



1 In triangle DEF, angle DEF = 90°.

DE = 10 cm and EF = 7 cm.

Work out the size of angle FDE.

Give your answer correct to 1 decimal place.

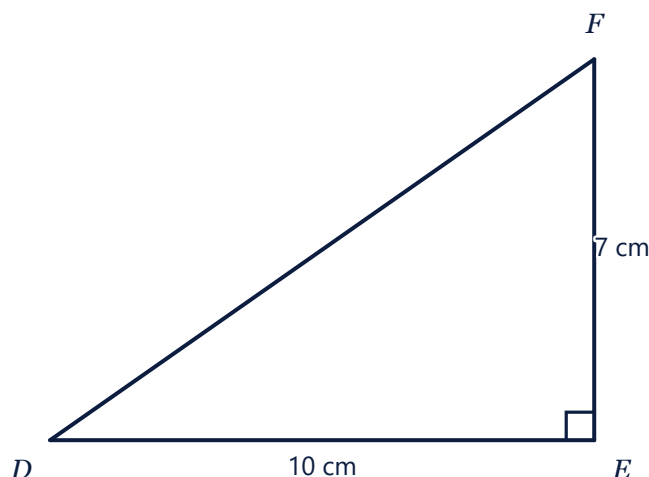


Diagram NOT accurately drawn

(2 marks)

$EF = 7$ cm is opposite angle FDE and $DE = 10$ cm is adjacent to it, so use $\tan$

$$\tan FDE = 7 \div 10 = 0.7$$

$$\text{Angle FDE} = \tan^{-1}(0.7) = 34.99... = 35.0^\circ \text{ (1 dp)}$$

$\tan^{-1}$ is the inverse tangent button: it finds the angle from its tangent ratio. It does not mean $1/\tan$. Use degree mode

$$\boxed{35.0^\circ}$$

2 In a right-angled triangle, the side opposite angle x is 5 cm and the hypotenuse is 8 cm.

Work out the size of angle x . Give your answer correct to 1 decimal place.

(2 marks)

O and H: use SOH

$$\sin x = \frac{5}{8}$$

$$x = \sin^{-1}(0.625)$$

$$\boxed{x = 38.7^\circ}$$

- 3 In a right-angled triangle, the side next to angle y is 6.4 cm and the hypotenuse is 9.2 cm. Work out the size of angle y . Give your answer correct to 1 decimal place.

(2 marks)

A and H: use CAH

$$\cos y = \frac{6.4}{9.2}$$

$$y = \cos^{-1}(0.6956...)$$

$$y = 45.9^\circ$$

- 4 In triangle JKL, angle JKL = 90° .

JK = 5 cm and JL = 13 cm.

Work out the size of angle KJL.

Give your answer correct to 1 decimal place.

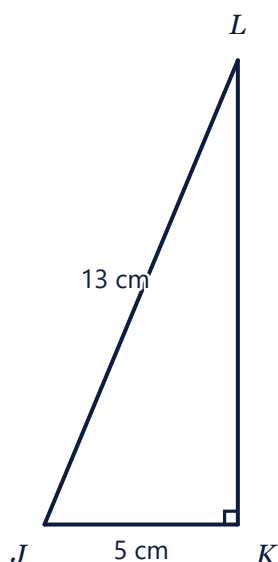


Diagram NOT accurately drawn

(2 marks)

JK = 5 cm is adjacent to angle KJL and JL = 13 cm is the hypotenuse, so use cos

$$\cos KJL = 5 \div 13 = 0.3846..$$

$$\text{Angle KJL} = \cos^{-1}\left(\frac{5}{13}\right) = 67.38... = 67.4^\circ \text{ (1 dp)}$$

$$67.4^\circ$$

- 5 A ladder 5 m long leans against a vertical wall. The foot of the ladder is 1.4 m from the wall on level ground.

Work out the angle the ladder makes with the wall. Give your answer correct to 1 decimal place.

(3 marks)

Ladder = hypotenuse (5). Opposite the angle at the wall = 1.4

$$\sin x = \frac{1.4}{5}$$

$$x = \sin^{-1}(0.28)$$

$$x = 16.3^{\circ}$$

- 6 Jamal stands 40 m from the base of a vertical tower on level ground. The tower is 18 m high. Ignore Jamal's height.

