



- 1 In triangle ABC, angle ABC = 90° and angle BAC = 34° .

AB = 12 cm.

Work out the length of BC.

Give your answer correct to 3 significant figures.

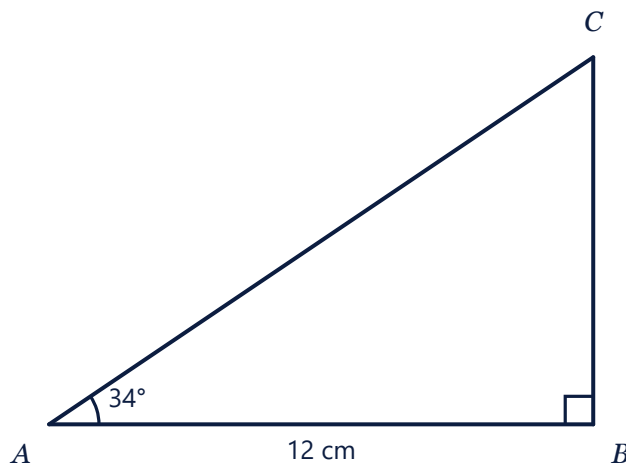


Diagram NOT accurately drawn

(2 marks)

Use degree mode. The hypotenuse is opposite the right angle; relative to the 34° angle, the opposite side is across from it and the adjacent side touches it but is not the hypotenuse

BC is opposite the 34° angle and AB = 12 cm is adjacent to it, so use tan

$$\tan 34^\circ = BC \div 12$$

$$BC = 12 \times \tan 34^\circ = 12 \times 0.6745... = 8.094... = 8.09 \text{ cm (3 sf)}$$

8.09 cm

- 2 In triangle PQR, angle PQR = 90° and angle PRQ = 52° .
 PQ = 9 cm.
 Work out the length of PR.
 Give your answer correct to 3 significant figures.

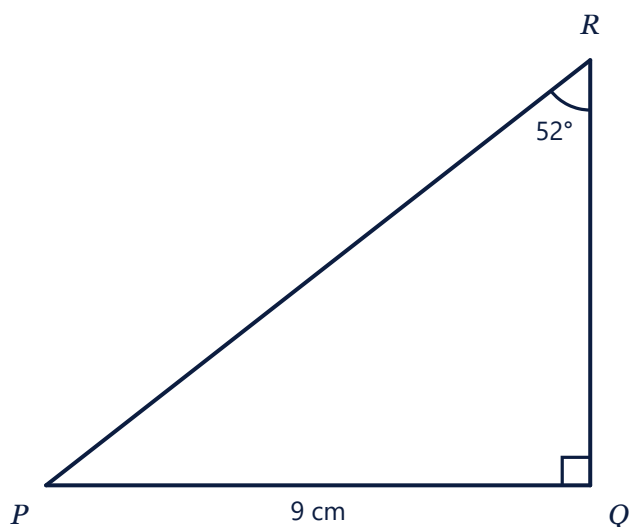


Diagram NOT accurately drawn

(2 marks)

PQ = 9 cm is opposite the 52° angle and PR is the hypotenuse, so use sin

$$\sin 52^\circ = 9 \div PR$$

$$PR = 9 \div \sin 52^\circ = 9 \div 0.7880... = 11.42... = 11.4 \text{ cm (3 s.f.)}$$

11.4 cm

- 3 In triangle DEF, angle DEF = 90° and angle EDF = 28° .
 DE = 15 cm.
 Work out the length of EF. Give your answer correct to 3 significant figures.

(2 marks)

Opposite = EF, Adjacent = 15

$$\tan 28^\circ = \frac{EF}{15}$$

$$\text{EF} = 15 \times \tan 28^\circ$$

EF = 7.98 cm

- 4 In triangle KLM, angle KLM = 90° and angle LKM = 62°.

KM = 18 cm.

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

(2 marks)

Hypotenuse = 18, Adjacent = KL

$$\cos 62^\circ = \frac{KL}{18}$$

$$\times 18 \quad KL = 18 \times \cos 62^\circ \quad \times 18$$

$$KL = 8.45 \text{ cm}$$

- 5 In triangle ABC, angle ABC = 90° and angle ACB = 35°.

AB = 7 cm.

