

Upper and Lower Bounds

For Pearson Edexcel GCSE Mathematics (1MA1) • Higher tier

Name _____

Total marks: **25**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

- 1** The mass of a bag is 60 kg, correct to the nearest 10 kg.
Write down the error interval for the mass, m kg.

.....
(2)

(Total for Question 1 is 2 marks)

- 2** The thickness of a sheet of card is 0.26 mm, correct to 2 significant figures.
Complete the error interval for the thickness, t mm.

..... $\leq t <$
(2)

(Total for Question 2 is 2 marks)

- 3** A stopwatch shows a time in seconds, to 2 decimal places.
Leon writes down the time by truncating it to a whole number of seconds.
He writes down 58 seconds.
Write down the error interval for the time shown on the stopwatch, t seconds.

.....
(2)

(Total for Question 3 is 2 marks)

- 4 The length of a side of a square is 9 cm, correct to the nearest cm.
Work out the upper bound for the perimeter of the square.

..... cm
(2)

(Total for Question 4 is 2 marks)

- 5 The circumference of a bicycle wheel is 185 cm, correct to the nearest 5 cm.
Work out the lower bound for the diameter of the wheel.
Give your answer correct to 1 decimal place.

..... cm
(2)

(Total for Question 5 is 2 marks)

- 6 A shelf in a shop can safely hold a load of 180 kg, correct to the nearest 10 kg.
Tins of paint are put on the shelf.
Each tin weighs 4.6 kg, correct to 1 decimal place.
Work out the greatest number of tins that can **always** be put on the shelf safely.
You must show your working.

.....
(3)

(Total for Question 6 is 3 marks)

7 ABC is a right-angled triangle.

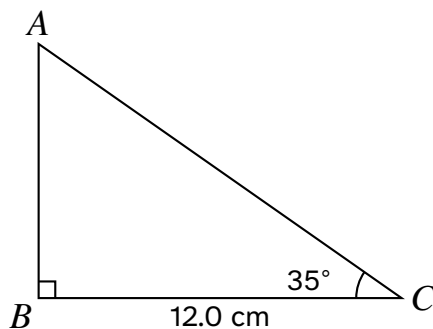


Diagram **NOT** accurately drawn

$BC = 12.0\text{ cm}$ correct to the nearest mm.

Angle $ACB = 35^\circ$ correct to the nearest degree.

Calculate the upper bound for the length of AB .

Give your answer correct to 3 significant figures.

You must show all your working.

..... cm
(3)

(Total for Question 7 is 3 marks)

- 8 The kinetic energy, E joules, of an object of mass m kg moving at a speed of v m/s is given by the formula

$$E = \frac{1}{2}mv^2$$

A ball has mass 0.45 kg, correct to 2 significant figures.

The kinetic energy of the ball is 32 joules, correct to 2 significant figures.

Work out the upper bound and the lower bound for the speed of the ball.

Give your answers correct to 1 decimal place.

You must show all your working.

upper bound =

lower bound =

(4)

(Total for Question 8 is 4 marks)

- 9 A tin is in the shape of a cylinder.

The volume of the tin is 850 cm^3 , correct to 3 significant figures.

The height of the tin is 12.4 cm, correct to 1 decimal place.

By considering bounds, work out the radius of the tin to a suitable degree of accuracy.

Give a reason for your answer.

radius = cm

(5)

(Total for Question 9 is 5 marks)
