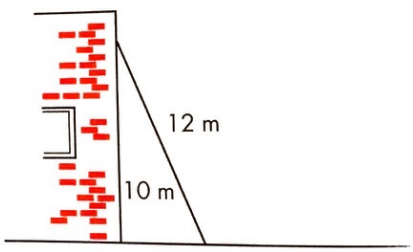
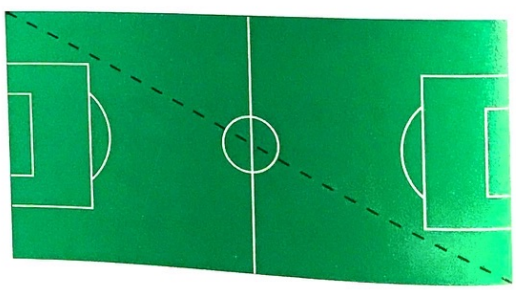
Pythagoras Theorem Problems

1 A ladder, 12 metres long, leans against a wall. The ladder reaches 10 metres up the wall. How far away from the foot of the wall is the foot of the ladder?



2 A model football pitch is 2 metres long and 0.5 metre wide. How long is the diagonal?



3 How long is the diagonal of a square with a side of 8 metres?

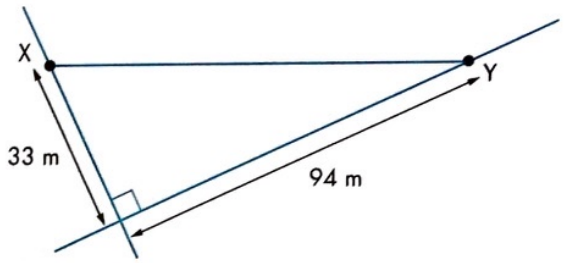
4 A ship going from a port to a lighthouse steams 15 km east and 12 km north. How far is the lighthouse from the port?

5 Some pedestrians want to get from point X on one road to point Y on another. The two roads meet at right angles.

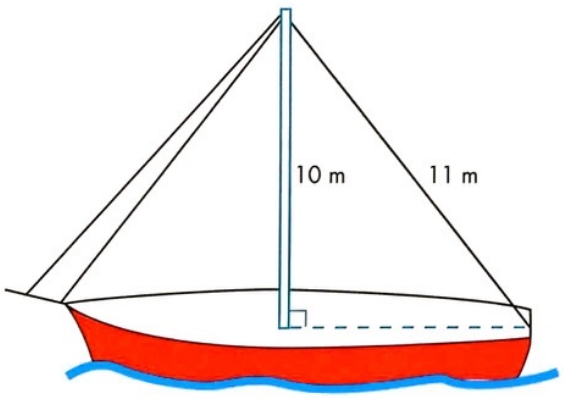
a If they follow the roads, how far will they walk?

b Instead of walking along the road, they take the shortcut, XY. Find the length of the shortcut.

c How much distance do they save?



6 A mast on a sailboat is strengthened by a wire (called a stay), as shown on the diagram. The mast is 10 m tall and the stay is 11 m long. How far from the base of the mast does the stay reach?

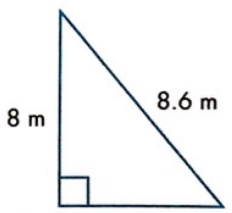


7 A ladder, 4 m long, is put up against a wall.

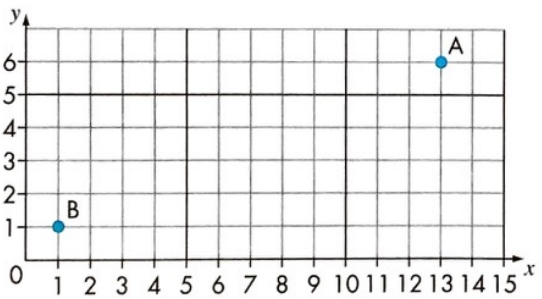
a How far up the wall will it reach when the foot of the ladder is 1 m away from the wall?

b When it reaches 3.6 m up the wall, how far is the foot of the ladder away from the wall?

8 A pole, 8 m high, is supported by metal wires, each 8.6 m long, attached to the top of the pole. How far from the foot of the pole are the wires fixed to the ground?



9 How long is the line that joins the two coordinates A(13, 6) and B(1, 1)?



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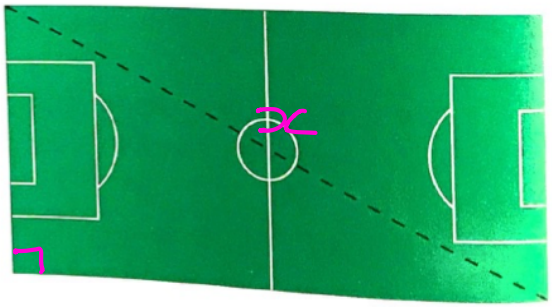


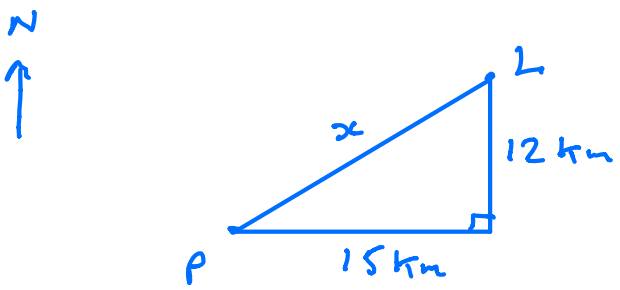
$$0.5^2 + 2^2 = x^2$$

$$4.25 = x^2$$

$$\sqrt{4.25} = x$$

$$x = 2.06\text{ m}$$

4 A ship going from a port to a lighthouse steams 15 km east and 12 km north. How far is the lighthouse from the port?



$$12^2 + 15^2 = x^2$$

$$369 = x^2$$

$$\sqrt{369} = x$$

$$x = 19.2\text{ km}$$