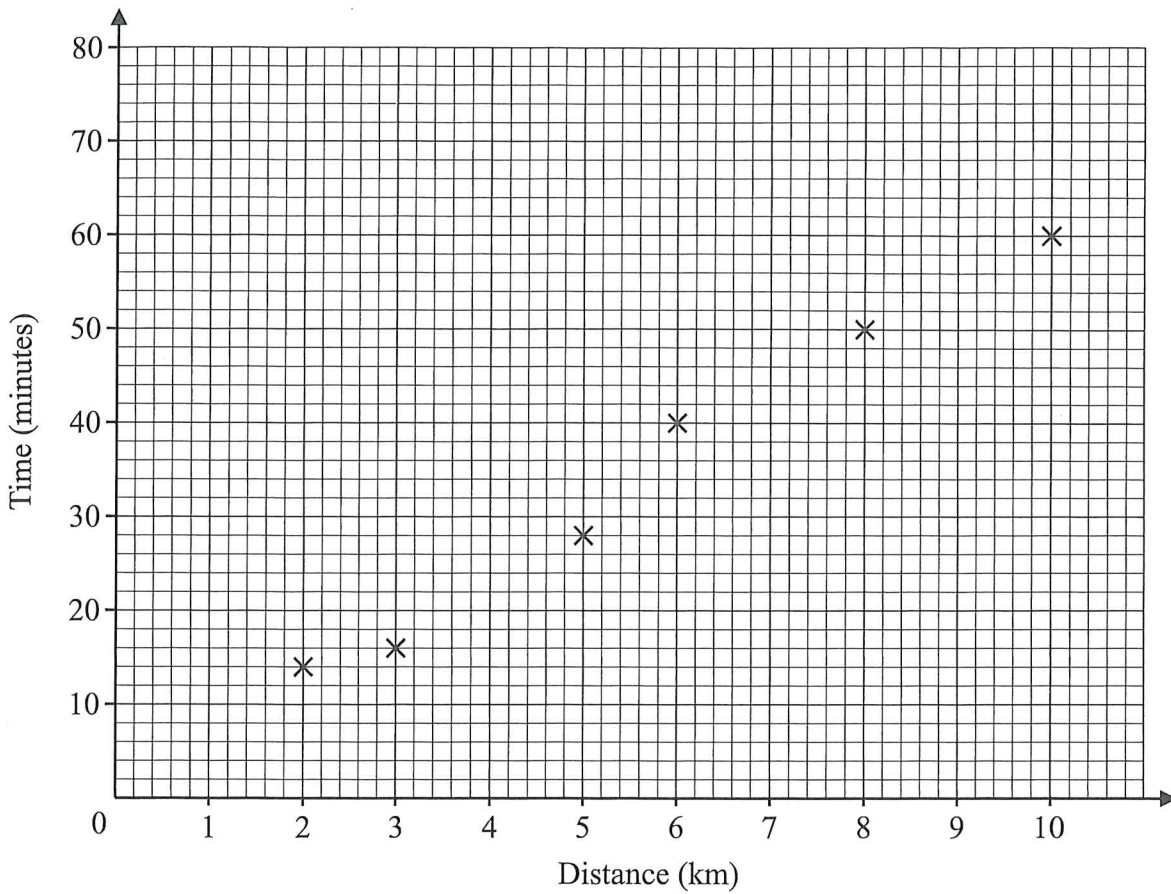
Explain your answer.

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

**[Total 1 mark]**



- 8 Dom has been training for a half marathon. He records the distances and times taken when he goes out running.



- (a) Dom also completed a 4 km run in 21 minutes and a 9 km run in 62 minutes. Plot these points on the graph.

[1]

- (b) Use the graph to estimate how long it would take him to run 7.5 km.

..... minutes  
[2]

- (c) Why might you not expect the points to lie in a straight line?

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

[1]

[Total 4 marks]

- 9 Alice has 2 dogs, Ollie and Taffy.  
Ollie eats  $\frac{2}{3}$  of a tin of dog food every day and Taffy eats  $\frac{2}{5}$  of a tin every day.  
Alice buys a crate of 24 tins.  
How many whole days should the crate last?

..... days

**[Total 3 marks]**

- 10 Look at this calculation.

$$\frac{226 \times 0.074}{0.681}$$

- (a) By rounding each number to 1 significant figure, work out an estimate to the calculation.

