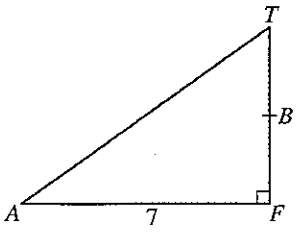
4. In the diagram, TF is a vertical tree, A is a point on the horizontal ground 7 m from the tree. The angle of elevation of T from A is 33°.

(a) Find the height of the tree.

(b) If B is a bird at the mid-level of the tree, find the angle of elevation of the bird from A.

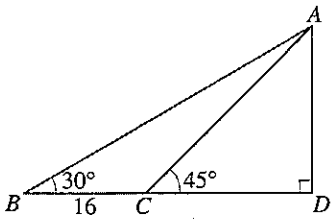


5. In the diagram, BCD is a straight line, $BC = 16$ cm, $\angle ABC = 30°$, $\angle ACD = 45°$ and $\angle ADB = 90°$. Find

(a) the length of AB,

(b) the length of CD,

(c) the length of AD.



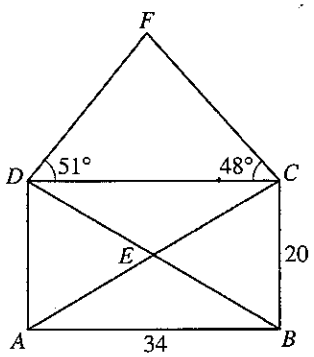
6. In the diagram, $ABCD$ is a rectangle and its diagonals intersect at E. $AB = 34$ cm, $BC = 20$ cm, $\angle FCD = 48°$ and $\angle FDC = 51°$. Find

(a) the length of the diagonal AC,

(b) $\angle BEC$,

(c) the length of CF,

(d) the area of the pentagon $ABCFD$.

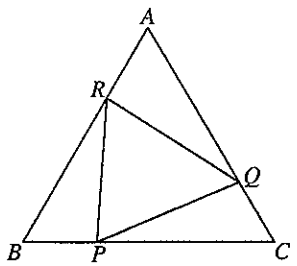


7. In the diagram, ABC is an equilateral triangle of side 7 cm and $BP = CQ = AR = 2$ cm.

(a) Find the length of PQ.

(b) What type of triangle is $\triangle PQR$? Explain briefly.

(c) Find $\frac{\text{area of } \triangle PQR}{\text{area of } \triangle ABC}$.



8. In the diagram, the sides of $\triangle ABC$ touch the circle with centre O at P, Q and R. P is the midpoint of BC. $CP = 12$ cm, $AR = 25$ cm and the radius of the circle is r cm.

(a) Find the lengths of AB, BC and AC.

(b) Find $\angle ABC$.

(c) Find the area of $\triangle ABC$.

(d) Express the area of $\triangle OAB$ in terms of r and AB.

(e) By considering $\triangle OAB$, $\triangle OBC$ and $\triangle OAC$, express the area of $\triangle ABC$ in terms of r.

(f) Hence find the value of r.