— CALC C —

GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Calculator

Name ..... **Class** .....

Answer all questions. Show all your working. Diagrams are NOT accurately drawn unless stated.

1 In a sale, all prices are reduced by 15%.

The sale price of a bike is £484.50

Work out the price of the bike before the sale.

£ .....

(Total for Question 1 is 2 marks)

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2 $s = ut + \frac{1}{2}at^2$

(a) Make a the subject of the formula.

$a =$ .....

(2)

(b) Work out the value of a when $s = 45.6$, $u = 3.2$ and $t = 4.5$

Give your answer correct to 3 significant figures.

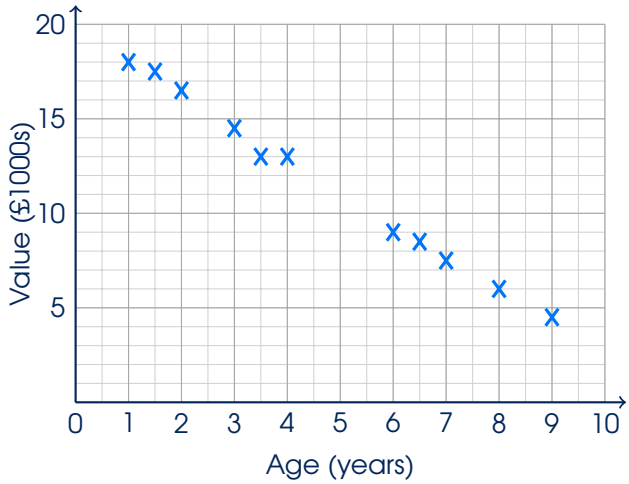
$a =$ .....

(1)

(Total for Question 2 is 3 marks)

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3 The scatter graph shows information about the age and the value of 11 cars of the same model.



Another car of the same model is 5 years old.

(a) Use the scatter graph to find an estimate for the value of this car.

£ .....

(2)

(b) Explain why it may not be reliable to use the scatter graph to estimate the value of a car of this model that is 15 years old.

.....

.....

(1)

(Total for Question 3 is 3 marks)

4 The diagram shows a rectangle and a triangle. All measurements are in centimetres.

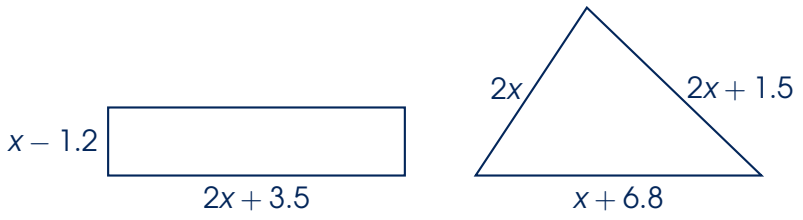


Diagram NOT accurately drawn

The perimeter of the rectangle is equal to the perimeter of the triangle.

Work out the area of the rectangle.

..... cm^2

(Total for Question 4 is 4 marks)

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5 A solid block in the shape of a cuboid has a weight of 168 newtons.

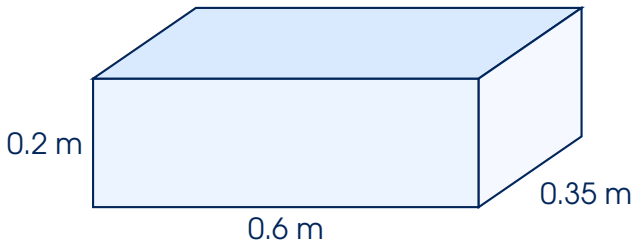


Diagram NOT accurately drawn

The block can rest on any one of its faces on horizontal ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Work out the difference between the greatest possible pressure and the least possible pressure that the block can exert on the ground.

..... N/m^2

(Total for Question 5 is 3 marks)

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6 Amir stands on horizontal ground, 42 m from the foot of a vertical building.

His eyes are 1.6 m above the ground.

The angle of elevation of the top of the building from his eyes is 33°.

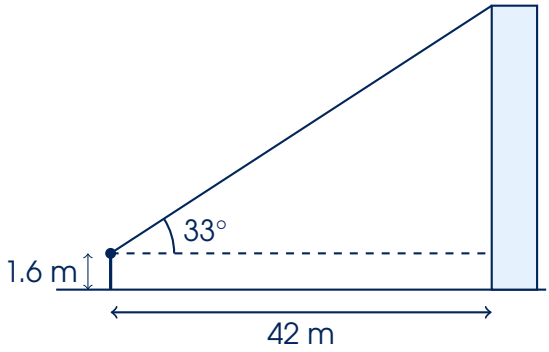


Diagram NOT accurately drawn

Work out the height of the building.

Give your answer correct to 3 significant figures.

..... m

(Total for Question 6 is 3 marks)

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7 A security code is made of two letters followed by three digits, for example **KP 507**

The letters can be any of the 26 letters from A to Z, and a letter can be used more than once.

