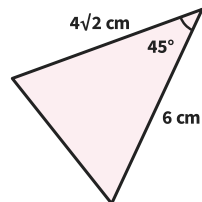


Area of a Triangle: $\frac{1}{2}ab \sin C$ *extend*

ANSWERS 

1

Find the exact area of the triangle.



$$\frac{1}{2} \times 4\sqrt{2} \times 6 \times \frac{\sqrt{2}}{2}$$

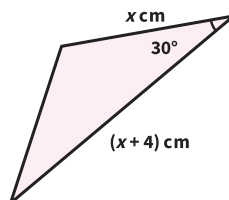
$$= 3 \times 4 \times \sqrt{2} \times \sqrt{2} \div 2 = 12$$

$$12 \text{ cm}^2$$

Answer

2

The area of the triangle is 15 cm^2 .
Find x .



$$\frac{1}{2}x(x+4) = 15, x^2 + 4x - 60 = 0$$

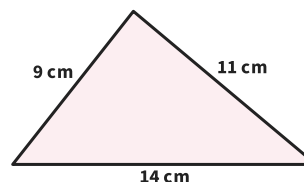
$$(x+10)(x-6) = 0$$

$$x = 6$$

Answer

3

Find the area of the triangle to 3 significant figures.



$$\cos C = \frac{9^2 + 11^2 - 14^2}{2 \times 9 \times 11}, C = 88.26^\circ$$

$$\frac{1}{2} \times 9 \times 11 \times \sin 88.26^\circ$$

$$49.5 \text{ cm}^2$$

Answer

4

B is 12 km from A on a bearing of 040° . C is 9 km from B on a bearing of 165° . Find the area of triangle ABC to 3 significant figures.

$$\text{angle } ABC = 220^\circ - 165^\circ = 55^\circ$$

$$\frac{1}{2} \times 12 \times 9 \times \sin 55^\circ$$

$$44.2 \text{ km}^2$$

Answer

5

A triangle has sides of 8 cm and 5 cm and an area of 16 cm^2 .

Show that there are two possible lengths for the third side, and give both as surds.

$$\sin C = 0.8, \text{ so } \cos C = 0.6 \text{ or } -0.6$$

$$8^2 + 5^2 - 80 \times (\pm 0.6) = 41 \text{ or } 137$$

$$\sqrt{41} \text{ cm or } \sqrt{137} \text{ cm}$$

Answer

6

An equilateral triangle has an area of $9\sqrt{3} \text{ cm}^2$. Find its perimeter.

$$\frac{1}{2}s^2 \times \frac{\sqrt{3}}{2} = 9\sqrt{3}$$

$$s^2 = 36, s = 6$$

$$18 \text{ cm}$$

Answer

7

In triangle ABC , $AB = 8 \text{ cm}$ and angle $A = 50^\circ$. The area is 30 cm^2 .
Find BC to 3 significant figures.

$$AC = 60 \div (8 \sin 50^\circ) = 9.791$$

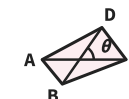
$$BC^2 = 64 + 95.85 - 100.69 = 59.16$$

$$BC = 7.69 \text{ cm}$$

Answer

8

Diagonals p and q of $ABCD$ cross at θ .
Prove its area is $\frac{1}{2}pq \sin \theta$.



$$\text{parts } a, c \text{ of } p \text{ and } b, d \text{ of } q$$

$$\sin(180^\circ - \theta) = \sin \theta, \text{ so the}$$

$$4 \text{ parts: } \frac{1}{2} \sin \theta (ab + bc + cd + da)$$

$$= \frac{1}{2} \sin \theta (a+c)(b+d)$$

$$\frac{1}{2}pq \sin \theta$$

Proof