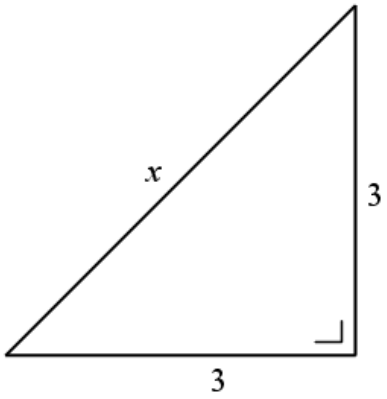
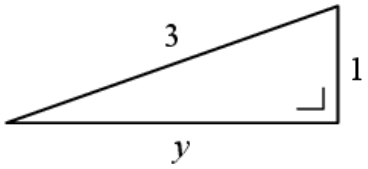
Question 1

(i) Use the diagram on the right to calculate the value of x.
Give your answer in surd form.

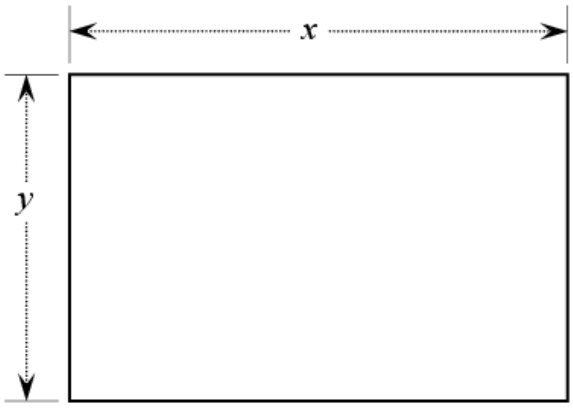


(ii) Use the diagram below to calculate the value of y. Give your answer in surd form.



(iii) A rectangle with sides of length x and y is drawn using the values of x and y from parts **(i)** and **(ii)**, as shown below.

Write the **perimeter** of this rectangle in the form $a\sqrt{2}$, where $a \in \mathbb{N}$.



Question 2

(i) Construct a right-angled triangle ABC, where:

$$|AB| = 6 \text{ cm}$$
$$|\angle ABC| = 90°$$
$$|AC| = 10 \text{ cm}.$$

(ii) On your diagram, measure the angle $\angle CAB$. Give your answer correct to the nearest degree.

$|\angle CAB| =$ ☐

(iii) Let X be the whole number you wrote as your answer to **(ii)**.

Use a calculator to find $\cos X$. Give your answer correct to 3 decimal places.

$\cos(\quad) =$

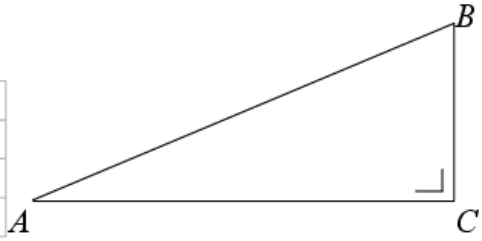
(iv) Jacinta says that $\cos(\angle CAB)$ is exactly 0·6, because $\cos(\angle CAB) = \dfrac{\text{adjacent}}{\text{hypotenuse}}$.

Explain why your answer in **(iii)** is **not** the same as Jacinta's.

Question 3

In the triangle ABC, $|AB| = 2$ and $|BC| = 1$.

(a) Find $|AC|$, giving your answer in surd form.



(b) Write $\cos \angle BAC$ and hence find $|\angle BAC|$.

(c) Sketch a right angled isosceles triangle in which the equal sides are 1 unit each and use it to write $\cos 45°$ in surd form.

(d) Show that $\cos 75° \neq \cos 45° + \cos 30°$.

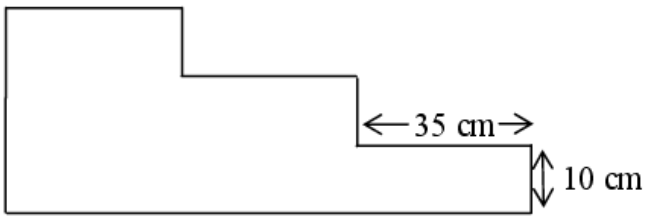
Question 4

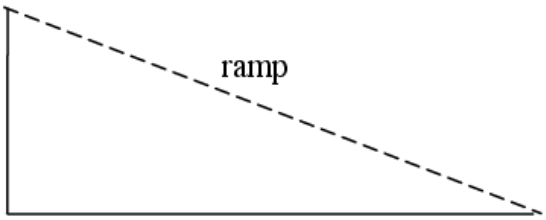
(a) Construct a right-angled triangle containing an angle A such that $\sin A = 0 \cdot 4$.

(b) Find, from your triangle, $\cos A$ in surd form.

Question 5

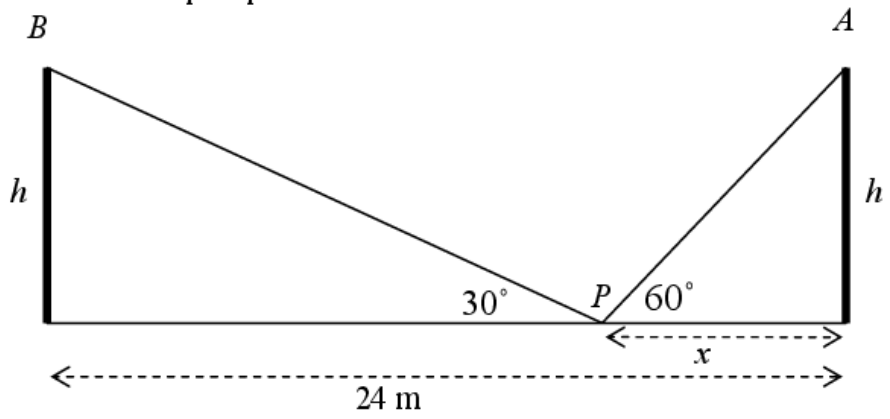
A homeowner wishes to replace the three identical steps leading to her front door with a ramp. Each step is 10 cm high and 35 cm long. Find the length of the ramp. Give your answer correct to one decimal place.





Question 6

Two vertical poles A and B, each of height h, are standing on opposite sides of a level road. They are 24 m apart. The point P, on the road directly between the two poles, is a distance x from pole A. The angle of elevation from P to the top of pole A is 60°.



(a) Write h in terms of x.

(b) From P the angle of elevation to the top of pole B is 30°. Find h, the height of the two poles.

Question 7

A tree 32 m high casts a shadow 63 m long. Calculate θ, the angle of elevation of the sun.
Give your answer in degrees and minutes (correct to the nearest minute).