.....  
[2]

- (b) Explain whether you think your answer to part (a) is an overestimate, underestimate or if it is impossible to tell.

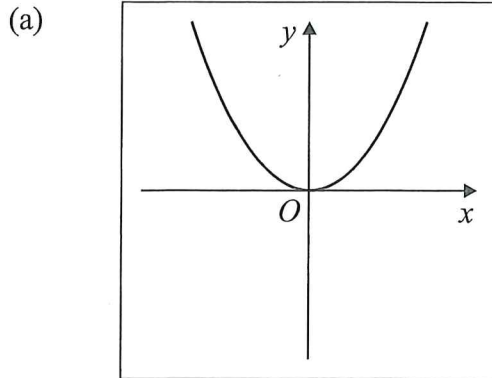
.....  
.....  
.....  
[1]

**[Total 3 marks]**

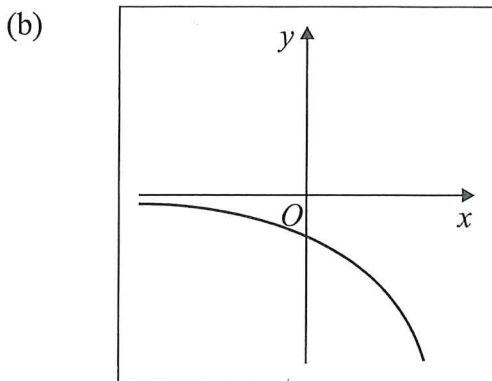
11 Choose an equation from the box to match each of the graphs below.

Leave blank

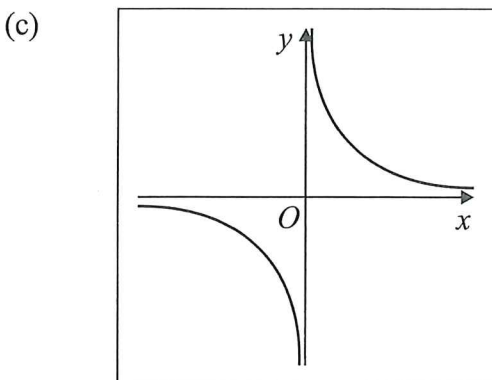
$y = \sin x$	$y = \cos x$	$y = x^2$	$y = -x^2$	$y = x^3$	$y = -x^3$
$y = -2^x$		$y = 2^x$	$y = \frac{1}{x}$	$y = -\frac{1}{x}$	



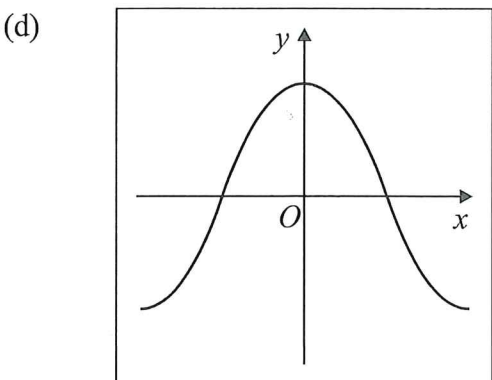
$y = \dots\dots\dots$   
[1]



$y = \dots\dots\dots$   
[1]



$y = \dots\dots\dots$   
[1]



$y = \dots\dots\dots$   
[1]

[Total 4 marks]

Leave  
blank

- 12 A child's set of building blocks contains 5 different colours.  
One block is selected at random.  
The table shows the probabilities of selecting a blue block and a green block.

Block Colour	Blue	Green	Orange	Red	Yellow
Probability	0.2	0.35			

The probability of picking out a green or orange block is 0.62  
The probability of picking out a block that is not yellow is 0.92

Complete the table to show the probability of picking each block colour.

*[Total 3 marks]*

- 13 Two numbers are in the ratio 4 : 5.  
Their highest common factor is 16.
- (a) Find a possible pair of numbers.

..... and .....  
[2]

- (b) Are there any other possible pairs? Tick a box.

Yes  No

Explain your answer.

