$h = 37.8 \, cm$ to 1 d.p. $37.75 \leq h < 37.85$

(greatest) Lower Bound for $h = 37.75$

(least) Upper Bound for $h = 37.85$

$x = 240 \, km$ to nearest km

$239.5 \, km \leq x < 240.5 \, km$

$y = 240 \, km$ to nearest 5 km

(answers could be $230 \, km$ $235 \, km$ $240 \, km$ $245 \, km$ $250 \, km$)

$237.5 \, km \leq y < 242.5 \, km$

Distance d from Gloucester to London

$= 90$ miles to nearest 10 miles

$85 \, miles \leq d < 95 \, miles$

$t = 32.41$ to 2 d.p.

$32.405 \leq t < 32.415$

Exercise

1) $a = 30$ to nearest 5

$$27.5 \leq a < 32.5$$

2) $b = 14$ to nearest whole number

$$13.5 \leq b < 14.5$$

3) $c = 2500$ to nearest 100

$$2450 \leq c < 2550$$

4) $d = 46.4$ to 1 dp

$$46.35 \leq d < 46.45$$

5) $e = 13.45$ to 2 dp

$$13.445 \leq e < 13.455$$
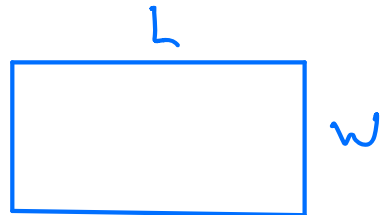
6) $f = 41600$ to 3 s.f.

$$41550 \leq f < 41650$$

Using Bounds

(Unrealistic question)

A carpet measures 4m x 3m each measurement
to the nearest metre

$$3.5m \leq Length < 4.5m$$
$$2.5m \leq Width < 3.5m$$

Area $= L \times W$

Find upper and lower bounds for area.

Upper Bound $= 4.5 \times 3.5 = 15.75 \, m^2$

Lower Bound $= 3.5 \times 2.5 = 8.75 \, m^2$

Nominal Value $= 4 \times 3 = 12 \, m^2$

More realistic exam type question

A track is 100m to the nearest metre

John runs this track and his time is
measured at 14s to the nearest second

Find upper and lower bounds for his speed
in metres per second ms^{-1}

$$99.5m \leq \text{Distance} < 100.5m$$

$$13.5s \leq \text{Time} < 14.5s$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{\text{Smallest}}{\text{largest}} \quad \frac{99.5}{14.5} \leq \text{Speed} < \frac{100.5}{13.5} \quad \frac{\text{largest}}{\text{smallest}}$$

$$6.86 \, ms^{-1} \leq \text{Speed} < 7.44 \, ms^{-1}$$

Give your answer as accurate as you can justify

$$\text{Answer} = 7 \, ms^{-1} \quad \text{to nearest whole number}$$

Exercise Question

$$p = 5.2, \quad q = 6.4, \quad r = 3.7$$

all correct to 1 d.p.

$$5.15 \leq p < 5.25$$

Find bounds for $\dfrac{pq}{r}$

$$6.35 \leq q < 6.45$$

$$3.65 \leq r < 3.75$$

$$\frac{5.15 \times 6.35}{3.75} \quad \frac{\text{little} \times \text{little}}{\text{big}} \leq \frac{pq}{r} < \frac{\text{big} \times \text{big}}{\text{little}} = \frac{5.25 \times 6.45}{3.65}$$

$$8.72 \leq \frac{pq}{r} < 9.28$$