

GCSE Maths: Area of a triangle: $\frac{1}{2}ab \sin C$ (Higher): answers

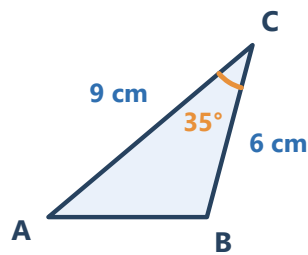
GCSE Maths - Pythagoras and Trigonometry - Higher - Lesson 20.10

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/area-of-a-triangle-ab-sin-c/

Exercise 20L Area of a triangle using $\frac{1}{2}ab \sin C$ Calculator allowed

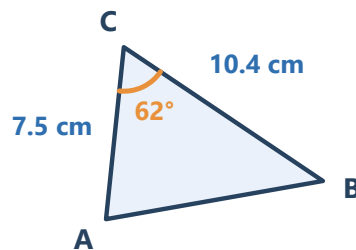
- 1 Work out the area of each triangle. Give your answers correct to 1 decimal place. All lengths are in centimetres.

(a)



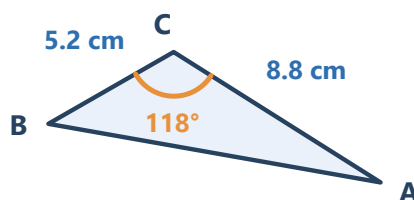
Answer: 15.5 cm^2

(b)



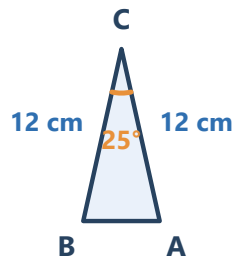
Answer: 34.4 cm^2

(c)



Answer: 20.2 cm^2

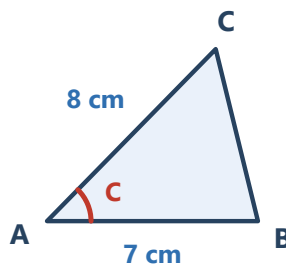
(d)



Answer: 30.4 cm²

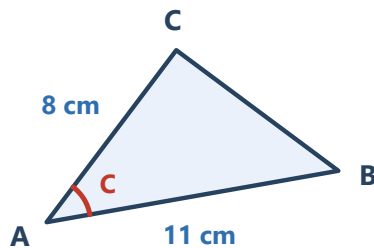
2 Work out the size of the acute angle C between the two sides of each triangle. Give your answers correct to 1 decimal place.

(a) Area = 20 cm², sides 8 cm and 7 cm. Angle C is acute.



Answer: 45.6°

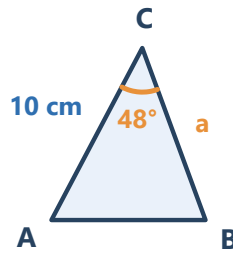
(b) Area = 30 cm², sides 8 cm and 11 cm. Angle C is acute.



Answer: 43.0°

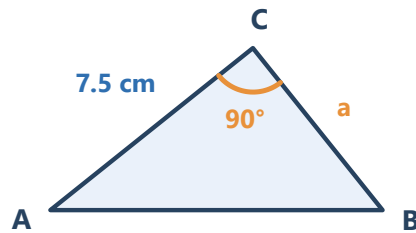
3 Work out the length of the side a in each triangle, correct to 1 decimal place. The angle shown is between the two sides.

- (a) Area = 35 cm^2 , other side 10 cm, angle 48°



Answer: 9.4 cm

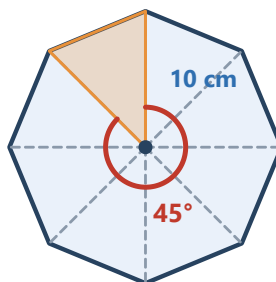
- (b) Area = 22.5 cm^2 , other side 7.5 cm, angle 90°



Answer: 6.0 cm

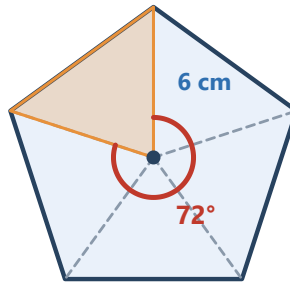
- 4 Each regular polygon is split into identical triangles from its centre. Work out the area of each polygon, correct to 1 decimal place.

