

KS3 – Pythagoras & Trigonometry

Section A – Basic Pythagoras

Q1 (4 marks)

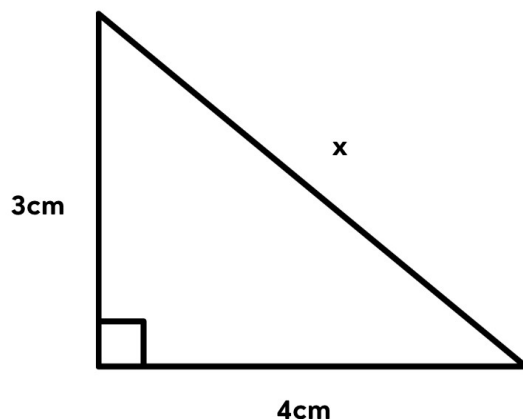
Answer these questions.

- Write down Pythagoras' theorem for a right-angled triangle.
- Which side of a right-angled triangle is the hypotenuse?
- If the two shorter sides are known, which operation is used between their squares to find the hypotenuse?
- If the hypotenuse and one shorter side are known, which operation is used between their squares to find the missing shorter side?

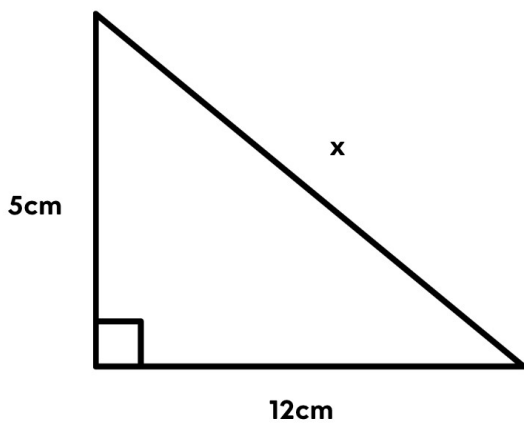
Q2 (4 marks)

Find the missing length. Give exact answers where possible.

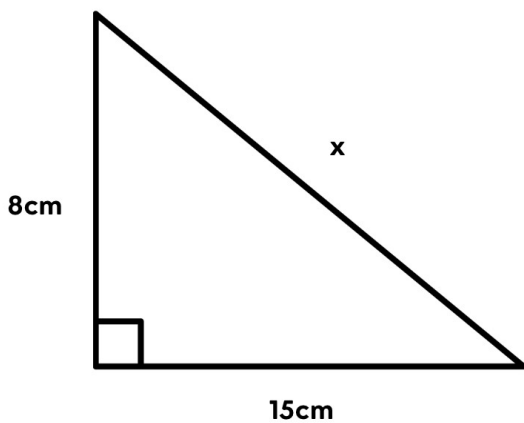
a)



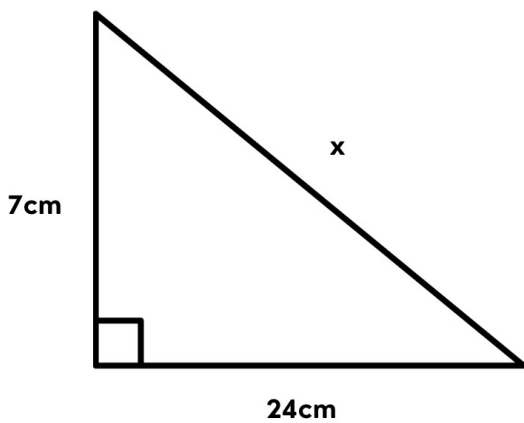
b)



c)



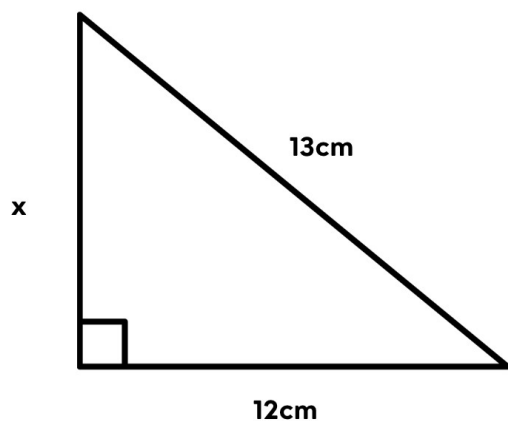
d)



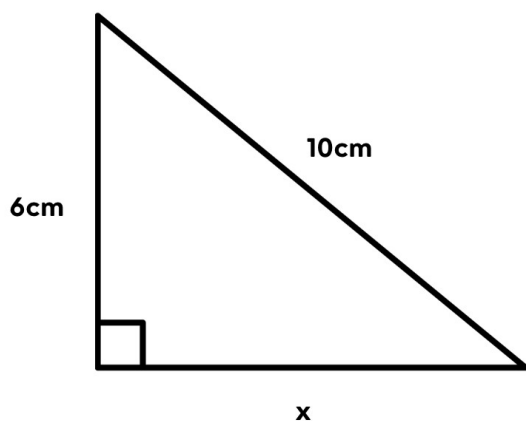
Q3 (4 marks)

Find the missing shorter side.

