

GCSE Maths: The cosine rule (Higher): answers

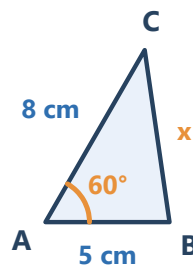
GCSE Maths - Pythagoras and Trigonometry - Higher - Lesson 20.9

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch20-pythagoras-trigonometry/higher/the-cosine-rule/

Exercise 20K The cosine rule Calculator allowed

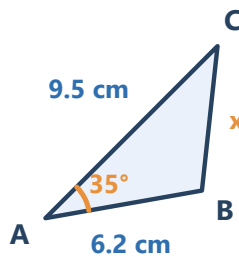
- 1 Work out the length of the side marked x in each triangle. Give your answers correct to 1 decimal place. All lengths are in centimetres.

(a)



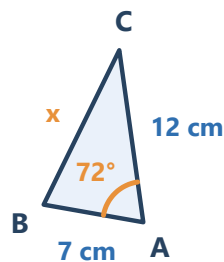
Answer: 7.0 cm

(b)



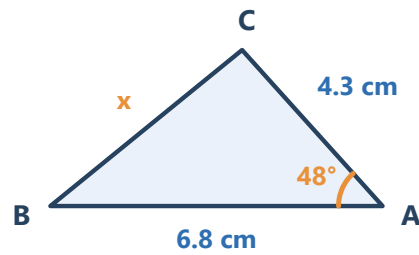
Answer: 5.7 cm

(c)



Answer: 11.9 cm

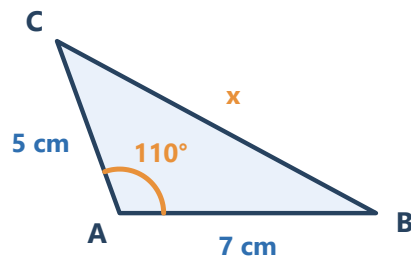
(d)



Answer: 5.1 cm

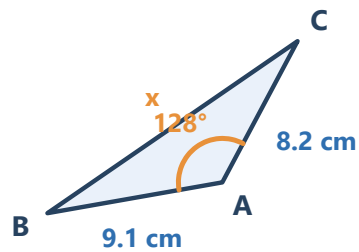
- 2 Each triangle has an obtuse angle. Work out the length of the side marked x. Give your answers correct to 1 decimal place. All lengths are in centimetres.

(a)



Answer: 9.9 cm

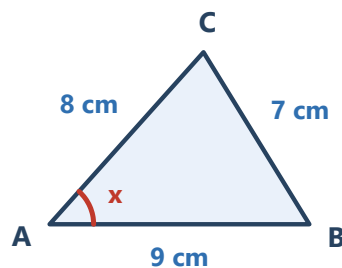
(b)



Answer: 15.6 cm

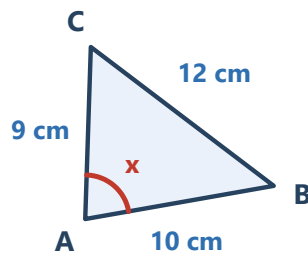
- 3 Work out the size of the angle marked x in each triangle. Give your answers correct to 1 decimal place. All lengths are in centimetres.

(a)



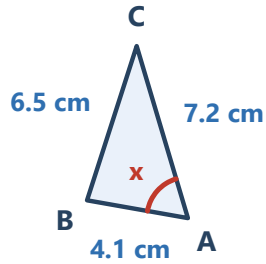
Answer: 48.2°

(b)



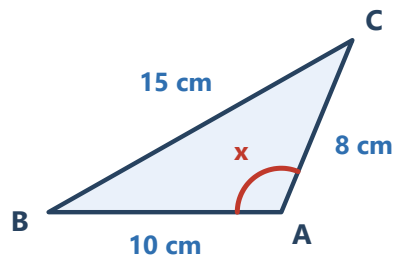
Answer: 78.1°

(c)



Answer: 63.4°

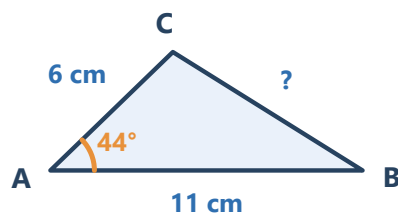
(d)



Answer: 112.4°

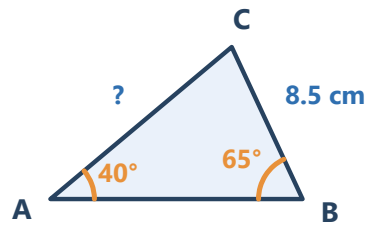
- 4 For each triangle, say whether you would use the sine rule or the cosine rule to find the value marked with a question mark. You do not need to calculate it.

(a) Two sides and the angle between them are known (SAS). You want the third side.



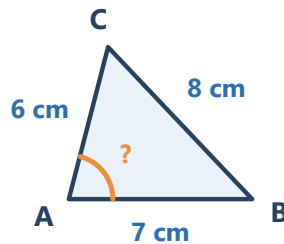
Answer: cosine rule

- (b) Two angles and a side are known. You want another side.



