PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

# Rounding and Bounds: exam questions

10 questions · 28 marks · mark schemes at the end

Name _____ Date _____ Score / 28

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/rounding-and-bounds

**1.** **2 marks**

(a) Write 0.004 738 6 correct to 3 significant figures. **(1)**

(b) Write 52 749 correct to 2 significant figures. **(1)**

**2.** **2 marks**

The length, $L$ cm, of a metal rod is 36 cm correct to the nearest centimetre.

Write down the error interval for $L$.

**3.** **2 marks**

A rectangle has length 8.6 cm correct to 1 decimal place and width 4.2 cm correct to 1 decimal place.

Work out the upper bound for the area of the rectangle.

**4.** **3 marks**

A runner covers 120 m, correct to the nearest metre, in 14.2 seconds, correct to 1 decimal place.

Work out the lower bound for her average speed. Give your answer correct to 3 significant figures and show your working clearly.

**5.** **3 marks**

$p = 2400$ correct to 2 significant figures.

$q = 30$ correct to 1 significant figure.

Work out the upper bound for $\frac{p}{q}$.

**6.** **2 marks**

The area of a square is 50 cm², correct to the nearest square centimetre.

Work out the lower bound for the length of one side of the square. Give your answer correct to 4 significant figures.

**7.** **4 marks**

$a = 5.3$ correct to 1 decimal place.

$b = 1.62$ correct to 2 decimal places.

$$c = \frac{a+b}{a-b}$$

(a) Write down the upper bound of $a$. **(1)**

(b) Work out the upper bound of $c$. Give your answer correct to 4 significant figures. **(3)**

**8.** **3 marks**

A block of metal has a mass of 450 g, correct to the nearest 10 g. Its volume is 60 cm³, correct to the nearest 5 cm³.

Work out the upper bound for the density of the metal. Give your answer correct to 3 significant figures.

**9.** **4 marks**

The distance between two villages is 18 km, correct to the nearest kilometre. Omar walks between them at 5 km/h, correct to the nearest 0.5 km/h.

Omar says, "I will definitely get there in under 4 hours."

Is Omar right? You must show your working.

**10.** **3 marks**

The two shorter sides of a right-angled triangle are 7.4 cm and 3.1 cm, each correct to 1 decimal place.

Work out the lower bound for the length of the hypotenuse. Give your answer correct to 4 significant figures.

## Answers and worked solutions

### Question 1 — 2 marks

**(a)**

**B1** 0.004 74

**(b)**

**B1** 53 000

**Answer:** (a) 0.004 74; (b) 53 000

### Question 2 — 2 marks

**B1** lower bound 35.5

**B1** upper bound 36.5, written as $35.5 \leqslant L < 36.5$

B1 for one bound correct in an otherwise wrong inequality.

**Answer:** $35.5 \leqslant L < 36.5$

### Question 3 — 2 marks

**M1** upper bounds 8.65 and 4.25 used: $8.65 \times 4.25$

**A1** $36.7625\ \text{cm}^2$

**Answer:** $36.7625\ \text{cm}^2$

### Question 4 — 3 marks

**B1** 119.5 or 14.25 seen

**M1** $\dfrac{119.5}{14.25}$ (least distance over greatest time)

**A1** $8.385\ldots$ so $8.39\ \text{m/s}$

**Answer:** $8.39\ \text{m/s}$

### Question 5 — 3 marks

**B1** 2450 or 25 seen

**M1** $\dfrac{2450}{25}$

**A1** 98

**Answer:** 98

### Question 6 — 2 marks

**M1** $\sqrt{49.5}$

**A1** $7.035\ldots$ so 7.036 cm

**Answer:** 7.036 cm

### Question 7 — 4 marks

**(a)**

**B1** 5.35

**(b)**

**B1** 5.25 and 1.625 seen

**M1** $\dfrac{5.25 + 1.625}{5.25 - 1.625} = \dfrac{6.875}{3.625}$ ($c$ is largest when the denominator is smallest)

**A1** $1.896\ldots$ so 1.897

Using 5.35 for $a$ in the numerator and 5.25 in the denominator is a different value of $a$ in one expression: M0.

**Answer:** (a) 5.35; (b) 1.897

### Question 8 — 3 marks

**B1** 455 or 57.5 seen

**M1** $\dfrac{455}{57.5}$

**A1** $7.913\ldots$ so 7.91 g/$\text{cm}^3$

**Answer:** 7.91 g/$\text{cm}^3$

### Question 9 — 4 marks

**B1** 18.5 (upper bound of distance)

**B1** 4.75 (lower bound of speed)

**M1** $\dfrac{18.5}{4.75}$

**A1** $3.89\ldots$ hours, which is less than 4, so Omar is right

**Answer:** Yes: the longest possible time is 3.89 hours

### Question 10 — 3 marks

**M1** lower bounds 7.35 and 3.05 used

**M1** $\sqrt{7.35^2 + 3.05^2} = \sqrt{63.325}$

**A1** $7.957\ldots$ so 7.958 cm

**Answer:** 7.958 cm

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/rounding-and-bounds
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