- (a) Regular octagon with centre-to-corner distance 10 cm



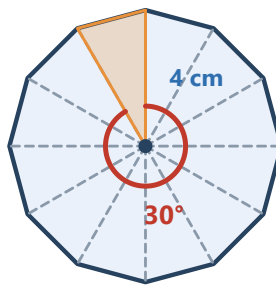
Answer: 282.8 cm^2

- (b) Regular pentagon with centre-to-corner distance 6 cm



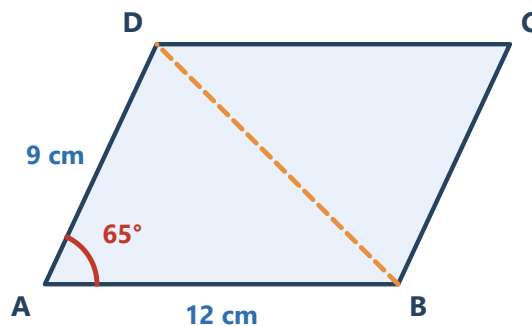
Answer: 85.6 cm^2

- (c) Regular dodecagon with centre-to-corner distance 4 cm



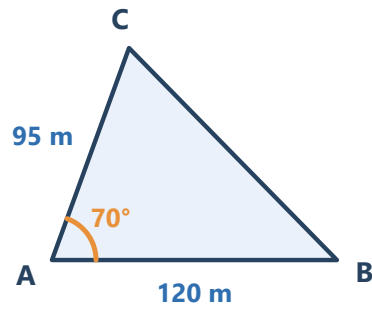
Answer: 48.0 cm^2

- 5 A parallelogram has sides of length 9 cm and 12 cm, and the angle between them is 65° . Work out the area of the parallelogram, correct to 1 decimal place.



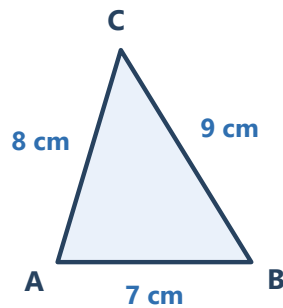
Answer: 97.9 cm^2

- 6 A triangular field has two sides of length 120 m and 95 m with an angle of 70° between them. Grass seed costs £0.35 for every square metre. Work out the cost of seeding the whole field, to the nearest pound.



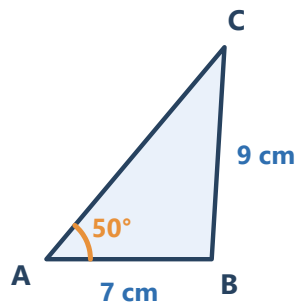
Answer: £1875

- 7 A triangle has sides of length 7 cm, 8 cm and 9 cm. Work out its area, correct to 1 decimal place.



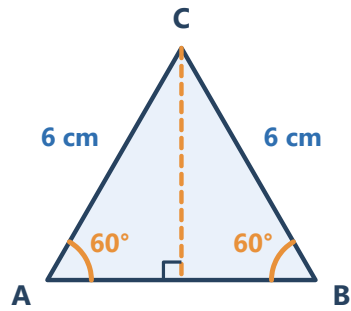
Answer: 26.8 cm²

- 8 Sam says that the area of triangle ABC is $\frac{1}{2} \times 7 \times 9 \times \sin 50^\circ$. Explain what is wrong with his method. (AB = 7 cm, BC = 9 cm, angle A = 50°.)



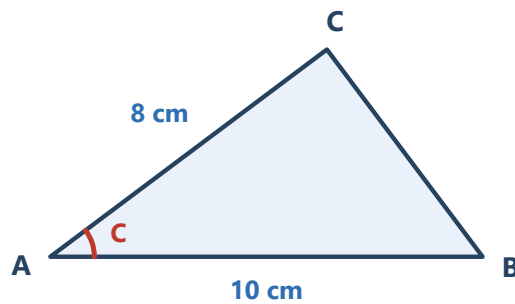
Answer: The 50° angle is not between the sides 7 cm and 9 cm.

- 9 **Show that** the area of an equilateral triangle with sides of length 6 cm is $9\sqrt{3}$ cm².



Answer: $\frac{1}{2} \times 6 \times 6 \times \sin 60^\circ = 9\sqrt{3} \text{ cm}^2$

- 10 Challenge.** A triangle has two sides of length 8 cm and 10 cm. Its area is 24 cm^2 . Work out the two possible sizes of the angle between these sides, correct to 1 decimal place. Explain why both answers are possible.



Answer: 36.9° or 143.1°