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

(2 marks)

Opposite = 7, Hypotenuse = AC

$$\sin 35^\circ = \frac{7}{AC}$$

$$AC = \frac{7}{\sin 35^\circ}$$

$$AC = 12.2 \text{ cm}$$

- 6 In triangle PQR, angle PQR = 90° and angle QPR = 53°.

QR = 9 cm.

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

(2 marks)

Opposite = 9, Adjacent = PQ

$$\tan 53^\circ = \frac{9}{PQ}$$

$$PQ = \frac{9}{\tan 53^\circ}$$

$$PQ = 6.78 \text{ cm}$$

7

In triangle RST, angle RST = 90° and angle SRT = 41° .

RT = 20 cm.

Calculate the length of RS.

Give your answer correct to 3 significant figures.

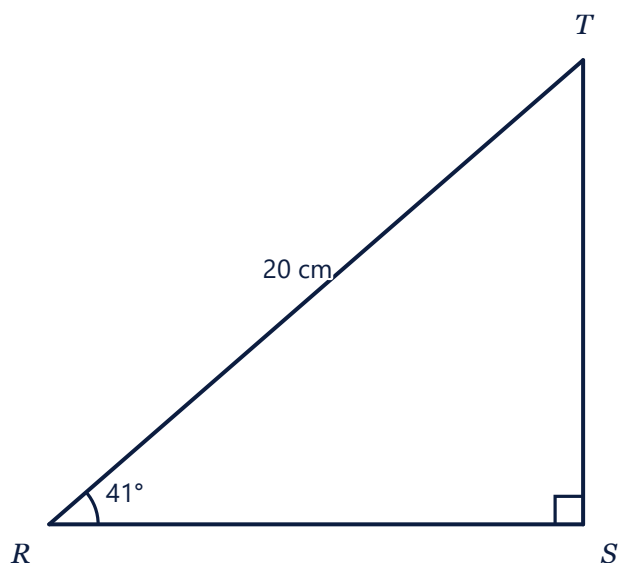


Diagram NOT accurately drawn

(2 marks)

RS is adjacent to the 41° angle and RT = 20 cm is the hypotenuse, so use cos

$$\cos 41^\circ = RS \div 20$$

$$RS = 20 \times \cos 41^\circ = 20 \times 0.7547... = 15.09... = 15.1 \text{ cm (3 s.f.)}$$

$$\boxed{15.1 \text{ cm}}$$

8

A straight ramp is 4.5 m long. It makes an angle of 12° with the horizontal ground.

Work out the horizontal distance the ramp covers. Give your answer correct to 3 significant figures.

(2 marks)

Hypotenuse = 4.5, Adjacent = d

$$\cos 12^\circ = \frac{d}{4.5}$$

$$\overset{\times 4.5}{d} = \overset{\times 4.5}{4.5 \times \cos 12^\circ}$$

$$\boxed{d = 4.40 \text{ m}}$$

9

A ladder of length 6 m leans against a vertical wall. The ladder makes an angle of 68° with the horizontal ground. Work out how far up the wall the ladder reaches. Give your answer correct to 3 significant figures.

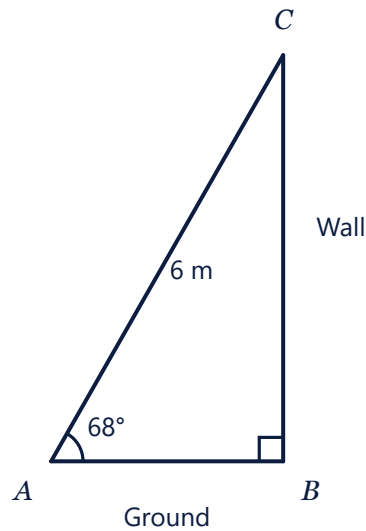


Diagram NOT accurately drawn

(2 marks)

The height up the wall is opposite the 68° angle and the ladder is the hypotenuse, so use sin

$$\sin 68^\circ = \text{height} \div 6$$

$$\text{Height} = 6 \times \sin 68^\circ = 6 \times 0.9271... = 5.563... = 5.56 \text{ m (3 s.f.)}$$

5.56 m

10

Aisha stands 40 m from the foot of a vertical tower on level ground. The angle of elevation of the top of the tower from her eyes is 36° .

Her eyes are 1.6 m above the ground.

- Work out the height of the top of the tower above her eye level. Give your answer correct to 3 significant figures.
- Work out the height of the tower above the ground. Give your answer correct to 3 significant figures.