Work out the angle of elevation of the top of the tower from Jamal. Give your answer correct to 1 decimal place.

(3 marks)

O = 18, A = 40: use TOA

$$\tan x = \frac{18}{40}$$

$$x = \tan^{-1}(0.45)$$

$$x = 24.2^{\circ}$$

- 7 A straight ramp is 6 m long and rises 0.8 m.

Work out the angle the ramp makes with the horizontal. Give your answer correct to 1 decimal place.

(3 marks)

H = 6, O = 0.8: use SOH

$$\sin x = \frac{0.8}{6}$$

$$x = \sin^{-1}(0.1333...)$$

$$x = 7.7^{\circ}$$

- 8 Rectangle PQRS has PQ = 12 cm and QR = 5 cm. The diagonal PR is drawn.

Work out the size of angle QPR. Give your answer correct to 1 decimal place.

(3 marks)

Triangle PQR: right angle at Q

$$O = QR = 5, A = PQ = 12$$

$$\tan x = \frac{5}{12}$$

$$x = \tan^{-1}(0.4166...)$$

$$x = 22.6^{\circ}$$

9

An isosceles triangle has two equal sides of length 10 cm and a base of 12 cm. The perpendicular from the top vertex to the base meets the base at its midpoint.

- Work out the size of one base angle. Give your answer to 1 decimal place.
- Work out the size of the angle at the top vertex.

(4 marks)

a) half the base = 6

$A = 6, H = 10$: use CAH

$$\cos x = \frac{6}{10}$$

$$x = \cos^{-1}(0.6)$$

$$x = 53.1^\circ$$

b) angles in a triangle add to 180°

$$180 - 2 \times 53.13 = 73.7$$

$$73.7^\circ$$

10

A tree is 9 m tall. A second tree next to it is twice as tall. Dev stands on level ground 15 m from the base of the taller tree. Ignore Dev's height.

Work out the angle of elevation of the top of the taller tree from Dev. Give your answer correct to 1 decimal place.

(3 marks)

$$\text{taller tree} = 2 \times 9 = 18 \text{ m}$$

$O = 18, A = 15$: use TOA

$$\tan x = \frac{18}{15}$$

$$x = \tan^{-1}(1.2)$$

$$x = 50.2^\circ$$

11

The diagram shows triangle ABC with a right angle at B . D is a point on BC . Give each answer correct to 1 decimal place.

- Work out the size of angle ADB .
- Work out the size of angle ACB .
- Work out the size of angle DAC .

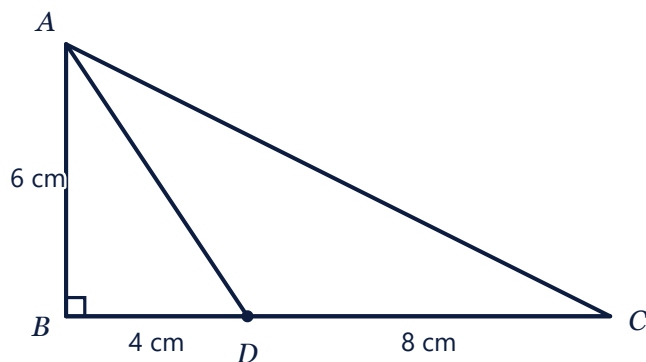


Diagram NOT accurately drawn

(5 marks)

a) triangle ABD : opposite 6, adjacent 4

$$\tan(\angle ADB) = \frac{6}{4}$$

$$\angle ADB = \tan^{-1}(1.5)$$

$$\boxed{56.3^\circ}$$

b) $BC = 4 + 8 = 12$

$$\tan(\angle ACB) = \frac{6}{12}$$

$$\angle ACB = \tan^{-1}(0.5)$$

$$\boxed{26.6^\circ}$$

c) $\angle ADB$ is the exterior angle of triangle ADC

$$\angle DAC = 56.3^\circ - 26.6^\circ$$

$$\boxed{29.7^\circ}$$

12

The diagram shows a quadrilateral $ABCD$ split by the diagonal AC . Angle ABC and angle CAD are both right angles. $AB = 5$ cm, $BC = 12$ cm and $AD = 9$ cm.

