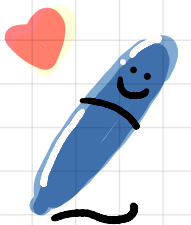


# 1.6) Estimating



## Rounding Numbers

Decimal Places (d.p.)

Significant Figures (s.f.)

## Review: Nearest

35.29 (nearest whole number)

432.73 (nearest 10)

M = 4352 kg. (nearest 100 kg)

H = 42.43 m. (nearest 1 m)

H = 4.534 m. (nearest 10 cm)

## Decimal Places (d.p.)

↳ Last digit

↳ The decider

$\geq 5$  Round up the last digit.

$\leq 4$  Stay the same for last digit.

1 d.p.

2 d.p.

3 d.p.

0.275

0.62

20.7428

Example : Round for 2 decimal place.

7.45839

45.6994

32.996

4.0023

315.3

## Significant Figures (s.f.)

↳ The 1<sup>st</sup> significant figure ( Digit which isn't a zero )

↳ 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, .... ( Follow after the first )

0.004503

4.0059

39000

39010

# Numbers: Estimating

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3 s.f.

2 s.t.

1 s.t.

57.39528

0.01052

0.0005491

38094.5

20.961

20.041

0.05151

105.05

5000

## Estimating:

↳ Round to convenient numbers. ( 1 s.f.)

↳ Work out the answer by easy number.

Example : Estimate the value of  $\frac{128.4 + 43.9}{59.1 \times 3.25}$  Showing all your working.

# Numbers: Estimating

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Example :  $\frac{45.9 \times \sqrt{39.42}}{14.82 + 5.21}$

## Lower Bound and Upper Bound

**270 ( nearest 10 )**

## Review: Place value

3 9 0 5 . 2 4 1

270 (nearest 10)

270 (nearest whole number)

# Numbers: Estimating

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270 (for 2 s.f.)

270 (for 3 s.f.)

2.7 (nearest 1 d.p.)

H = 270 cm. (nearest 5 cm)

**Example :** The mass of cake is given as 13 kg to nearest kg.

**What are the upper bound and lower bound of the cake?**

## Maximum Value and Minimum Value

Maximum (Upper Bound)

$$A + B$$

$$A - B$$

$$(A)(B)$$

$$\frac{A}{B}$$

Minimum (Lower Bound)

$$A + B$$

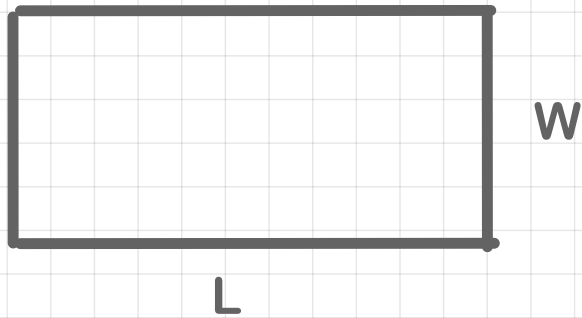
$$A - B$$

$$(A)(B)$$

$$\frac{A}{B}$$

# Numbers: Estimating

Example :



$$L = 20 \text{ cm (nearest cm)}$$

$$W = 15 \text{ cm (nearest 5 cm)}$$

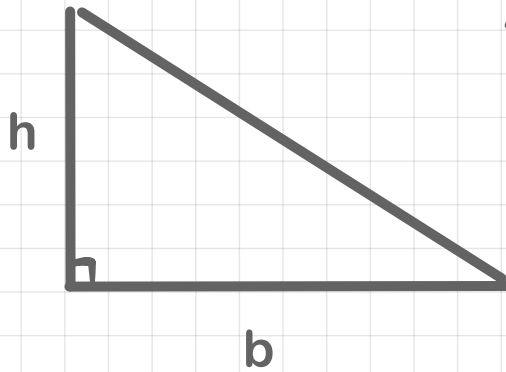
a) Find Lowest area.

b) Find Upper Bound of Perimeter

# Numbers: Estimating

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Example:



Area of triangle =  $20 \text{ cm}^2$  ( nearest  $5 \text{ cm}^2$  )

$h = 3 \text{ cm}$  ( nearest  $\text{cm}$  )

Find maximum value of  $b$ .

# Numbers: Estimating

Example :  $P = \frac{A}{M - N}$

$A = 40$  (nearest 10)

$M = 9$  (nearest whole number)

$N = 5$  (nearest 5)

(i) Find maximum value of  $P$

(ii) Find minimum value of  $P$

## Exercise





# Numbers: Estimating

Example:  $V = \frac{X + P}{E}$

$$V = 100 \text{ (nearest 10)}$$

$$E = 15 \text{ (nearest whole number)}$$

$$P = 70 \text{ (nearest 1 sig.)}$$

(i) Find maximum value of  $X$

$$X = \underset{\substack{\downarrow \\ \text{(up)}}}{V(E)} - P \xrightarrow{\text{(Low)}} X = (105)(15.5) - 65$$
$$= 1562.5$$

(ii) Find minimum value of  $X$

$$X = V(\bar{E}) - P$$

$$1302.5$$