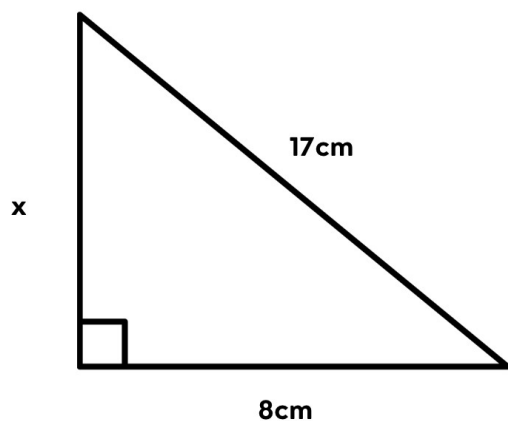
a)



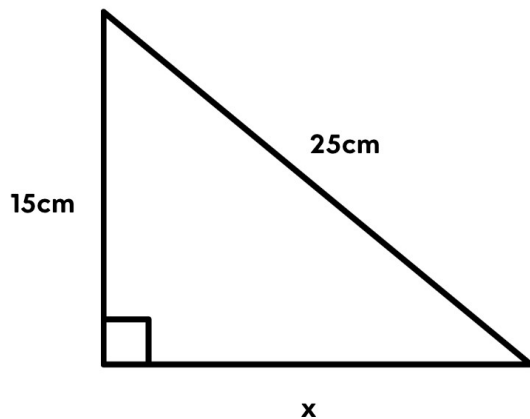
b)



c)



d)



Q4 (3 marks)

Find each missing length. Give answers to 1 decimal place.

a) A right-angled triangle has shorter sides 6 cm and 9 cm. Find the hypotenuse.

b) A right-angled triangle has hypotenuse 14 cm and one shorter side 8 cm. Find the other shorter side.

c) A right-angled triangle has shorter sides 11 m and 7 m. Find the hypotenuse.

Q5 (3 marks)

Solve each problem using Pythagoras. Give answers to 1 decimal place where necessary.

a) A rectangular garden is 9 m long and 12 m wide. Find the straight-line distance from one corner to the opposite corner.

b) A ladder reaches 8 m up a wall. Its foot is 6 m from the wall. Find the length of the ladder.

c) A rectangular screen is 16 cm wide and 12 cm high. Find the length of its diagonal.

Q6 (3 marks)

Decide whether each triangle is right-angled. Show a Pythagoras check.

a) Side lengths 6 cm, 8 cm and 10 cm.

b) Side lengths 5 cm, 6 cm and 8 cm.

c) Side lengths 7 cm, 24 cm and 25 cm.

Challenge

Q7 (6 marks)

A rectangular park measures 18 m by 24 m.

A path runs directly from one corner to the opposite corner. Find the length of the path.

Section B – SOHCAHTOA (Higher KS3)

Q8 (4 marks)

Complete these facts about right-angled trigonometry.

a) Complete: SOH means $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$.

b) Complete: CAH means $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$.

c) Complete: TOA means $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$.

d) Which side of a right-angled triangle is always opposite the right angle?

Q9 (3 marks)

For each description, choose sine, cosine or tangent.

a) You know the opposite side and hypotenuse.

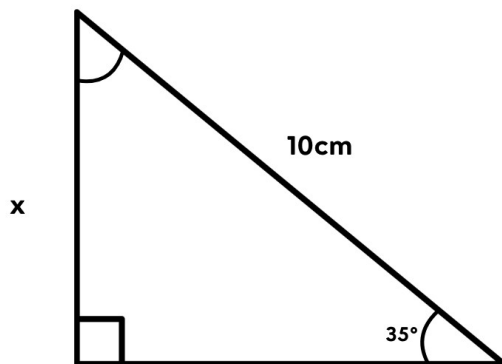
b) You know the adjacent side and hypotenuse.

c) You know the opposite and adjacent sides.

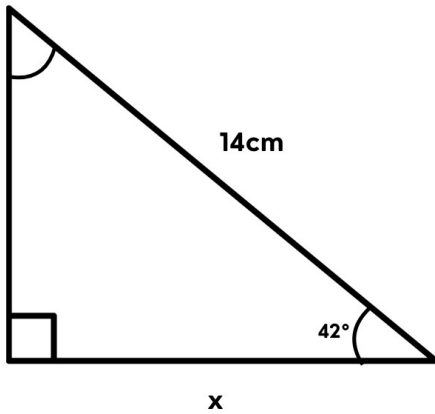
Q10 (6 marks)

Find the missing side x . Give answers to 1 decimal place.