- Work out the length of AC .
- Work out the size of angle ADC . Give your answer correct to 1 decimal place.
- Work out the size of angle BCD . Give your answer correct to 1 decimal place.

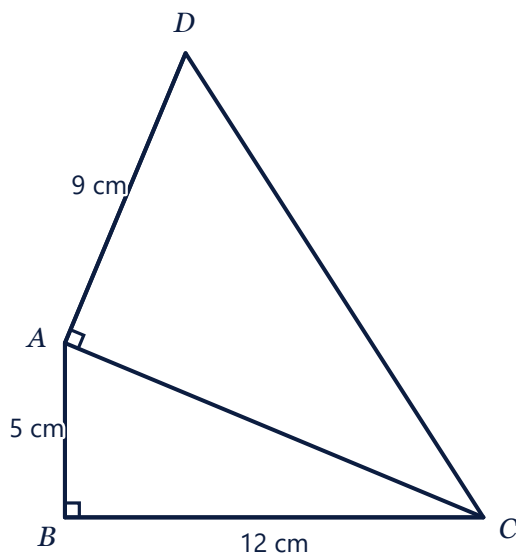


Diagram NOT accurately drawn

(6 marks)

a) Pythagoras in triangle ABC

$$AC^2 = 5^2 + 12^2 = 169$$

$$AC = 13 \text{ cm}$$

b) triangle ACD : opposite = AC , adjacent = AD

$$\tan(\angle ADC) = \frac{13}{9}$$

$$\angle ADC = \tan^{-1}\left(\frac{13}{9}\right)$$

$$55.3^\circ$$

c) $\angle BCD = \angle BCA + \angle ACD$

$$\tan(\angle BCA) = \frac{5}{12}, \angle BCA = 22.6^\circ$$

$$\angle ACD = 90^\circ - 55.3^\circ = 34.7^\circ$$

$$\angle BCD = 22.6^\circ + 34.7^\circ$$

$$57.3^\circ$$

13

In triangle ABC, angle ABC = 90° .

AB = 15 cm and BC = 8 cm.

- Work out the size of angle BAC. Give your answer correct to 1 decimal place.
- Write down the size of angle BCA, correct to 1 decimal place.

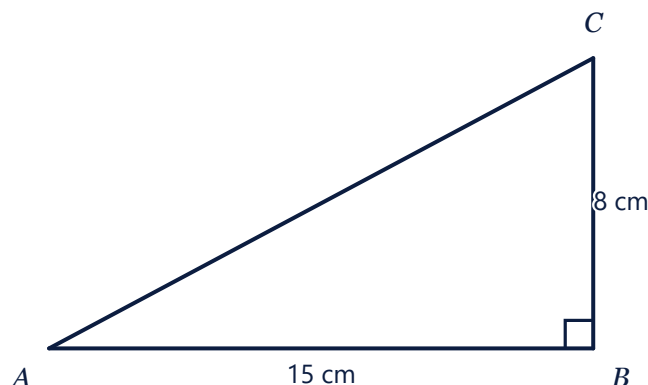


Diagram NOT accurately drawn

(3 marks)

a) BC = 8 cm is opposite angle BAC and AB = 15 cm is adjacent,
so $\tan BAC = \frac{8}{15}$

$$\text{Angle BAC} = \tan^{-1}\left(\frac{8}{15}\right) = 28.07\dots = 28.1^\circ \text{ (1 dp)}$$

b) The acute angles total 90° . Use the unrounded angle

$$BCA = 90^\circ - \tan^{-1}(8/15) = 61.927\dots^\circ, \text{ giving } 61.9^\circ \text{ to 1 decimal place}$$

