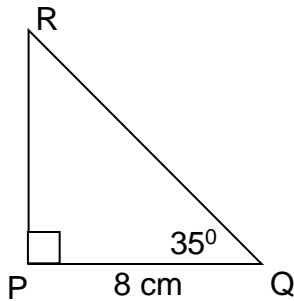
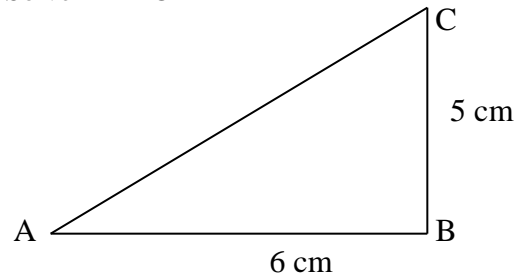


## Trigonometry Exercises

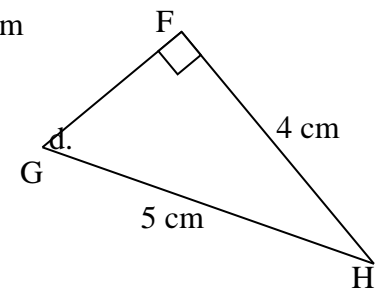
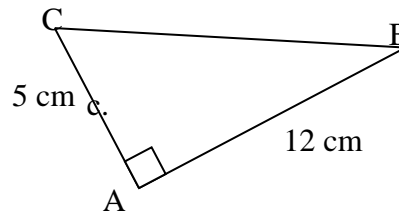
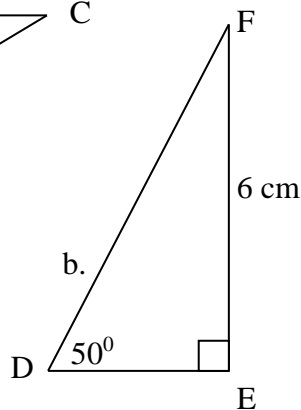
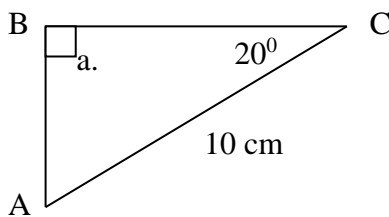
1. Solve  $\triangle PQR$ .



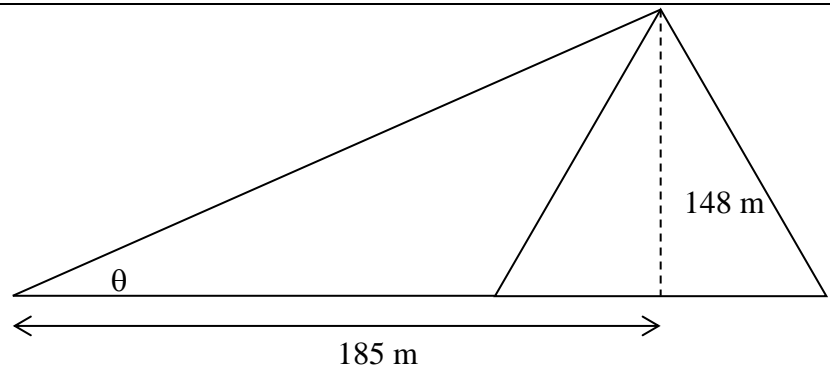
2. Solve  $\triangle ABC$



3. Solve the following triangles.



4. A clinometer is used to measure angles. If the Greek geometer Thales had access to a clinometer, what angle would he have measured to the top of the Great Pyramid?



5. For a circular track of radius  $r$  metres, banked at  $\theta$  degrees to the horizontal, the ideal velocity (the velocity that gives no tendency to sideslip) in metres per second is given by the formula:

$$v = \sqrt{gr \tan \theta}, \text{ where } g = 9.8 \text{ m/s}^2.$$

- What is the ideal velocity for a vehicle traveling on a circular track of radius 100 m, banked at an angle of  $15^\circ$ ?
- At what angle should a track of radius 200 m be banked, if it is designed for a vehicle traveling at 20 m/s?

6. A regular hexagon has a side length of 1 metre. Determine the area of this hexagon in square metres.

## Trigonometry - Angles of Elevation and Depression

For each question below, first draw a diagram. Label all sides and angles, and mark the unknown.

1. Find the height of a vertical cliff if the angle of elevation is  $35^\circ$  to the top, from a point which is 170 metres from the base of the cliff (measured horizontally).
2. Lindsay is standing on level ground, 100 metres from a statue. Using a clinometer, he measures the angle of elevation to the top of the statue to be  $12^\circ$ .
  - a. Ignoring Lindsay's height, what is the height of the statue?
  - b. A more realistic model takes Lindsay's height into account. What is the height of the statue if Lindsay's eye is 1.6 metres above the ground?
3. The angle of elevation to the top of a lighthouse 175 metres above sea level, measured from a trawler is  $7^\circ$ . Calculate the horizontal distance of the boat from the lighthouse.
4. Kylie measures the angle of elevation from a point on level ground to the top of a building 120 metres high to be  $32^\circ$ . She walks towards the building until the angle of elevation is  $45^\circ$ . How far did she walk?
5. From a point A, 40 metres from the base of a building B, the angle of elevation to the top of the building C is  $51^\circ$ , and to the top of the flagpole D is  $56^\circ$ .

Find the length of the flagpole.