



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Bounds & Error Intervals · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☐ Secure

☒ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Bounds & Error Intervals

Total marks available: 85

● Bounds & Error Intervals

✓ 2.755 cm

Q1 · ● Developing · 2 marks

METHOD

Half the rounding unit = $0.01 \div 2 = 0.005$

Upper bound = $2.75 + 0.005 = 2.755$ cm

✓ $3950 \leq x < 4050$

Q2 · ● Developing · 2 marks

METHOD

Lower bound = $4000 - 50 = 3950$

Upper bound = $4000 + 50 = 4050$

✓ $3250 \leq x < 3350$

Q3 · ● Developing · 2 marks

METHOD

Lower bound = $3300 - 50 = 3250$

Upper bound = $3300 + 50 = 3350$

✓ 5.05 kg

Q4 · ● Developing · 2 marks

METHOD

Half the rounding unit = $0.1 \div 2 = 0.05$

Upper bound = $5 + 0.05 = 5.05$ kg

✓ $165 \leq x < 175$

Q5 · ● Developing · 2 marks

METHOD

Lower bound = $170 - 5 = 165$

Upper bound = $170 + 5 = 175$

✓ $165 \leq x < 175$

Q6 · ● Developing · 2 marks

METHOD

Lower bound = $170 - 5 = 165$

Upper bound = $170 + 5 = 175$

✓ 2.15 cm

Q7 · ● Developing · 2 marks

METHOD

Half the rounding unit = $0.1 \div 2 = 0.05$

Lower bound = $2.2 - 0.05 = 2.15 \text{ cm}$

✓ 5.885 kg

Q8 · ● Developing · 2 marks

METHOD

Half the rounding unit = $0.01 \div 2 = 0.005$

Lower bound = $5.89 - 0.005 = 5.885 \text{ kg}$

✓ 5.475 cm

Q9 · ● Developing · 2 marks

METHOD

Half the rounding unit = $0.01 \div 2 = 0.005$

Upper bound = $5.47 + 0.005 = 5.475 \text{ cm}$

✓ $2950 \leq x < 3050$

Q10 · ● Developing · 2 marks

METHOD

Lower bound = $3000 - 50 = 2950$

Upper bound = $3000 + 50 = 3050$

✓ 5.26 g/cm³

Q11 · ● Secure · 3 marks

METHOD

Min mass = 123.5 g, max volume = 23.5 cm³

Min density = $123.5 \div 23.5 = 5.26 \text{ g/cm}^3$

✓ 5.03 g/cm³

Q12 · ● Secure · 3 marks

METHOD

Min mass = 188.5 g, max volume = 37.5 cm³

Min density = $188.5 \div 37.5 = 5.03 \text{ g/cm}^3$

✓ 6.24 g/cm³

Q13 · ● Secure · 3 marks

METHOD

Min mass = 90.5 g, max volume = 14.5 cm³

Min density = $90.5 \div 14.5 = 6.24 \text{ g/cm}^3$

✓ 4.43 g/cm³

Q14 · ● Secure · 3 marks

METHOD

Min mass = 148.5 g, max volume = 33.5 cm³

Min density = $148.5 \div 33.5 = 4.43 \text{ g/cm}^3$

✓ 64.82 km/h

Q15 · ● Secure · 3 marks

METHOD

Max distance = 356.5 km, min time = 5.5 hours

Max speed = $356.5 \div 5.5 = 64.82 \text{ km/h}$

✓15.71 km/h

Q16 · ● Secure · 3 marks

METHOD

Max distance = 243.5 km, min time = 15.5 hours

Max speed = $243.5 \div 15.5 = 15.71$ km/h

✓16.05 km/h

Q17 · ● Secure · 3 marks

METHOD

Max distance = 168.5 km, min time = 10.5 hours

Max speed = $168.5 \div 10.5 = 16.05$ km/h

✓69.91 km/h

Q18 · ● Secure · 3 marks

METHOD

Max distance = 384.5 km, min time = 5.5 hours

Max speed = $384.5 \div 5.5 = 69.91$ km/h

✓8.39 km/h

Q19 · ● Secure · 3 marks

METHOD

Max distance = 138.5 km, min time = 16.5 hours

Max speed = $138.5 \div 16.5 = 8.39$ km/h

✓28.14 km/h

Q20 · ● Secure · 3 marks

METHOD

Max distance = 98.5 km, min time = 3.5 hours

Max speed = $98.5 \div 3.5 = 28.14$ km/h

✓106 cm

Q21 · ● Greater Depth · 3 marks

METHOD

Max original length = 219.5 cm

Min piece cut off = 113.5 cm

Max remaining = $219.5 - 113.5 = 106$ cm

✓51.5 cm

Q22 · ● Greater Depth · 3 marks

METHOD

Max original length = 160.5 cm

Min piece cut off = 109 cm

Max remaining = $160.5 - 109 = 51.5$ cm

✓261 cm

Q23 · ● Greater Depth · 3 marks

METHOD

Max original length = 356.5 cm

Min piece cut off = 95.5 cm

Max remaining = $356.5 - 95.5 = 261$ cm

✓329.5 cm

Q24 · ● Greater Depth · 3 marks

METHOD

Max original length = 383.5 cm

Min piece cut off = 54 cm

Max remaining = $383.5 - 54 = 329.5$ cm

✓27.14

Q25 · ● Greater Depth · 4 marks

METHOD

Min numerator: min $p = 343.5$, max $q = 58.5$

$p - q$ (min) = $343.5 - 58.5 = 285$

Max $r = 10.5$

Min $v = 285 \div 10.5 = 27.14$

✓20.82

Q26 · ● Greater Depth · 4 marks

METHOD

Min numerator: min $p = 440.5$, max $q = 34.5$

$p - q$ (min) = $440.5 - 34.5 = 406$

Max $r = 19.5$

Min $v = 406 \div 19.5 = 20.82$

✓29.9

Q27 · ● Greater Depth · 4 marks

METHOD

Min numerator: min $p = 384.5$, max $q = 70.5$

$p - q$ (min) = $384.5 - 70.5 = 314$

Max $r = 10.5$

Min $v = 314 \div 10.5 = 29.9$

✓28.86

Q28 · ● Greater Depth · 4 marks

METHOD

Min numerator: min $p = 346.5$, max $q = 43.5$

$p - q$ (min) = $346.5 - 43.5 = 303$

Max $r = 10.5$

Min $v = 303 \div 10.5 = 28.86$

✓189.5 cm

Q29 · ● Greater Depth · 3 marks

METHOD

Max original length = 280.5 cm

Min piece cut off = 91 cm

Max remaining = $280.5 - 91 = 189.5$ cm

✓20.67

Q30 · ● Greater Depth · 4 marks

METHOD

Min numerator: min $p = 435.5$, max $q = 94.5$

$p - q$ (min) = $435.5 - 94.5 = 341$

Max $r = 16.5$

Min $v = 341 \div 16.5 = 20.67$