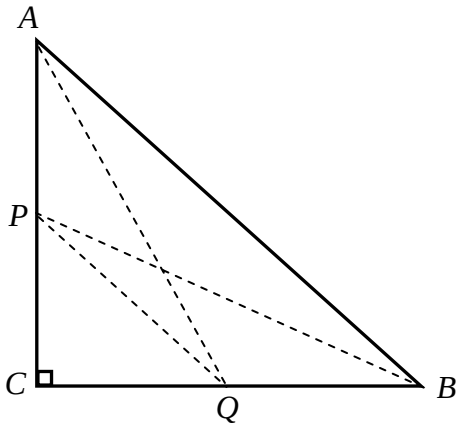
Q1



The diagram above shows a right-angled triangle ABC. P and Q are points on the sides AC and BC respectively.

(a) Write down 2 equations, one relating AQ, QC and AC and another relating BP, BC and CP. **[2]**

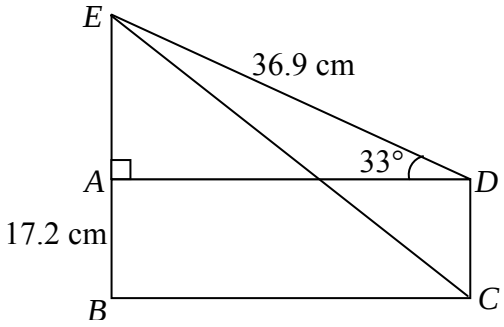
(b) Hence, if $PQ = x$ cm and $AB = y$ cm, show that $AQ^2 + BP^2 = x^2 + y^2$. **[2]**

Q2 In the figure below, $ABCD$ is a rectangle where $AB = 17.2$ cm, $DE = 36.9$ cm and $\angle EDA = 33°$. Calculate

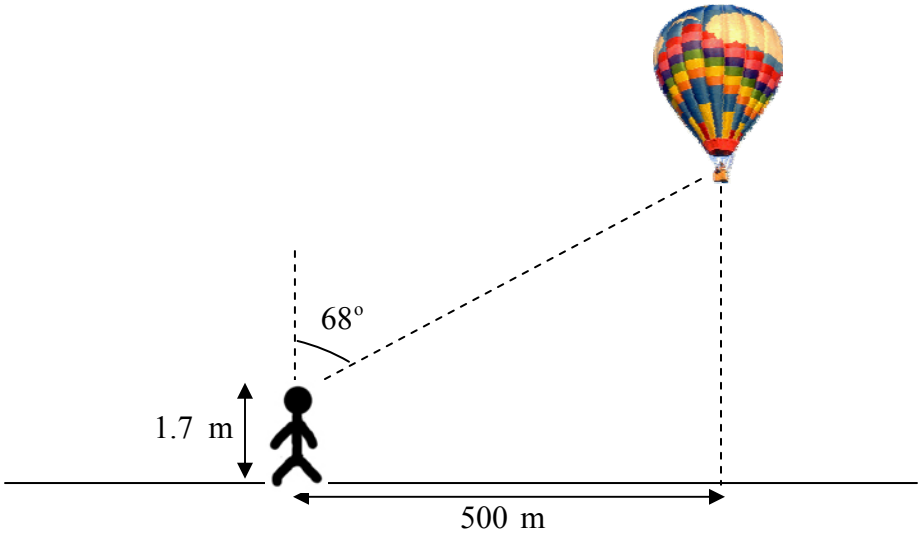
(a) AE, **[2]**

(b) AD, **[1]**

(c) $\angle DEC$. **[2]**



Q3 A man standing on horizontal ground observes a hot air balloon as shown. The angle between his line of sight and the vertical is 68°. Given that the man is 1.7 m tall and that the horizontal distance of the balloon from the man is 500 m, find the height of the hot air balloon above the ground. **[2]**



