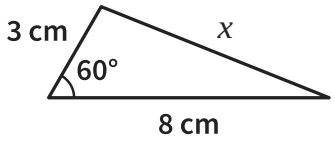
The cosine rule: finding a side

ANSWERS

1

Find x.



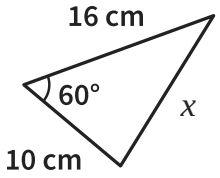
$x^2 =$ $3^2 + 8^2 - 2 \times 3 \times 8 \times \cos 60°$

$x^2 =$ 49

$x =$ 7 cm

2

Find x.



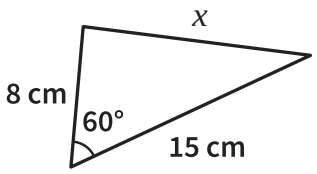
$x^2 =$ $10^2 + 16^2 - 2 \times 10 \times 16 \times \cos 60°$

$x^2 =$ 196

$x =$ 14 cm

3

Find x.



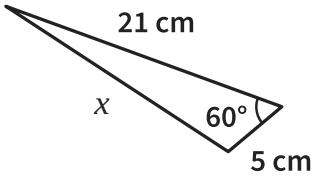
$x^2 =$ $8^2 + 15^2 - 2 \times 8 \times 15 \times \cos 60°$

$x^2 =$ 169

$x =$ 13 cm

4

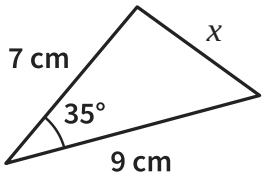
Find x.



$x =$ 19 cm

5

Find x to 1 decimal place.



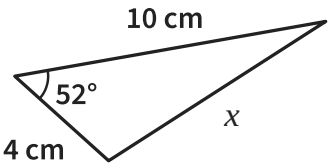
$x^2 =$ $7^2 + 9^2 - 2 \times 7 \times 9 \times \cos 35°$

$x^2 =$ 26.79

$x =$ 5.2 cm

6

Find x to 1 decimal place.



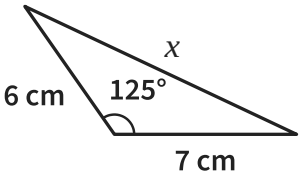
$x^2 =$ $4^2 + 10^2 - 2 \times 4 \times 10 \times \cos 52°$

$x^2 =$ 66.75

$x =$ 8.2 cm

7 *Notice the change!*

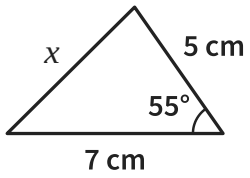
Find x to 1 decimal place.



$x =$ 11.5 cm

8

Kai finds x like this:
$x^2 = (5^2 + 7^2 - 2 \times 5 \times 7) \times \cos 55°$.
Explain his mistake and find x.



cos 55° multiplies only the 2 × 5 × 7

$x^2 =$ $74 - 70 \times \cos 55° = 33.85$

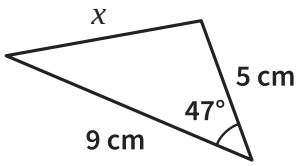
$x =$ 5.8 cm

The cosine rule: finding a side *further practice*

ANSWERS

9

Find x to 1 decimal place.



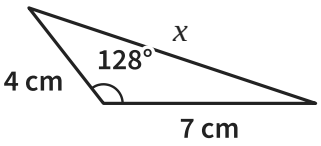
$x^2 = 9^2 + 5^2 - 2 \times 9 \times 5 \times \cos 47°$

$x^2 = 44.62$

Answer 6.7 cm

10

Find x to 1 decimal place.



$x^2 = 4^2 + 7^2 - 2 \times 4 \times 7 \times \cos 128°$

$x^2 = 99.48$

Answer 10.0 cm

11

In triangle ABC, AB = 6 cm, AC = 11 cm and angle BAC = 38°. Find BC to 1 decimal place.

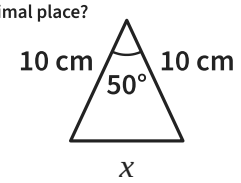
$BC^2 = 6^2 + 11^2 - 2 \times 6 \times 11 \times \cos 38°$

$BC^2 = 52.98$

BC = 7.3 cm

12

The two legs of a pair of compasses are each 10 cm long. They are opened to an angle of 50°. How far apart are the point and the pencil, to 1 decimal place?



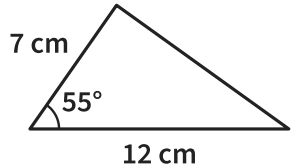
$x^2 = 10^2 + 10^2 - 2 \times 10 \times 10 \times \cos 50°$

$x^2 = 71.44$

Answer 8.5 cm

13

Find the perimeter of the triangle to 1 decimal place.



third side^2 = 96.64, so 9.83 cm

7 + 12 + 9.83

Answer 28.8 cm

14

Two fences of a triangular field are 45 m and 60 m long. They meet at an angle of 80°. How long is the third fence, to 1 decimal place?

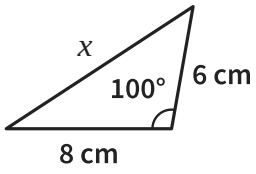
$x^2 = 45^2 + 60^2 - 2 \times 45 \times 60 \times \cos 80°$

$x^2 = 4687.30$

Answer 68.5 m

15

Without working out x, explain whether x is more or less than 10 cm. Then check.



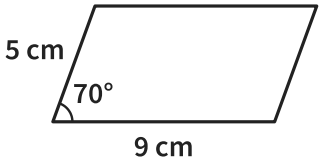
at 90° Pythagoras gives 10 cm

100° is wider than 90°, so the side is longer

So more: 10.8 cm

16

A parallelogram has sides 5 cm and 9 cm and an angle of 70°.
Find the length of its longer diagonal to 1 decimal place.



opposite it: 180° − 70° = 110°

$d^2 = 5^2 + 9^2 - 2 \times 5 \times 9 \times \cos 110°$

Diagonal 11.7 cm