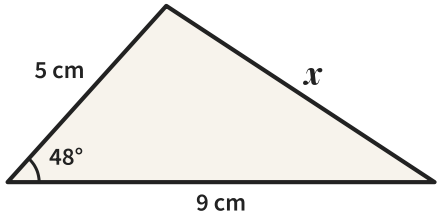
The Cosine Rule

ANSWERS

1

Find x to 1 decimal place.



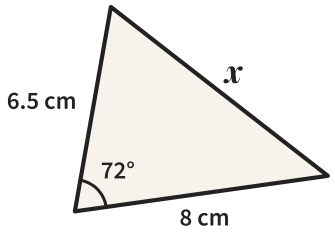
$x^2 = 5^2 + 9^2 - 2 \times 5 \times 9 \times \cos 48°$

$x^2 = 45.778...$

$x = 6.8$ cm

2

Find x to 1 decimal place.



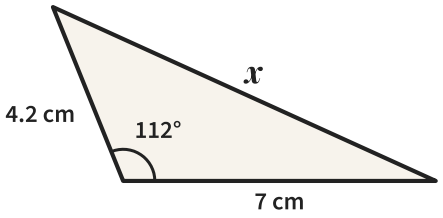
$x^2 = 6.5^2 + 8^2 - 2 \times 6.5 \times 8 \times \cos 72°$

$x^2 = 74.112...$

$x = 8.6$ cm

3

Find x to 1 decimal place.



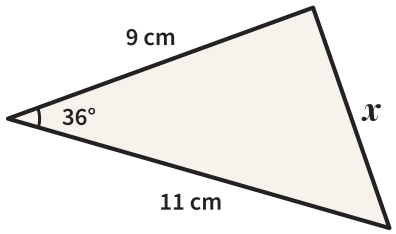
$x^2 = 4.2^2 + 7^2 - 2 \times 4.2 \times 7 \times \cos 112°$

$x^2 = 88.667...$

$x = 9.4$ cm

4

Find x to 1 decimal place.



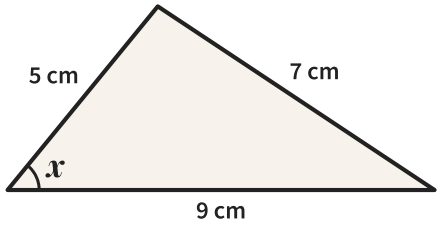
$x^2 = 11^2 + 9^2 - 2 \times 11 \times 9 \times \cos 36°$

$x^2 = 41.815...$

$x = 6.5$ cm

5

Find the angle x to 1 decimal place.



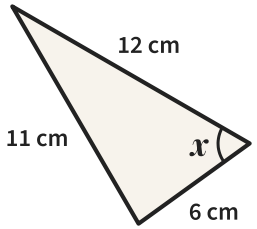
$\cos x = \dfrac{5^2 + 9^2 - 7^2}{2 \times 5 \times 9}$

$\cos x = 0.6333..., x = \cos^{-1}(0.6333...)$

$x = 50.7°$

6

Find the angle x to 1 decimal place.



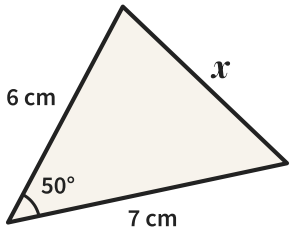
$\cos x = (6^2 + 12^2 - 11^2) \div (2 \times 6 \times 12)$

$\cos x = 0.4097..., x = \cos^{-1}(0.4097...)$

$x = 65.8°$

7

Ella works out $6^2 + 7^2 - 2 \times 6 \times 7 = 1$ first, then multiplies by cos 50° and gets $x = 0.8$ cm. Explain her mistake. Find x to 1 decimal place.



multiply first: $2 \times 6 \times 7 \times \cos 50°$

$x^2 = 85 - 84 \times \cos 50° = 31.006...$

$x = 5.6$ cm

8

A pair of compasses has two legs, each 11 cm long. They are opened so the angle between the legs is 38°. How far apart are the point and the pencil tip? Give your answer to 1 decimal place.

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

$x^2 = 51.301...$

Answer 7.2 cm

The Cosine Rule *further practice*

ANSWERS

9

A triangle has sides of 8 cm, 11 cm and 14 cm. Find its largest angle to 1 decimal place.

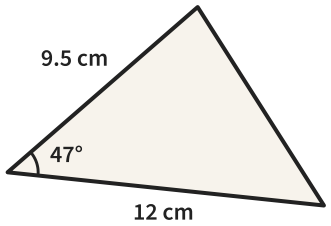
the largest angle is opposite the 14 cm side

$\cos x = -0.0625$

Answer *93.6°*

10

Find the perimeter of the triangle to 1 decimal place.



third side = 8.8744...

8.8744... + 9.5 + 12

Perimeter *30.4 cm*

11

A triangle has sides of 5 cm and 7 cm. The angle opposite the 7 cm side is 80°. Kai says, "Use the cosine rule to find the third side." Explain why the sine rule is the one to start with.

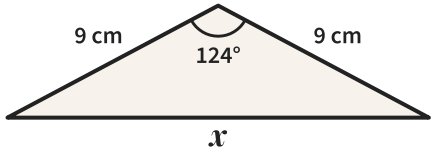
7 cm and 80° are a side and the angle opposite it: a pair

the cosine rule needs the angle between the two sides

Answer *a pair: the sine rule*

12

The triangle is isosceles. Find the base x to 1 decimal place.



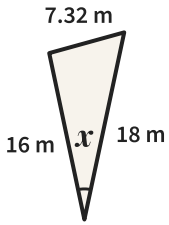
$x^2 = 9^2 + 9^2 - 2 \times 9 \times 9 \times \cos 124°$

$x^2 = 252.589...$

$x =$ *15.9 cm*

13

A footballer stands 16 m from one goalpost and 18 m from the other. The goal is 7.32 m wide. Find the angle x the player can shoot into, to 1 decimal place.



opposite the goal: $\cos x = 0.9139...$

$x =$ *23.9°*

14

A triangle has sides of 7 cm and 9 cm with 70° between them. Find the third side, then the angle opposite the 7 cm side. Give both to 1 decimal place.

third side = 9.3223... = 9.3 cm

opposite 7 cm: $\cos y = 0.7086...$

Answer *9.3 cm, 44.9°*

15

A triangle has sides of 5 cm, 6 cm and 9 cm. Is its largest angle obtuse? Show how you know.

$\cos x = -0.3333...$

cos is negative, so the angle is more than 90°

Answer *Yes, 109.5°*

16

Show that when angle A is 90°, the cosine rule becomes Pythagoras' theorem, $a^2 = b^2 + c^2$.

$\cos 90° = 0$, so the last part is 0

$a^2 = b^2 + c^2 - 0$

So $a^2 = b^2 + c^2$