FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

N16: Bounds

Solve problems involving upper and lower bounds

20 marks · 25 minutes · Calculator allowed

1) A car travels 150 km, to the nearest km, in 1.8 hours, to 1 decimal place. Can you be sure that its average speed was more than 80 km/h? Show your working.

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[Question 1: 3 marks]

2) Boxes each have a mass of 12 kg, to the nearest kg. A van can carry up to 500 kg. What is the greatest number of boxes it can definitely carry?

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[Question 2: 3 marks]

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3) A rectangle has area 50 cm^2, to the nearest cm^2, and length 10 cm, to the nearest cm. Find the upper bound of its width.

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[Question 3: 3 marks]

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4) A square garden has sides of 8.4 m, to 1 decimal place. Fencing comes in rolls of 34 m. Is one roll definitely enough to go all the way round? Show your working.

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[Question 4: 3 marks]

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5) a = 3.6 and b = 1.2, both to 1 decimal place. Find the value of $\frac{a}{b}$ to a suitable degree of accuracy. Justify your answer.

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[Question 5: 4 marks]

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6) A lift holds at most 650 kg. 8 people each have a mass of 80 kg, to the nearest 5 kg. Can you be sure the lift is safe? Explain.

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[Question 6: 2 marks]

7) A runner covers 400 m, to the nearest 10 m, at 5 m/s, to the nearest 0.5 m/s. Find the upper bound of the time taken.

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[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Yes	LB distance 149.5 and UB time 1.85 (P1, P1); 80.8 $>$ 80 (C1).
2	40	UB mass 12.5 kg (P1); 500 $\div$ 12.5 (P1); 40 (A1).
3	5.32	UB area 50.5 and LB length 9.5 (P1, P1); 5.32 (A1).
4	Yes	UB side 8.45 (P1); perimeter 33.8 m (P1); $\leqslant$ 34 (C1).
5	3	LB 3.55 $\div$ 1.25 = 2.84 (P1); UB 3.65 $\div$ 1.15 = 3.17 (P1); both round to 3 to 1 s.f. (P1); 3 (A1).
6	No	UB 8 $\times$ 82.5 = 660 $>$ 650 (P1); C1.
7	85.3	405 $\div$ 4.75 (P1); A1.