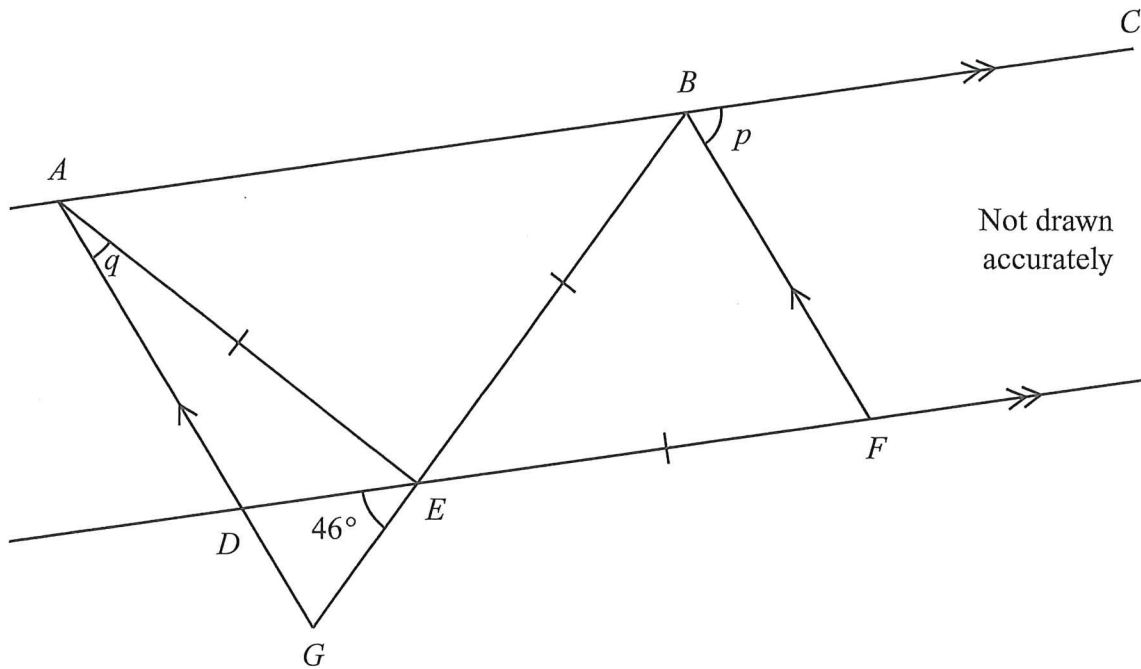
.....  
.....  
.....  
[1]

*[Total 3 marks]*



- 14  $ABC$  and  $DEF$  are parallel.  
 $AG$  and  $BF$  are parallel.  
 $AE = BE = EF$   
 Angle  $DEG = 46^\circ$

Leave blank



Find the size of the angles marked  $p$  and  $q$ .  
 You must show your working.