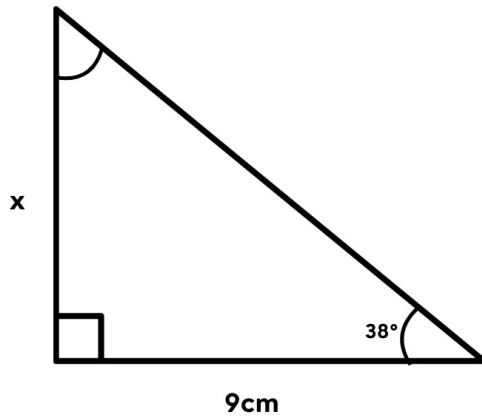
a)



b)



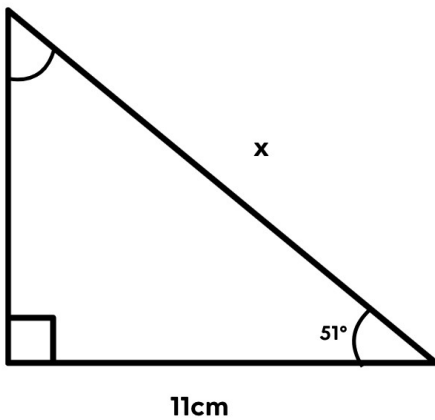
c)



Q11 (6 marks)

Find the missing side x . Give answers to 1 decimal place.

a)



b)

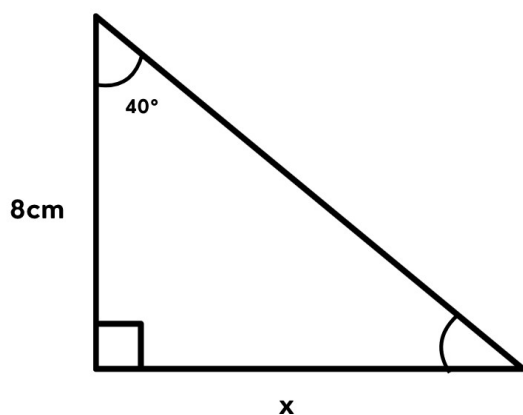
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Geometry & Measures

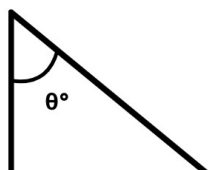
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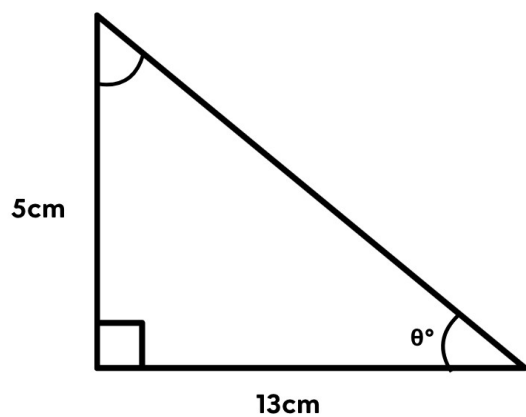
Q12 (6 marks)

Find the angle θ . Give answers to 1 decimal place.

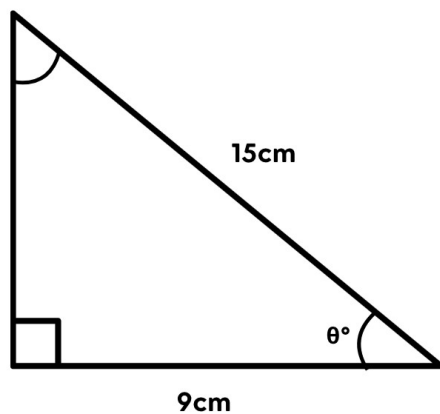
a)



b)



c)



Q13 (4 marks)

Solve each worded problem using trigonometry. Give answers to 1 decimal place.

a) A ladder is 7 m long and makes an angle of 65° with level ground. How high up a vertical wall does it reach?

b) A ramp rises 1.5 m vertically over a horizontal distance of 6 m. Find the angle the ramp makes with the horizontal ground.

Q14 (4 marks)
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Solve each problem. Give answers to 1 decimal place.

a) From a point on level ground, the angle of elevation to the top of a vertical tree is 38° . The point is 12 m from the base of the tree. Find the height of the tree.

b) A right-angled triangular support has a hypotenuse of 9 m and makes an angle of 32° with the horizontal. Find its vertical height.

Q15 (4 marks)

Solve these worded trigonometry problems. Give answers to 1 decimal place.

a) A kite string is 20 m long and makes an angle of 30° with level ground. Assuming the string is straight, find the vertical height of the kite above the hand holding the string.

b) A wheelchair ramp is 5 m long and rises 0.8 m vertically. Find the angle the ramp makes with the horizontal ground.

Challenge

Q16 (8 marks)

A right-angled triangle has a hypotenuse of 18 cm and one acute angle of 37° .

a) Find the side opposite the 37° angle.

b) Find the side adjacent to the 37° angle.

Total: ____ / 72

Percentage: ____%