

The Cosine Rule *stretch*

ANSWERS 

1



In triangle DEF , $DE = 8.4$ cm,
 $DF = 6.5$ cm and angle $EDF = 71^\circ$.
Find EF to 3 significant figures.

$$EF^2 = 8.4^2 + 6.5^2 - 2 \times 8.4 \times 6.5 \times \cos 71^\circ$$

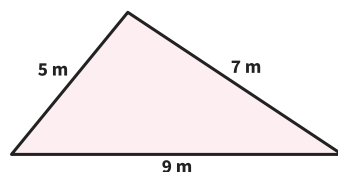
$$EF = 8.79 \text{ cm}$$

Answer

2



Find the smallest angle in the triangle, to 1 decimal place.



it is opposite the 5 m side

$$\cos = \frac{7^2 + 9^2 - 5^2}{2 \times 7 \times 9}$$

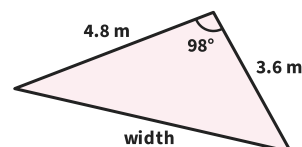
$$33.6^\circ$$

Answer

3



Two roof beams of 4.8 m and 3.6 m meet at 98° at the top. A third beam joins their lower ends. Find the width of the roof, to 3 significant figures.



$$width^2 = 4.8^2 + 3.6^2 - 2 \times 4.8 \times 3.6 \times \cos 98^\circ$$

$$6.39 \text{ m}$$

Answer

4



A cyclist rides 8 km from A to B , then 5 km from B to C . Angle $ABC = 140^\circ$. How much further is this than riding straight from A to C ? Give your answer to 2 decimal places.

$$AC^2 = 8^2 + 5^2 - 80 \cos 140^\circ$$

$$AC = 12.26, 13 - 12.26$$

$$0.74 \text{ km}$$

Answer

5



Theo finds the side opposite a 50° angle, between sides of 7 cm and 9 cm:
 $x^2 = 130 - 126 \times \cos 50^\circ = 4 \times \cos 50^\circ$
Explain his mistake. Find the side to 3 significant figures.

BIDMAS: work out $126 \times \cos 50^\circ$ first

$$x^2 = 130 - 80.99 = 49.01$$

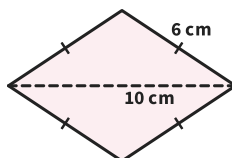
$$7.00 \text{ cm}$$

Answer

6



A rhombus has sides of 6 cm. Its longer diagonal is 10 cm. Find the obtuse angle of the rhombus, to 1 decimal place.



$$\text{triangle } 6, 6, 10: \cos = \frac{6^2 + 6^2 - 10^2}{2 \times 6 \times 6}$$

$$\cos = -0.3889$$

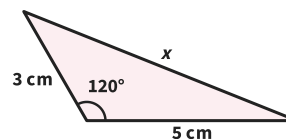
$$112.9^\circ$$

Answer

7



$\cos 120^\circ = -\frac{1}{2}$.
Show that $x = 7$ cm exactly.



$$x^2 = 9 + 25 - 30 \times \left(-\frac{1}{2}\right)$$

$$= 34 + 15 = 49$$

$$x = 7$$

Answer

8



Kit says you cannot use the cosine rule in a right angled triangle. Use a triangle with sides of 6 cm and 8 cm and 90° between them to show that he is wrong.

$$x^2 = 6^2 + 8^2 - 96 \times \cos 90^\circ$$

$$\cos 90^\circ = 0, \text{ so } x^2 = 100$$

$$10 \text{ cm, as Pythagoras gives}$$

Reason