Area of Parallelogram, Triangle, Trapezium
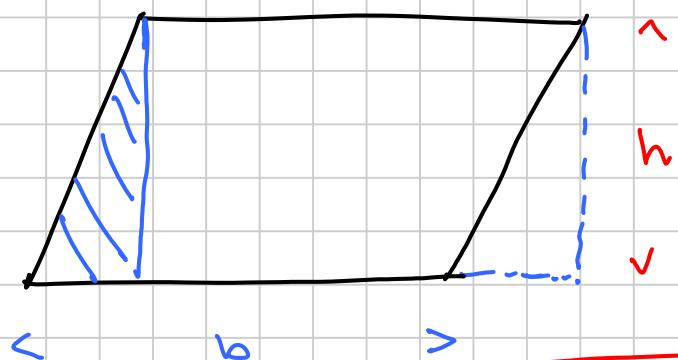

> **Area of parallelogram = base × perpendicular height**
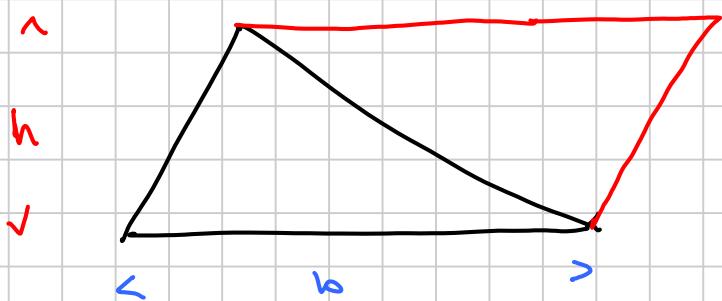
> **Area of triangle = $\frac{1}{2}$ × area of parallelogram**
>
> $\quad\quad\quad\quad\quad\quad\; = \frac{1}{2}$ × base × perpendicular height

Examples

① 9cm   8cm   10cm
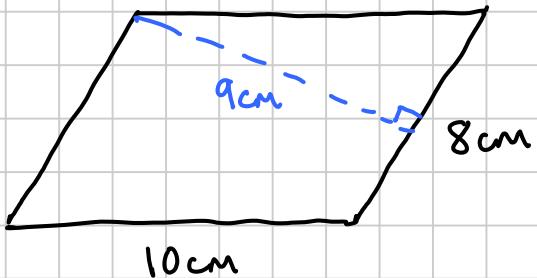
Area of this parallelogram = $8 \times 9 = 72\,\text{cm}^2$

(turn it round so that 8cm is the base!)

②

10cm   8cm   6cm   A   B   C   D
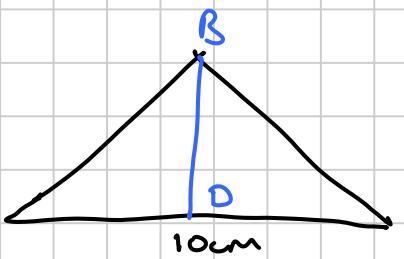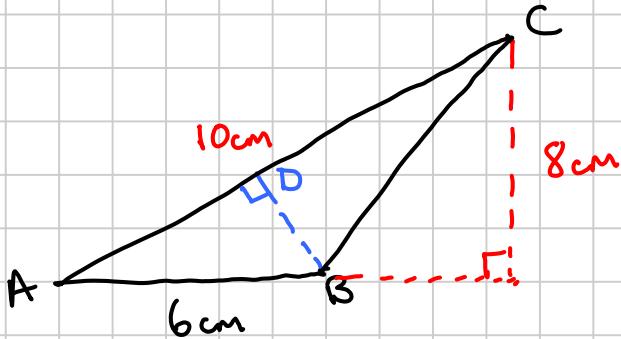
10cm

(a) Find the area of triangle ABC

Area $= \frac{1}{2} \times$ base $\times$ perp ht

$\quad = \frac{1}{2} \times 6 \times 8$

$\quad = \underline{\underline{24 \text{ cm}^2}}$

(b) Find the length BD

$\frac{1}{2} \times 10 \text{ cm} \times BD = 24 \text{ cm}^2$

(to see this, turn the triangle round so that AC is the base)

$5 \times BD = 24$

$BD = \dfrac{24}{5}$

$\quad = \underline{\underline{4\,\tfrac{4}{5} \text{ cm}}} \quad \text{or} \quad \underline{\underline{4 \cdot 8 \text{ cm}}}$

Trapezium
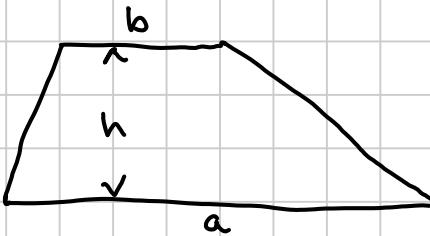
$$\boxed{\text{Area of trapezium} = \tfrac{1}{2}(a+b)\,h}$$

To see this, make a parallelogram from two identical trapezia:

Area of whole parallelogram $=$ base $\times$ height

$\quad = (a+b)\,h$

So area of one trapezium $= \tfrac{1}{2}(a+b)\,h$

Examples

①
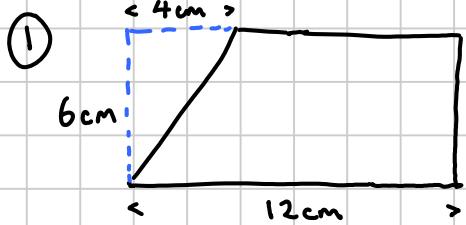
Area of trapezium
$$= \tfrac{1}{2}(12+8) \times 6$$
$$= \underline{\underline{60 \text{ cm}^2}}$$

$$\begin{bmatrix} \text{or} & = & \text{rectangle} - \text{triangle} \\ & = & 12 \times 6 - \tfrac{1}{2} \times 6 \times 4 \\ & = & 72 - 12 = 60 \text{ cm}^2 \end{bmatrix}$$

②
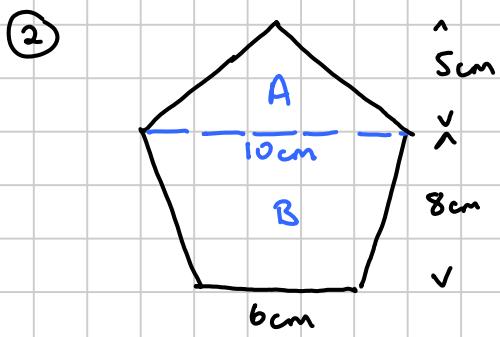
Area of $A = \tfrac{1}{2} \times 10 \times 5$
$$= 25 \text{ cm}^2$$

Area of $B = \tfrac{1}{2}(6+10) \times 8$
(trapezium) $= 64 \text{ cm}^2$

Total area $= 25 + 64$
$$= 89 \text{ cm}^2$$