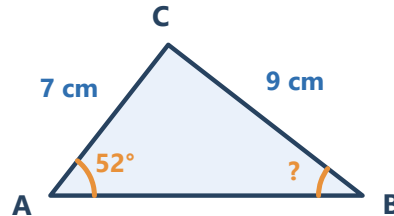
Answer: sine rule

- (c) All three sides are known. You want an angle.



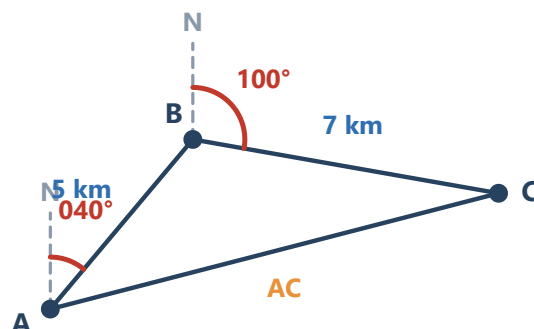
Answer: cosine rule

- (d) Two sides and an angle opposite one of them are known. You want another angle.



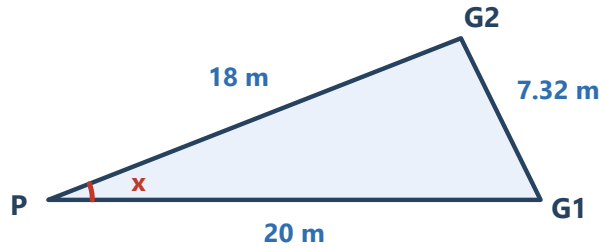
Answer: sine rule

- 5 A hiker walks 5 km from A to B on a bearing of 040° . She then walks 7 km from B to C on a bearing of 100° . Work out the distance AC, correct to 1 decimal place.



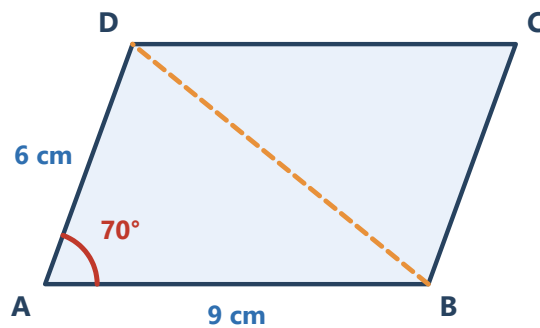
Answer: 10.4 km

- 6 A football goal is 7.32 m wide. A player at P is 18 m from one post and 20 m from the other post. Work out the angle that the goal makes at P (the angle between the two lines to the posts), correct to 1 decimal place.



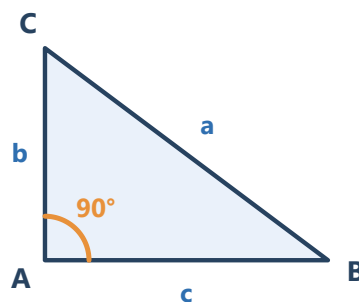
Answer: 21.4°

- 7 ABCD is a parallelogram with AB = 9 cm, AD = 6 cm and angle DAB = 70°. Work out the length of the shorter diagonal BD, correct to 1 decimal place.



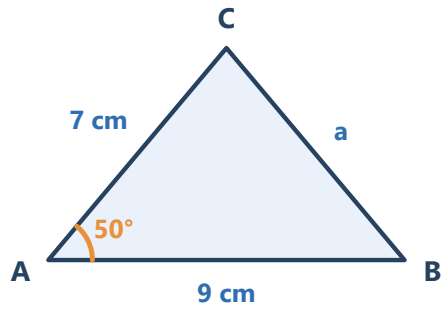
Answer: 8.9 cm

- 8 Show that the cosine rule becomes Pythagoras' theorem when angle A = 90°.



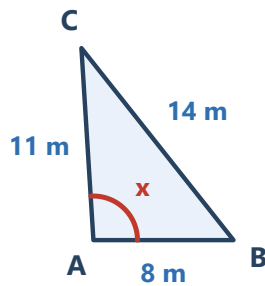
Answer: $\cos 90^\circ = 0$, so $a^2 = b^2 + c^2$

- 9 Zoe uses the cosine rule to find a when $b = 7$ cm, $c = 9$ cm and $A = 50^\circ$. She works out $a^2 = (7^2 + 9^2 - 2 \times 7 \times 9) \times \cos 50^\circ$. Explain her mistake and work out the correct value of a , correct to 1 decimal place.



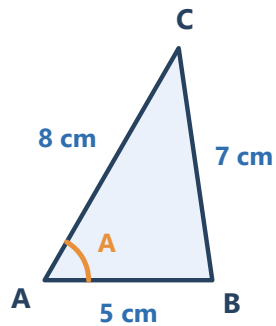
Answer: 7.0 cm

- 10** A triangular garden has sides of length 8 m, 11 m and 14 m. Show that the garden has an obtuse angle by working out the size of its largest angle, correct to 1 decimal place.



Answer: 93.6°

- 11 Challenge.** In triangle ABC, AB = 5 cm, AC = 8 cm and BC = 7 cm. **Show that** angle A = 60°.



Answer: $\cos A = \frac{40}{80} = \frac{1}{2}$, so $A = 60^\circ$