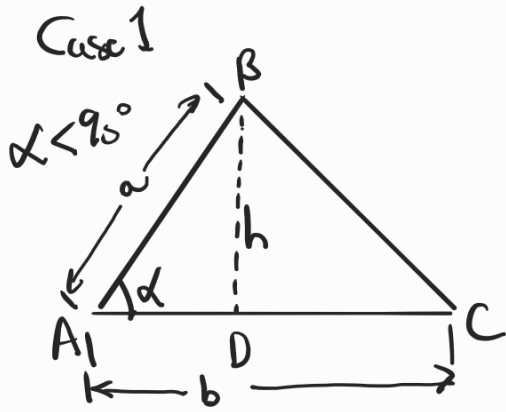
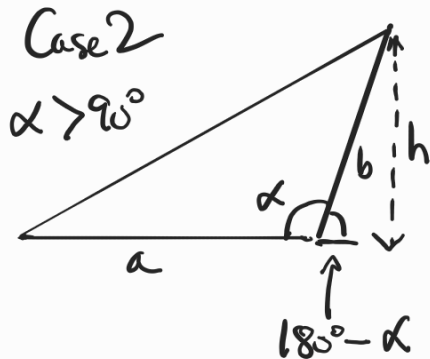


MATHS 10 Important formulae in trigonometry



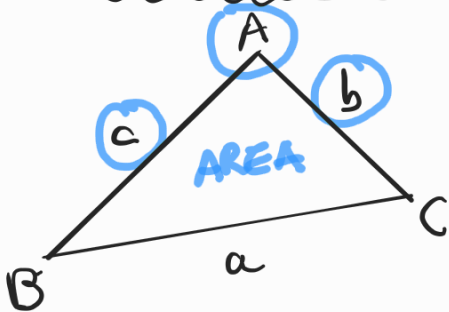
$$AB \sin \angle BAC = \sin \alpha \times AB = BD$$
$$\text{area of triangle} = \frac{1}{2} AC \times BD$$
$$= \frac{1}{2} AC AB \sin \alpha$$

$$\text{Area of } \triangle ABC = \underline{\underline{\frac{1}{2} ab \sin \alpha}}$$



$$\text{Area of } \triangle = \frac{1}{2} a h$$
$$= \frac{1}{2} a b \sin (180^\circ - \alpha)$$
$$= \underline{\underline{\frac{1}{2} ab \sin \alpha}}$$

The Sine Formula



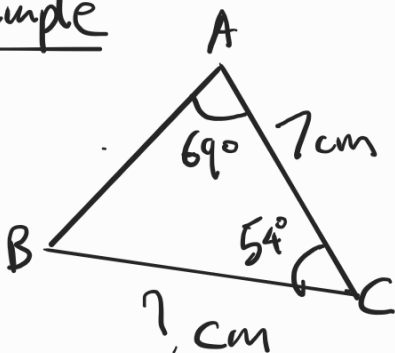
$$\text{Area of } \triangle ABC = \frac{1}{2} bc \sin A = \frac{1}{2} ac \sin B$$

$$\triangle ABC = \frac{1}{2} ab \sin C$$

Therefore

$$\underline{\underline{\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}}}$$

Example



$$\angle B = 180^\circ - 69^\circ - 54^\circ \text{ (sum of } \triangle)$$
$$= 57^\circ$$

$$\frac{BC}{\sin A} = \frac{AC}{\sin B} \text{ (sine formula)}$$

$$BC = \underline{\underline{7.79 \text{ cm}}}$$

Example

In $\triangle ABC$ $a = 5\text{cm}$ $b = 4\text{cm}$ $B = 40^\circ$ Find A

Solution

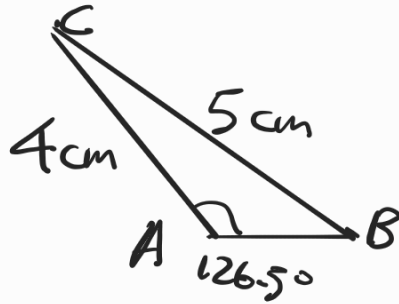
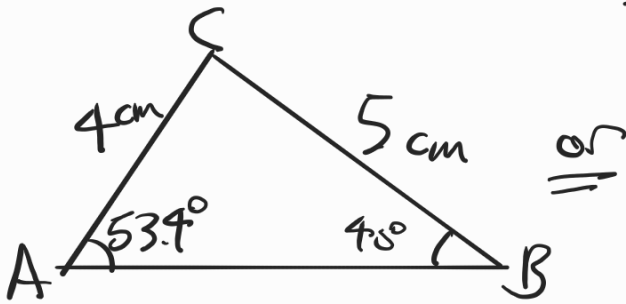
By sine formula:

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

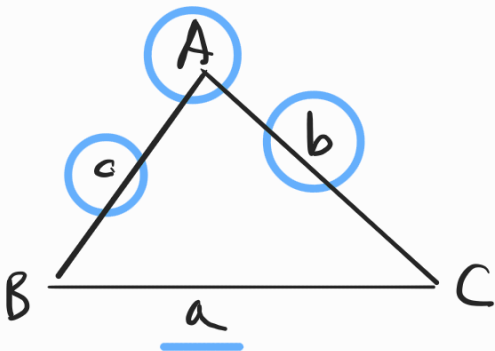
$$\sin A = 0.8035$$

$$A = \sin^{-1}(0.8035)$$

$$= \underline{\underline{53.4^\circ}} \quad \text{or} \quad \underline{\underline{180 - 53.4^\circ = 126.5^\circ}}$$



Cosine Formula



$$a^2 = b^2 + c^2 - 2bc \cos A$$

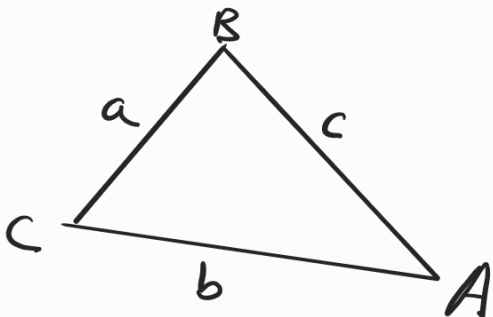
similarly:

$$b^2 = c^2 + a^2 - 2ca \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\text{or} \quad \cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Heron's Formula



$$\text{Let } s = \frac{1}{2}(a + b + c)$$

$$\text{Area of } \triangle ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

