



Timester Challenge

Calculating with Bounds



The length of a rectangle is 22cm to the nearest centimetre. The width of a rectangle is 40cm to the nearest centimetre. What is the upper bound for the area of the rectangle?

Bronze ★

The area of a rectangle is 48cm^2 to the nearest square cm. The width of the rectangle is 3cm to the nearest cm. Calculate the upper bound for the length of the rectangle.

Silver ★

The speed S of a car is given by the formula

$$S = \frac{D}{T}$$

Where D is the distance in miles and T is the time in hours

Given that $D = 170$ miles correct to 5 miles and $T = 2.9$ hours correct to 2 significant figures

By considering bounds, work out if there was a possibility of the car speeding in a 60mph zone.

The width of the field is 32m to 2 significant figures. The length of the field is 180m to 2 significant figures. What is the lower bound for the perimeter of the field?

Bronze ★

A lift can hold 2,700 kg to 2 significant figures. It is being used to lift people with an average weight of 80kg to the nearest 5kg. What is the maximum amount of people the lift could hold?

Silver ★

Gold ★



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Answers



The length of a rectangle is 22cm to the nearest centimetre. The width of a rectangle is 40cm to the nearest centimetre. What is the **upper bound** for the area of the rectangle?

	Length	Width
Min	21.5	39.5
Max	22.5	40.5

Area Upper Bound
 $= 22.5 \times 40.5$
 $= 911.25\text{cm}^2$

Bronze ★

The area of a rectangle is 48cm^2 to the nearest square cm. The width of the rectangle is 3cm to the nearest cm. Calculate the **upper bound** for the length of the rectangle.

	Area	Width
Min	47.5	2.5
Max	48.5	3.5

Length Upper Bound
 $= \text{Max Area} \div \text{Min Width}$
 $= 48.5 \div 2.5$
 $= 19.4\text{cm}$

Silver ★

The speed S of a car is given by the formula

$$S = \frac{D}{T}$$

Where D is the distance in miles and T is the time in hours
 Given that $D = 170$ miles correct to 5 miles and $T = 2.9$ hours correct to 2 significant figures

By considering bounds, work out if there was a possibility of the car speeding in a 60mph zone.

	D	T
Min	167.5	2.85
Max	172.5	2.95

Yes there is a possibility of the car speeding slightly at the upper bound by 0.5mph.

Speed Lower Bound
 $= \text{Min } D \div \text{Max } T$
 $= 167.5 \div 2.95$
 $= 56.77966 \dots \text{mph}$
 $= 56.8\text{mph} (1\text{dp})$

Speed Upper Bound
 $= \text{Max } D \div \text{Min } T$
 $= 172.5 \div 2.85$
 $= 60.5263 \dots \text{mph}$
 $= 60.5\text{mph} (1\text{dp})$

Gold ★

The width of the field is 32m to 2 significant figures. The length of the field is 180m to 2 significant figures. What is the **lower bound** for the perimeter of the field?

	Length	Width
Min	175	31.5
Max	185	32.5

Perimeter Lower Bound
 $= 175 + 175 + 31.5 + 31.5$
 $= 413 \text{ m}$

Bronze ★

A lift can hold 2,700 kg to 2 significant figures. It is being used to lift people with an average weight of 80kg to the nearest 5kg. What is the **maximum** amount of people the lift could hold?

	Weight Lift	Weight Person
Min	2650	77.5
Max	2750	82.5

People Maximum
 $= \text{Max Lift} \div \text{Min Person}$
 $= 2750 \div 77.5$
 $= 35.48 \dots$
 $= 35 \text{ people}$

Silver ★