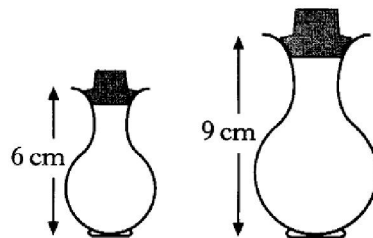


One of the questions that will state "SHOW ALL YOUR WORKING"  
They mean it. Vague working and solutions from nowhere are out.

Show the examiner how you arrived at your conclusion.

9. Two perfume bottles are mathematically similar in shape.



The smaller one is 6 centimetres high and holds 30 millilitres of perfume.

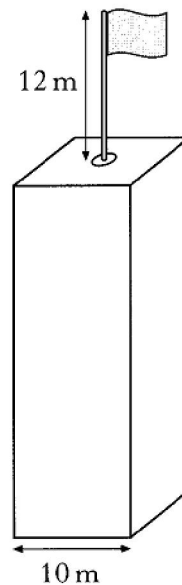
The larger one is 9 centimetres high.

What volume of perfume will the larger one hold?

3

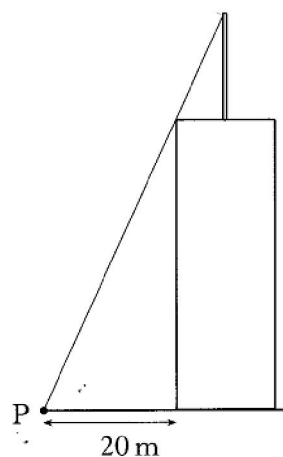
6. A vertical flagpole 12 metres high stands at the centre of the roof of a tower.

The tower is cuboid shaped with a square base of side 10 metres.



At a point P on the ground, 20 metres from the base of the tower, the top of the flagpole is just visible, as shown.

Calculate the height of the tower.

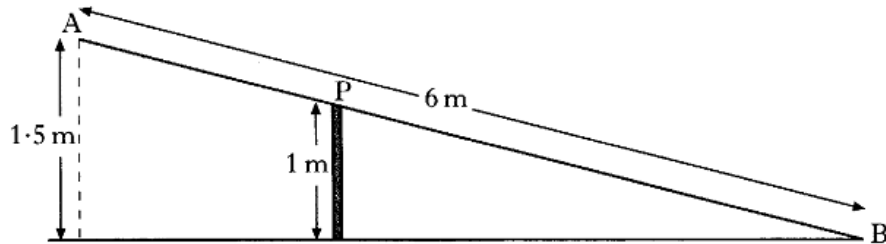


2. A metal beam, AB, is 6 metres long.

It is hinged at the top, P, of a vertical post 1 metre high.

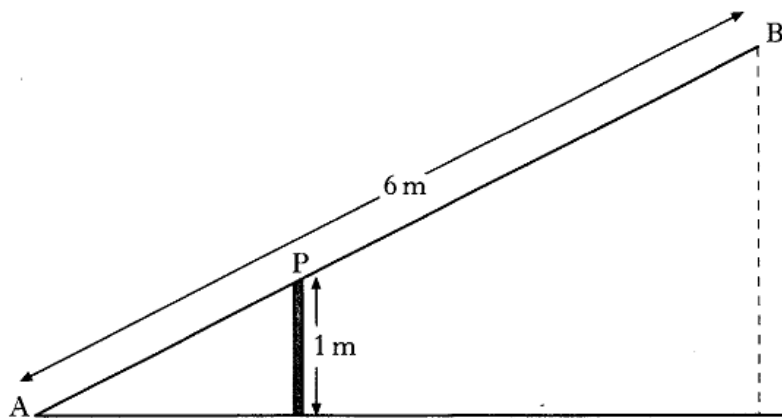
When B touches the ground, A is 1.5 metres above the ground, as shown in Figure 1.

Figure 1



When A comes down to the ground, B rises, as shown in Figure 2.

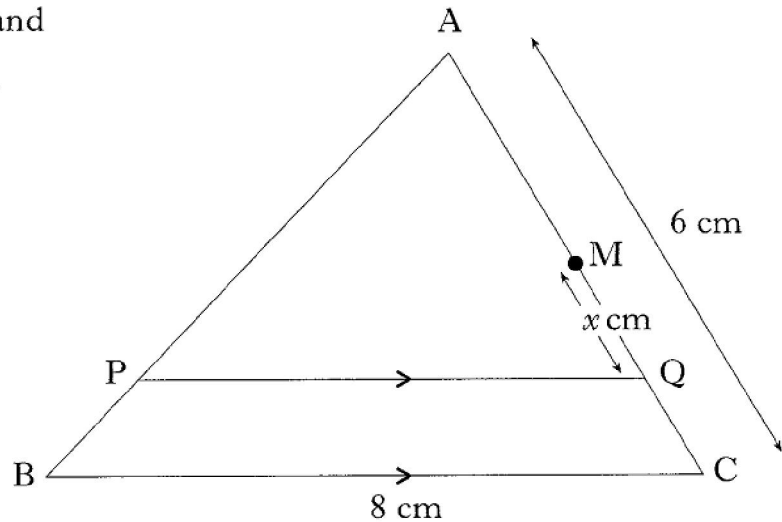
Figure 2



By calculating the length of AP, or otherwise, find the height of B above the ground.

**Do not use a scale drawing.**

11. In triangle ABC,  
 BC = 8 centimetres,  
 AC = 6 centimetres and  
 PQ is parallel to BC.



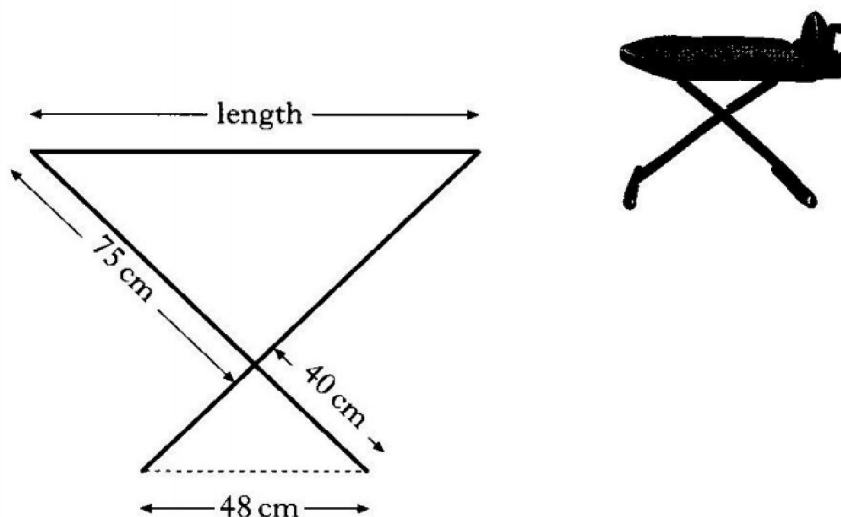
M is the midpoint of AC.

Q lies on AC,  $x$  centimetres from M, as shown on the diagram.

- (a) Write down an expression for the length of AQ.  
 (b) Show that  $PQ = (4 + \frac{4}{3}x)$  centimetres.

8. Mick needs an ironing board.

He sees one in a catalogue with measurements as shown in the diagram below.



When the ironing board is set up, two similar triangles are formed.

Mick wants an ironing board which is at least 80 centimetres in length.

Does this ironing board meet Mick's requirements?

**Show all your working.**