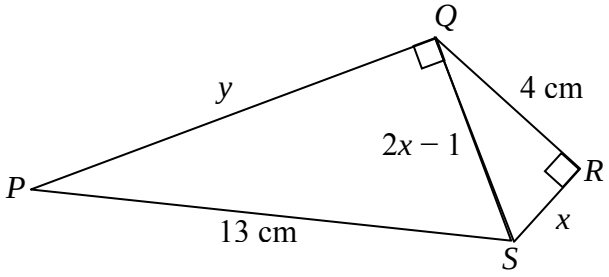
Q4 *AB* is an 8 m high vertical flag pole on a horizontal ground *BD*. A car is parked at point *C* 12 metres away from the foot of the flag pole. Calculate

(a) the length of *AC*. **[1]**

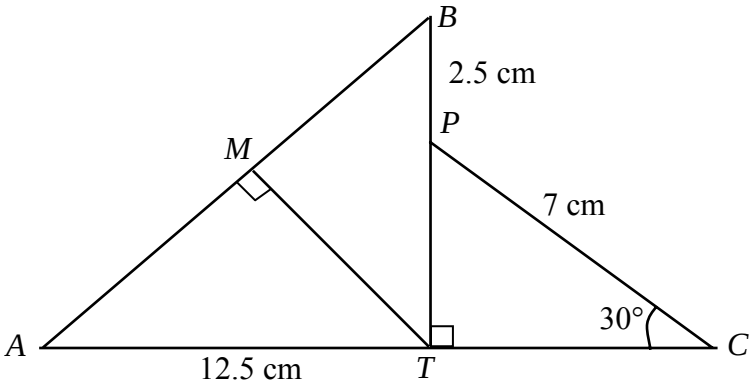
(b) the angle of depression of *C* from *A*. **[1]**

Q5 A marble lies on the ground between two equal-height buildings 50 m apart. If the angles of depression of the marble from the top of the buildings are $41°$ and $67°$ respectively, and the horizontal distance between the marble and the building it is closer to is x m, find x. **[4]**

Q6 The diagram below shows two right angled triangles *PQS* and *QRS* . The lengths of *QR* and *PS* are 4 cm and 13 cm respectively. Find the value of x and of y. **[3]**



Q7 In the diagram below, T is the foot of the perpendicular from B to the straight line AC and $AT = 12.5$ cm. P is a point on TB such that $PB = 2.5$ cm and $PC = 7$ cm and $\angle PCT = 30°$. M is a point on AB such that TM is perpendicular to AB.



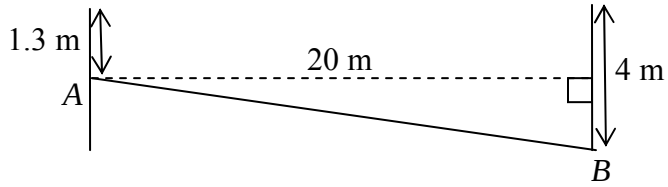
Calculate the

(i) length of PT, **[1]**

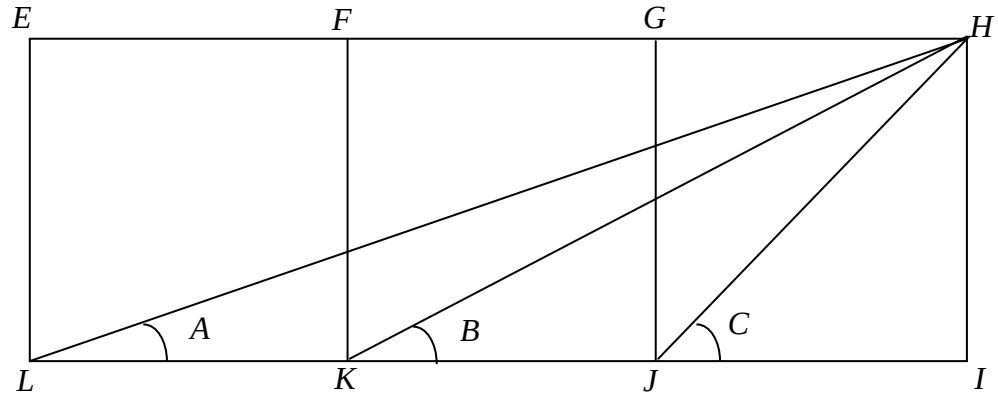
(ii) value of $\angle ABT$, **[2]**

(iii) length of MB. **[1]**

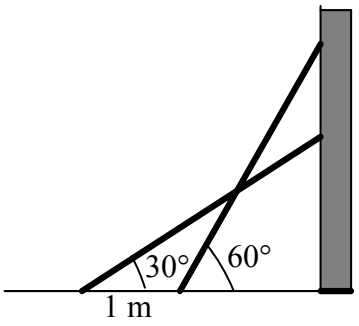
Q8 A swimming pool is 20 metres long. The bottom of the pool AB is slanted so that the water depth is 1.3 m at the shallow end and 4 m at the deep end, as shown in the figure below. Find the angle of depression of the bottom of the pool from A. **[2]**