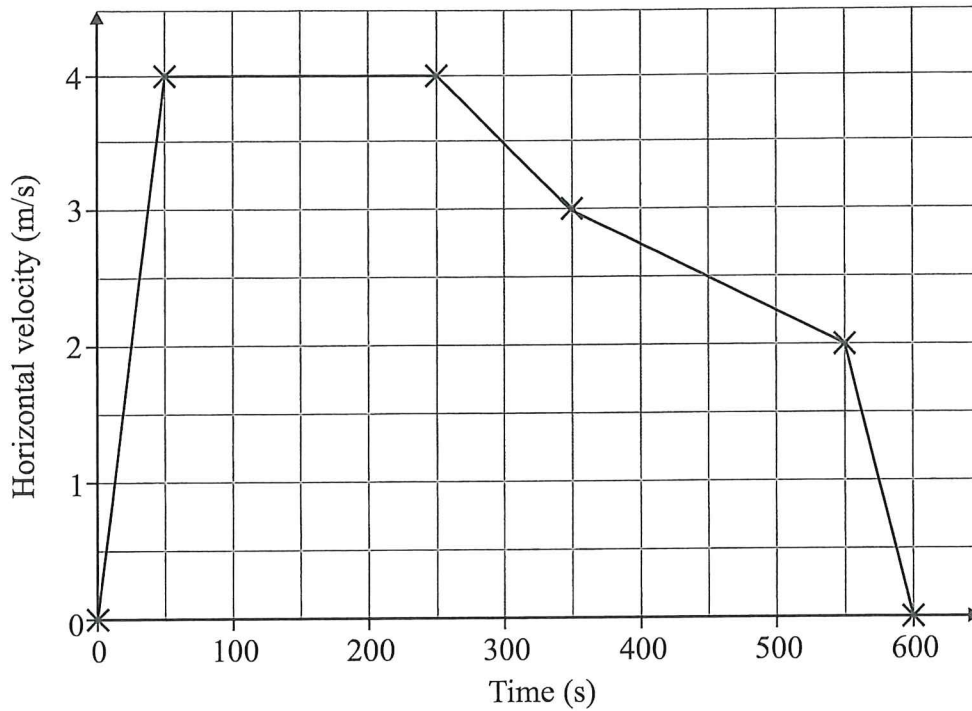
$p = \dots\dots\dots$

$q = \dots\dots\dots$

**[Total 4 marks]**

- 15 Nuala flew her drone at the beach for 10 minutes. The drone automatically recorded its horizontal velocity and Nuala was able to generate the following graph of the flight.

Leave  
blank



- (a) Use the graph to work out the total horizontal distance covered by the drone.

..... m  
[3]

- (b) What was the average horizontal acceleration of the drone? Circle your answer.

0 m/s<sup>2</sup>

2 m/s<sup>2</sup>

600 m/s<sup>2</sup>

150 m/s<sup>2</sup>

[1]

[Total 4 marks]

16 Find the value of:

(a)  $\frac{10}{\sqrt{5}}$ , giving your answer in the form  $\sqrt{c}$ , where  $c$  is an integer.

..... [3]

(b)  $\left(1\frac{7}{9}\right)^{-\frac{1}{2}}$ , giving your answer in the form  $\frac{a}{b}$ , where  $a$  and  $b$  are integers.

..... [3]

**[Total 6 marks]**

17 The table shows a list of metals and their densities (in g/cm<sup>3</sup>).

Name of metal	Density (g/cm <sup>3</sup> )
Aluminium	2.7
Iron	8
Silver	10.5

A metal of volume 0.5 m<sup>3</sup> has a mass of 4000 kg.  
Which metal do you think this is? Show your working.

..... [Total 2 marks]

- 18 There is a sale on at a clothes shop.  
All shorts are reduced by 10% and all jeans are reduced by 20%.

*Leave  
blank*

The ratio of the original price of jeans to the original price of shorts is 7 : 5.  
The sale price of the shorts is £18.00.

What is the sale price of the jeans?

£ .....

***[Total 4 marks]***

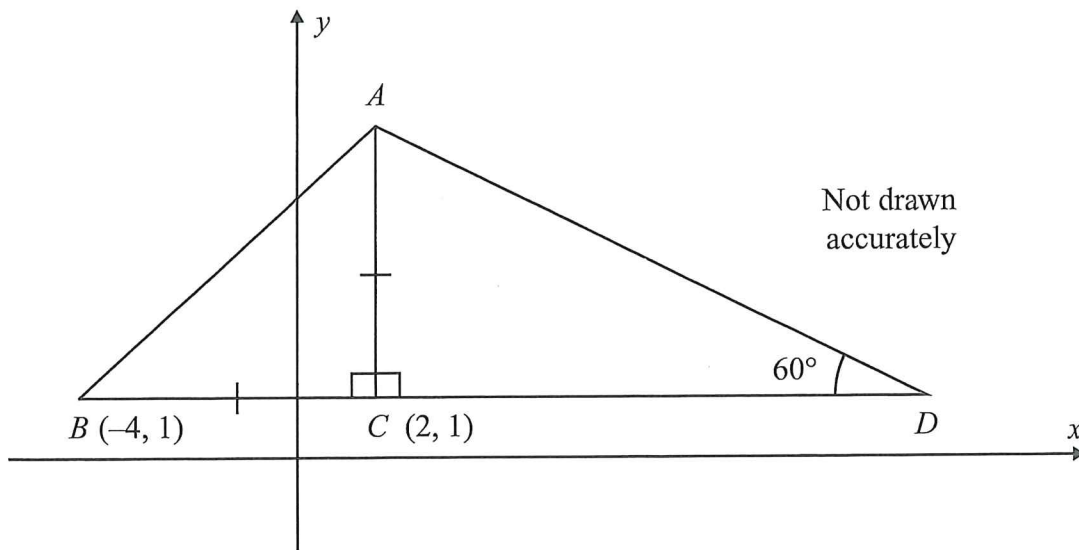
- 
- 19 Expand and simplify  $(x + 3)(x + 5)(x - 2)$

.....