The digits can be any of 0 to 9, but no digit can be used more than once.

Show that there are more than 450 000 possible codes.

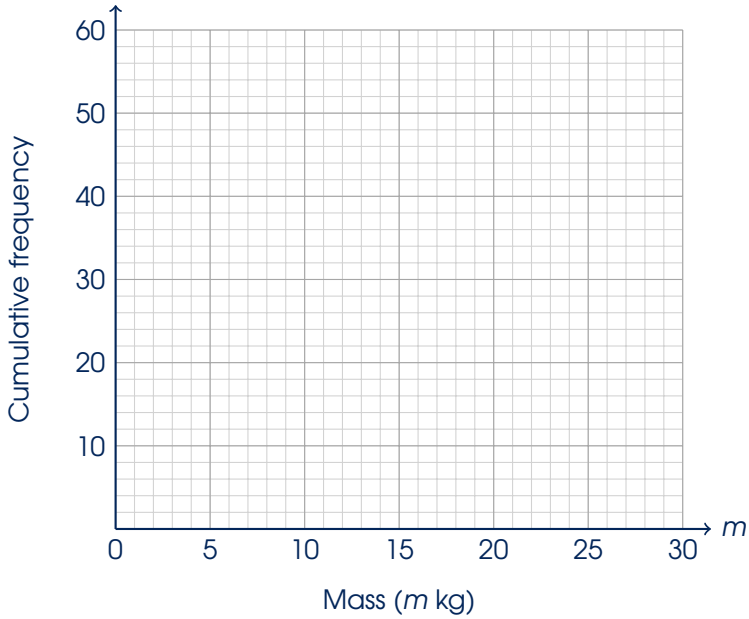
(Total for Question 7 is 2 marks)

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8 The table shows information about the masses of 60 parcels.

Mass (m kg)	Frequency
$0 < m \leqslant 5$	4
$5 < m \leqslant 10$	9
$10 < m \leqslant 15$	15
$15 < m \leqslant 20$	18
$20 < m \leqslant 25$	10
$25 < m \leqslant 30$	4

(a) On the grid, draw a cumulative frequency graph for this information.



(2)

(b) Jess says,

"More than half of the parcels have a mass greater than 17.5 kg."

Use your graph to decide whether Jess is correct. Give a reason for your answer.

.....

.....

(1)

(Total for Question 8 is 3 marks)

9 Here is triangle *PQR*.

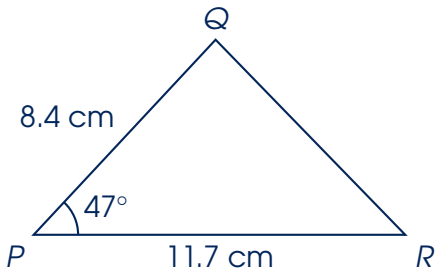


Diagram NOT accurately drawn

Work out the area of triangle *PQR*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 9 is 2 marks)

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10 A box is in the shape of a cuboid, 45 cm by 30 cm by 20 cm.

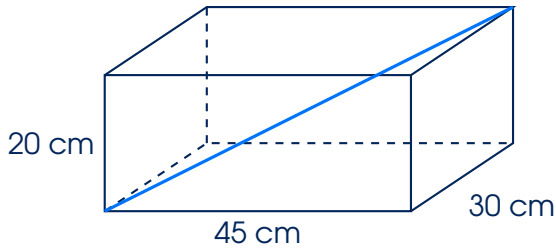


Diagram NOT accurately drawn

Lena wants to fit a straight rod of length 58 cm inside the box.
Can the rod fit inside the box? You must show how you get your answer.

(Total for Question 10 is 3 marks)

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11 A rectangle has an area of 54 cm^2, correct to the nearest cm^2.

The length of the rectangle is 9.6 cm, correct to 1 decimal place.

(a) Work out the lower bound for the width of the rectangle.

Give your answer correct to 3 significant figures.

..... cm

(2)

(b) By considering bounds, work out the width of the rectangle to a suitable degree of accuracy.

You must give a reason for your answer.

..... cm

(2)

(Total for Question 11 is 4 marks)

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12 The time taken to clear a building site is inversely proportional to the number of machines used.

With 14 machines, it takes 6.5 hours to clear the site.

The site manager wants the site to be cleared in no more than 3 hours 45 minutes.

Work out the least number of extra machines needed.

.....

(Total for Question 12 is 3 marks)

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13 **(a)** Show that the equation

$$\frac{3}{x+2} + \frac{2}{x-1} = 4$$

can be written as $4x^2 - x - 9 = 0$

(2)

(b) Solve $4x^2 - x - 9 = 0$

Give your solutions correct to 2 decimal places.

.....

(3)

(Total for Question 13 is 5 marks)

TOTAL FOR PAPER IS 40 MARKS