Q9 In the diagram below, $EFKL$, $FGJK$ and $GHIJ$ are squares. Show that $C = A + B$. **[3]**

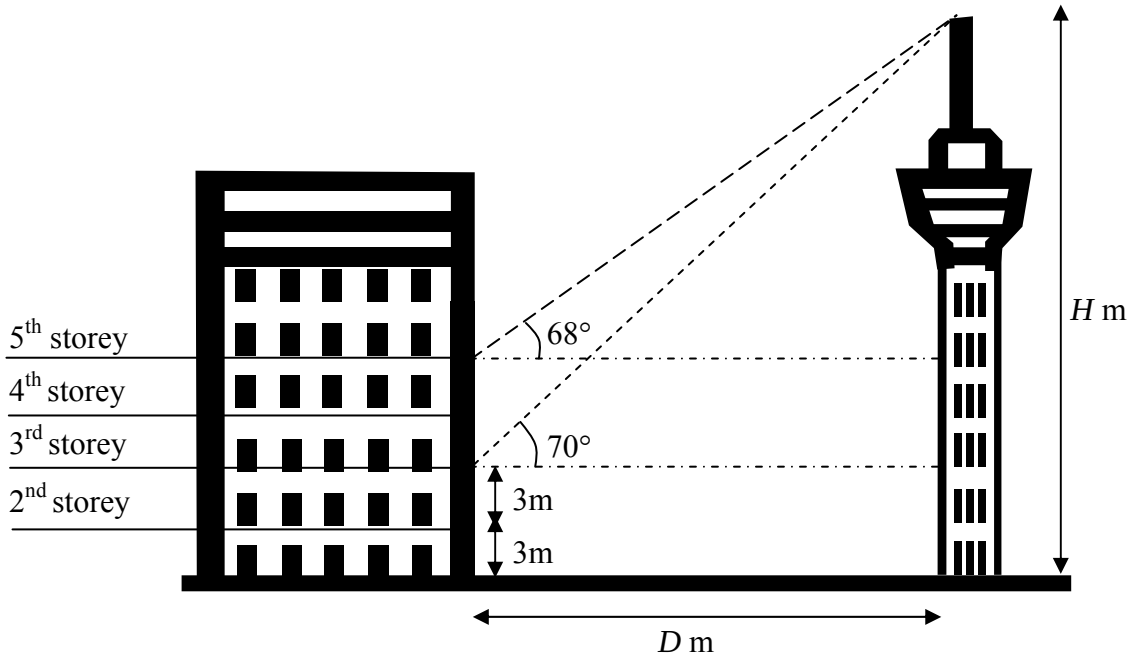


Q10 A ladder resting against a wall as shown below makes an angle of 60º with the horizontal ground. When the ladder slides down, it makes an angle 30º with the horizontal ground and is 1 m further from the wall. Find the length of the ladder. **[4]**



Q11 Two vertical poles of height 14 m and 10 m respectively are positioned 7 m apart on a horizontal ground. A bird flies from the top of the 14 m pole touches the ground and flies to the top of the 10 m one. Find the shortest distance travelled by the bird. **[3]**

Q12 John wants to find the height of a tower. In a building on the opposite of the street, he stands at a window 6 m above the ground and measures the angle of elevation of the top of the tower as 70°. He then goes up another two storeys and finds the angle of elevation of the top of the tower as 68°. Each storey is 3 m high. If the height of the tower is H m and the width of the street is D m, find the height of the tower. **[4]**



Bonus

Q13 A door 1 m by 2 m turns through 56° from *ABCD* to *ABEF* as shown below. Find

(a) the length of CF,

(b) ∠DBF.