UPPER AND LOWER BOUNDS
EXAM-TYPE QUESTIONS

Ref: G145. **1R1**

A1 Zoe weighs 62 kg, correct to the nearest kilogram. Write down the lower bound for Zoe's weight.	**A2** The length of line AB = 8.3 cm, correct to 2 significant figures. Write down the upper bound for the length of AB.	**A3** Anu weighs 83 kg, correct to the nearest <u>half</u> kilogram. Write down the upper bound for Anu's weight.	**A4** The length of line CD = 27 cm, correct to the nearest 0.5 cm Write down the lower bound for the length of CD.
B1 Correct to the nearest millimetre, the length of a side of a regular hexagon is 3.6 cm Calculate the upper bound for the perimeter of the hexagon.	**B2** The perimeter of a square is 24 cm, correct to the nearest half centimetre. Work out the lower bound for the length of a side.	**B3** Correct to 1 significant figure, the area of a rectangle is 80 cm^2. Correct to 2 significant figures, the length of the rectangle is 12 cm. Calculate the upper bound for the width.	**B4** Correct to 2 significant figures the area of a square is 230 cm^2. Calculate the lower bound for the perimeter of the square.
C1 x = 1.8 correct to 1 decimal place. Calculate the lower bound for the value of $4x + 1$	**C2** Correct to 1 significant figure, a = 20 and b = 5 Work out the upper bound of $$5(a - b)$$	**C3** $x = p(q - r)$ p = 42, q = 24 and r = 14 all correct to 2 significant figures. Work out the lower bound for the value of x.	**C4** Correct to 2 significant figures, w = 58, x = 28 and y = 18 Calculate the upper bound of $$\frac{w}{x - y}$$
D1 Jada has 100 litres of oil, correct to the nearest litre. The oil is poured into tins of volume 1.5 litres, correct to one decimal place. Calculate the upper bound for the number of tins that can be filled.	**D2** There are 300 sheets of paper in a pile, correct to the nearest 10 sheets. The height of the pile is 160 mm, correct to the nearest 10 mm. Calculate the upper bound for the thickness of one sheet.	**D3** The distance to school is 2.8 km, correct to the nearest 0.1 km. Sam walks at a speed of 5 km/h, correct to the nearest km/h. Calculate the upper bound for the time Sam takes to walk to school.	**D4** Correct to 2 decimal places, the volume of a solid cube is 42.88 cm^3 Calculate the lower bound for the surface area of the cube.

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Ref: G145. **1R1**

A1

Zoe weighs 62 kg, correct to the nearest kilogram.

Write down the lower bound for Zoe's weight.

$61.5 \, kg$

A2

The length of line $AB = 8.3$ cm, correct to 2 significant figures.

Write down the upper bound for the length of AB.

$8.35 \, cm$

A3

Anu weighs 83 kg, correct to the nearest half kilogram.

Write down the upper bound for Anu's weight.

$83.25 \, kg$

A4

The length of line $CD = 27$ cm, correct to the nearest 0.5 cm

Write down the lower bound for the length of CD.

$26.75 \, cm$

B1

Correct to the nearest millimetre, the length of a side of a regular hexagon is 3.6 cm

Calculate the upper bound for the perimeter

$6 \times 3.65 = 21.9 \, cm$

B2

The perimeter of a square is 24 cm, correct to the nearest half centimetre.

Work out the lower bound for the length of a side.

$\dfrac{23.75}{4} = 5.94 \, cm$

B3

Correct to 1 significant figure, the area of a rectangle is 80 cm². Correct to 2 significant figures, the length of the rectangle is 12 cm.

$Width_{UPPER} = \dfrac{85}{11.5} = 7.39 \, cm$

B4

Correct to 2 significant figures the area of a square is 230 cm².

$Side_{LOWER} = \sqrt{225} = 15$

$Perimeter = 4 \times 15 = 60 \, cm$

C1

$x = 1.8$ correct to 1 decimal place.

Calculate the lower bound for the value of $4x + 1$

$4 \times 1.75 + 1 = 8$

C2

Correct to 1 significant figure, $a = 20$ and $b = 5$

Work out the upper bound of

$$5(a - b)$$

$5(25 - 4.5) = 102.5$

C3 $x = p(q - r)$

$p = 42$, $q = 24$ and $r = 14$ all correct to 2 significant figures.

$x_{LOWER} = 41.5(23.5 - 14.5)$

$= 373.5$

C4

Correct to 2 significant figures, $w = 58$, $x = 28$ and $y = 18$

$\dfrac{w}{x - y}_{UPPER} = \dfrac{58.5}{27.5 - 18.5}$

$= 6.5$

D1 Jada has 100 litres of oil, correct to the nearest litre.
The oil is poured into tins of volume 1.5 litres, correct to one decimal place.

$Tins_{UPPER} = \dfrac{100.5}{1.45} = 69.3 = 69 \text{ full tins}$

D2 There are 300 sheets of paper in a pile, correct to the nearest 10 sheets.
The height of the pile is 160 mm, correct to the nearest 10 mm.

$Thickness_{UPPER} = \dfrac{165}{295} = 0.559 \, mm$

D3 The distance to school is 2.8 km, correct to the nearest 0.1 km.
Sam walks at a speed of 5 km/h, correct to the nearest km/h.

$Time_{UPPER} = \dfrac{2.85}{4.5} = 0.6\dot{3} \text{ hours}$

$= 38 \text{ minutes}$

D4 Correct to 2 decimal places, the volume of a solid cube is 42.88 cm³
Calculate the lower bound for the surface area of the cube.

$Edge_{LOWER} = \sqrt[3]{42.875} = 3.5$

$S.A._{LOWER} = 6 \times 3.5^2 = 73.5 \, cm^2$

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