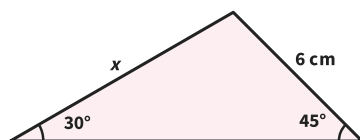


Sine Rule: Finding a Side *extend*

ANSWERS 

1

Find the exact value of x .



$$\frac{x}{\sin 45^\circ} = \frac{6}{\sin 30^\circ}$$

$$x = 6 \times \frac{\sqrt{2}}{2} \div \frac{1}{2} = 6\sqrt{2}$$

Answer $x = 6\sqrt{2} \text{ cm}$

2

A buoy B is 6 km due east of a harbour H . A yacht Y is on a bearing of 055° from H and 320° from B . Find how far the yacht is from H , and how far north of the line HB it is. Give both to 3 significant figures.

$$\text{angles: } H \ 35^\circ, B \ 50^\circ, Y \ 95^\circ$$

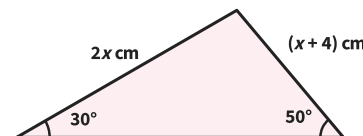
$$HY = 6 \sin 50^\circ \div \sin 95^\circ$$

$$\text{north} = 4.614 \times \sin 35^\circ$$

Answer 4.61 km, 2.65 km north

3

Find x to 3 significant figures.



$$\frac{2x}{\sin 50^\circ} = \frac{x+4}{\sin 30^\circ}$$

$$x = (x+4) \sin 50^\circ$$

$$x(1 - \sin 50^\circ) = 4 \sin 50^\circ$$

Answer $x = 13.1$

4

A triangle has angles of 40° , 60° and 80° and a perimeter of 30 cm. Find the length of its longest side, to 3 significant figures.

$$\text{each side} = k \times \sin \text{ of its opposite angle}$$

$$k(\sin 40^\circ + \sin 60^\circ + \sin 80^\circ) = 30$$

Answer 11.8 cm

5

In triangle ABC , angle A is twice angle B and angle $C = 72^\circ$. $BC = 10$ cm. Find AC to 3 significant figures.

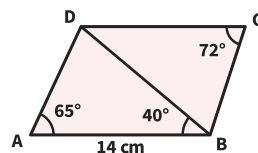
$$3B = 108^\circ, B = 36^\circ, A = 72^\circ$$

$$\frac{AC}{\sin 36^\circ} = \frac{10}{\sin 72^\circ}$$

Answer $AC = 6.18 \text{ cm}$

6

$ABCD$ is a trapezium with AB parallel to DC . Find BC to 3 significant figures.



$$BD = 14 \sin 65^\circ \div \sin 75^\circ = 13.136$$

$$\text{angle } BDC = 40^\circ \text{ (alternate)}$$

$$BC = 13.136 \times \sin 40^\circ \div \sin 72^\circ$$

Answer $BC = 8.88 \text{ cm}$

7

In triangle ABC , $AB = 10$ cm, $BC = 7$ cm and angle $A = 35^\circ$. Find both possible lengths of AC , to 3 significant figures.

$$\sin C = 10 \sin 35^\circ \div 7$$

$$C = 55.0^\circ \text{ or } 125.0^\circ$$

$$B = 90.0^\circ \text{ or } 20.0^\circ$$

$$AC = 7 \sin B \div \sin 35^\circ$$

Answer 12.2 cm or 4.18 cm

8

Prove that the area of any triangle

$$ABC \text{ is } \frac{a^2 \sin B \sin C}{2 \sin A}$$

$$\text{area} = \frac{1}{2}ab \sin C$$

$$\text{sine rule: } b = \frac{a \sin B}{\sin A}$$

$$\text{so area} = \frac{1}{2}a \times \frac{a \sin B}{\sin A} \times \sin C$$

Proof $\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$