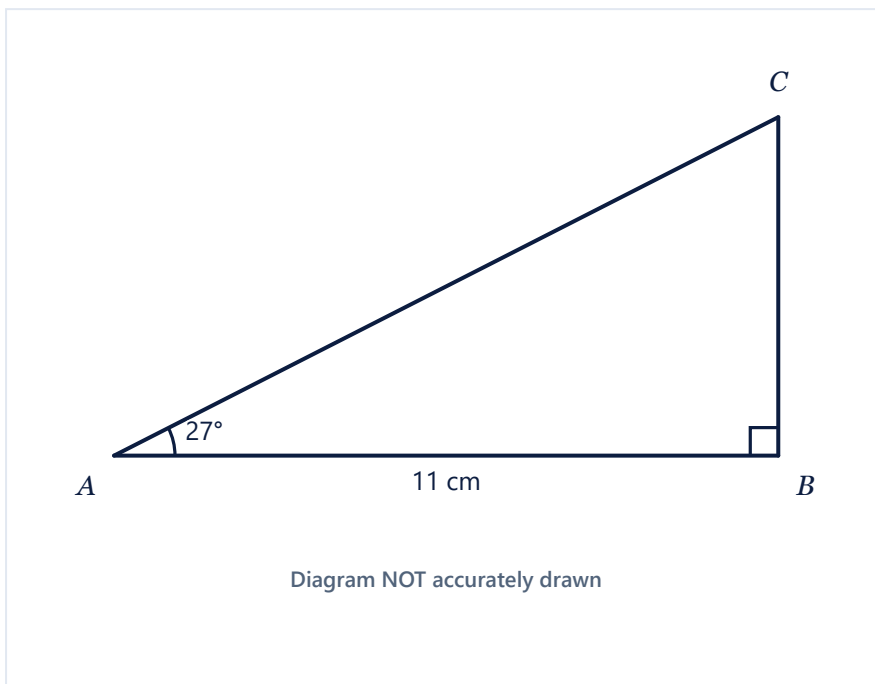
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In triangle ABC, angle ABC = 90° and angle BAC = 27° . AB = 11 cm.

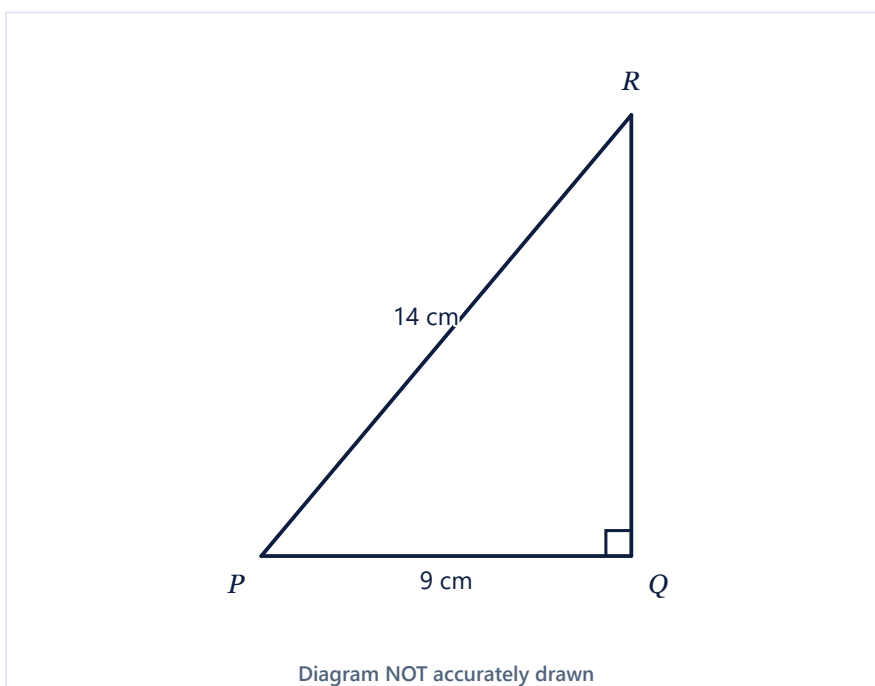
a. Work out the length of BC. Give your answer correct to 3 significant figures.

In triangle PQR, angle PQR = 90° . PQ = 9 cm and PR = 14 cm.

b. Work out the size of angle PRQ. Give your answer correct to 1 decimal place.



(a)



(b)

(4 marks)

a) BC is opposite the 27° angle and AB is adjacent, so $BC = 11 \times \tan 27^\circ = 11 \times 0.5095... = 5.604... = 5.60 \text{ cm (3 s.f.)}$

b) PQ = 9 cm is opposite angle PRQ and PR = 14 cm is the hypotenuse, so $\sin PRQ = \frac{9}{14} = 0.6428..$

$$\text{Angle } PRQ = \sin^{-1}\left(\frac{9}{14}\right) = 40.00\dots = 40.0^\circ \text{ (1 dp)}$$