(4 marks)

a)

Adjacent = 40, Opposite = h

$$\tan 36^\circ = \frac{h}{40}$$

$$\overset{\times 40}{h} = \overset{\times 40}{40 \times \tan 36^\circ}$$

$$h = 29.06...$$

$$\boxed{29.1 \text{ m}}$$

b)

$$29.06... + 1.6 = 30.66...$$

$$\boxed{30.7 \text{ m}}$$

11

$$\tan 40^\circ = (x + 3) \div 8$$

Work out the value of x.

Give your answer correct to 3 significant figures.

(3 marks)

$$\overset{\times 8}{x + 3} = \overset{\times 8}{8 \times \tan 40^\circ}$$

$$8 \times \tan 40^\circ = 8 \times 0.8390... = 6.712..$$

$$x = 6.712... - 3 = 3.712... = 3.71 (3 \text{ s.f.})$$

$$\boxed{x = 3.71}$$

12

Triangle ABC is isosceles with $AB = AC = 10$ cm.

Angle $BAC = 40^\circ$.

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

(4 marks)

M = midpoint of BC, $AM \perp BC$

Angle BAM = $40^\circ \div 2 = 20^\circ$

$$\sin 20^\circ = \frac{BM}{10}$$

$$\text{BM} = 10 \times \sin 20^\circ$$

$$BM = 3.4202\dots$$

$$BC = 2 \times 3.4202\dots$$

$$BC = 6.84 \text{ cm}$$

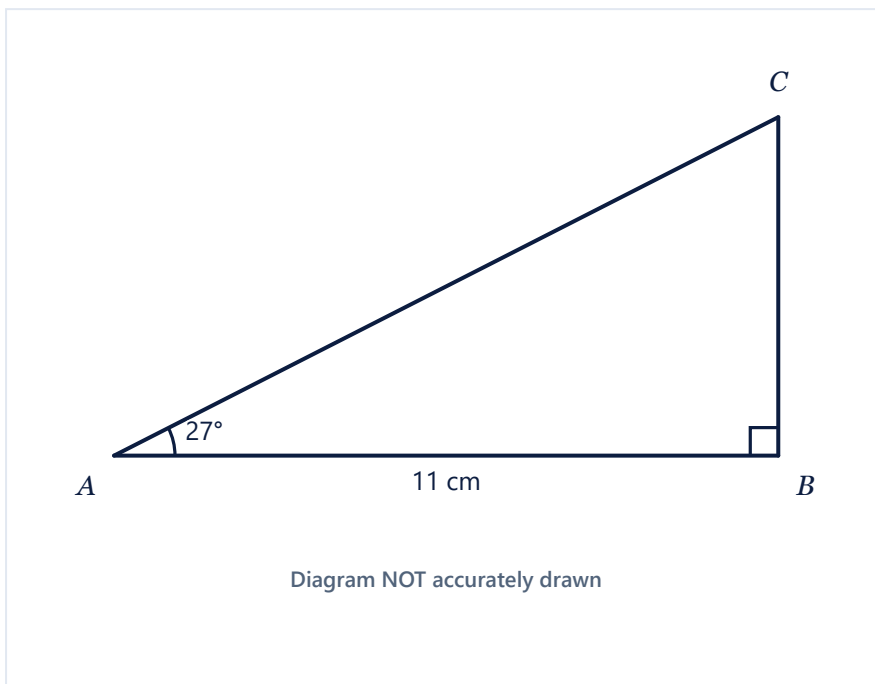
13

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

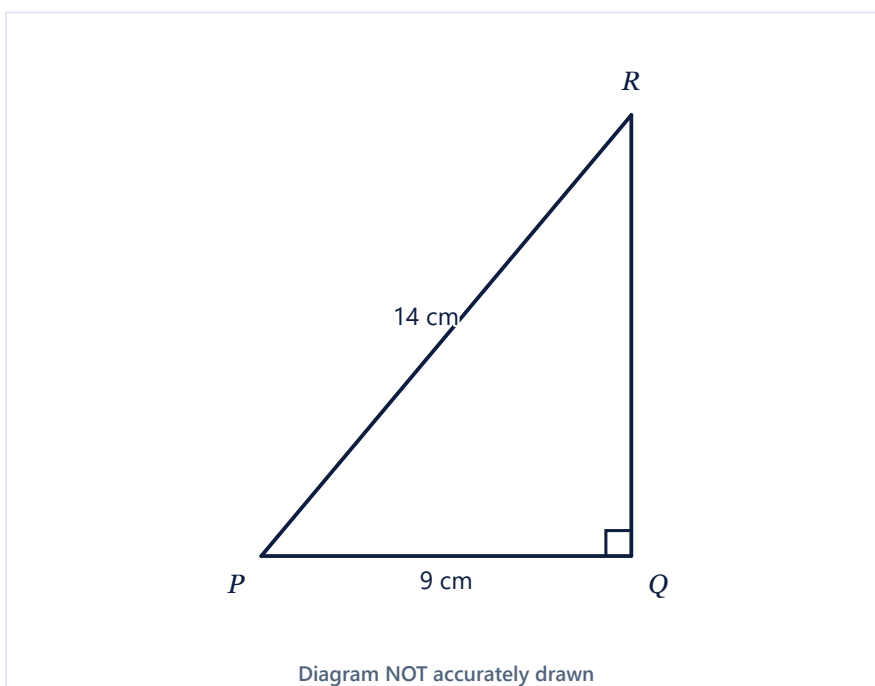
a. Work out the length of BC. Give your answer correct to 3 significant figures.

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 $\sin PRQ = \frac{9}{14} = 0.6428..$

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