***[Total 3 marks]***

- 20 On a coordinate grid,  $B = (-4, 1)$  and  $C = (2, 1)$ . Triangle  $ABC$  is isosceles. Angle  $ADC = 60^\circ$ .

Leave blank



- (a) Find an expression for the exact length of  $CD$ .  
Give your answer in the form  $a\sqrt{b}$ , where  $a$  and  $b$  are integers.

$$CD = \dots\dots\dots [4]$$

- (b) Find an expression for the exact length of  $AD$ .  
Give your answer in its simplest form.

$$AD = \dots\dots\dots [2]$$

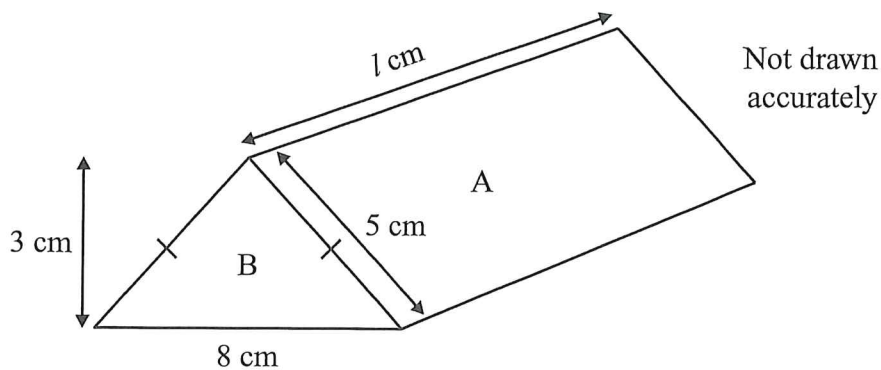
**[Total 6 marks]**



Leave blank

21 The triangular prism below has length  $l$  cm.

The ratio of the pressures exerted on the ground when the prism is stood on face A to when it is stood on face B is 3 : 5.



Find the missing length,  $l$ .

$l = \dots\dots\dots$  cm

**[Total 4 marks]**

22 The line with equation  $y = 4$  is reflected in the line  $y = -x$ .

What is equation of the reflected line?

$y = -x - 4$

$x = 4$

$x = -4$

$y = -4$

**[Total 1 mark]**

23 (a) Solve the simultaneous equations

$$x^2 + y^2 = 20$$

$$x - 3y = 10$$

Leave  
blank

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

[5]

(b) How many points of intersection are there for the graphs with equations  $x^2 + y^2 = 20$  and  $x - 3y = 10$ ? Circle your answer.

0

1

2

4

Explain your answer.

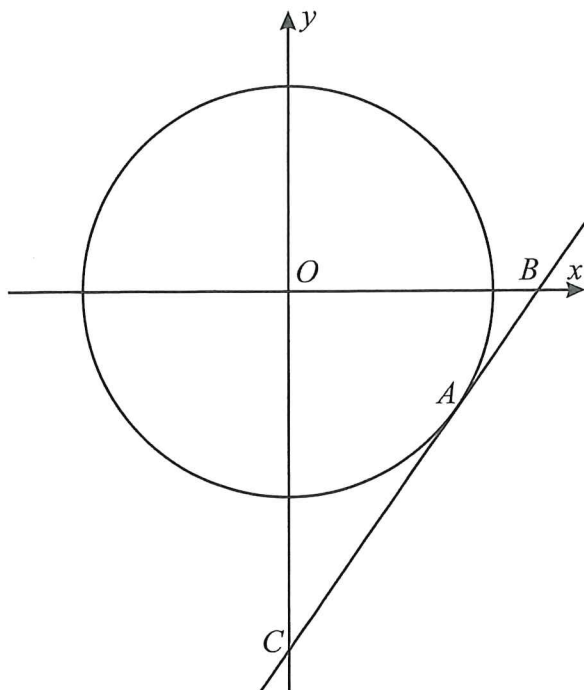
.....  
.....

[1]

[Total 6 marks]

- 24 The diagram shows a sketch of the circle with equation  $x^2 + y^2 = 5$ .  
 The  $y$ -coordinate of point  $A$  is  $-1$ .  
 The tangent to the circle at  $A$  crosses the axes at  $B$  and  $C$  as shown.

Leave  
blank



Find the area of triangle  $OBC$ .

.....  
**[Total 5 marks]**

**[TOTAL FOR PAPER = 80 MARKS]**