14

In triangle ABC, D is the point on AC such that BD is perpendicular to AC.

Angle BAD = 40° , AD = 7 cm and angle BCD = 55° .

Work out the length of BC.

Give your answer correct to 3 significant figures.

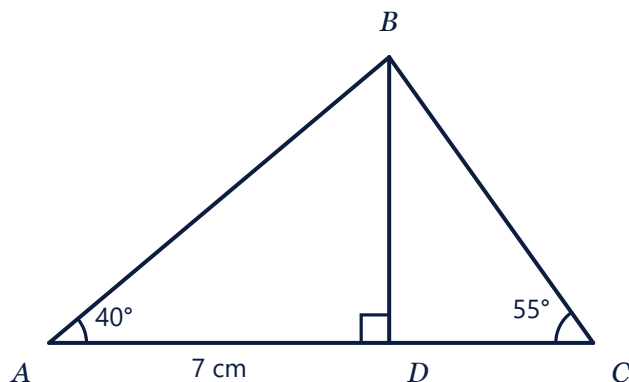


Diagram NOT accurately drawn

(3 marks)

In right-angled triangle ABD, BD is opposite the 40° angle and AD = 7 cm is adjacent, so $BD = 7 \times \tan 40^\circ = 5.873\dots$ cm

In right-angled triangle BCD, BD is opposite the 55° angle and BC is the hypotenuse, so $\sin 55^\circ = BD \div BC$

$$BC = 5.873\dots \div \sin 55^\circ = 5.873\dots \div 0.8191\dots = 7.170\dots = 7.17 \text{ cm (3 sf)}$$

sf)

7.17 cm

15

In triangle ABC, angle ABC = 90° .

The two acute angles of the triangle are in the ratio 2 : 3.

AC = 15 cm.

Work out the length of the side opposite the larger acute angle.

Give your answer correct to 3 significant figures.

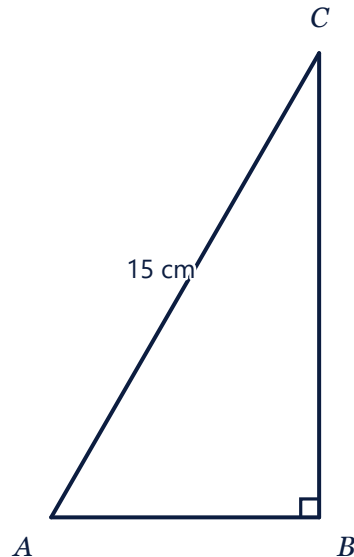


Diagram NOT accurately drawn

(4 marks)

The two acute angles sum to 90° . Dividing 90° in the ratio 2 : 3 gives $90 \div 5 = 18$, so the angles are 36° and 54°

The side opposite the 54° angle satisfies $\sin 54^\circ = \text{side} \div 15$, since AC = 15 cm is the hypotenuse

$$\text{Side} = 15 \times \sin 54^\circ = 15 \times 0.8090... = 12.13... = 12.1 \text{ cm (3 s.f.)}$$

12.1 cm