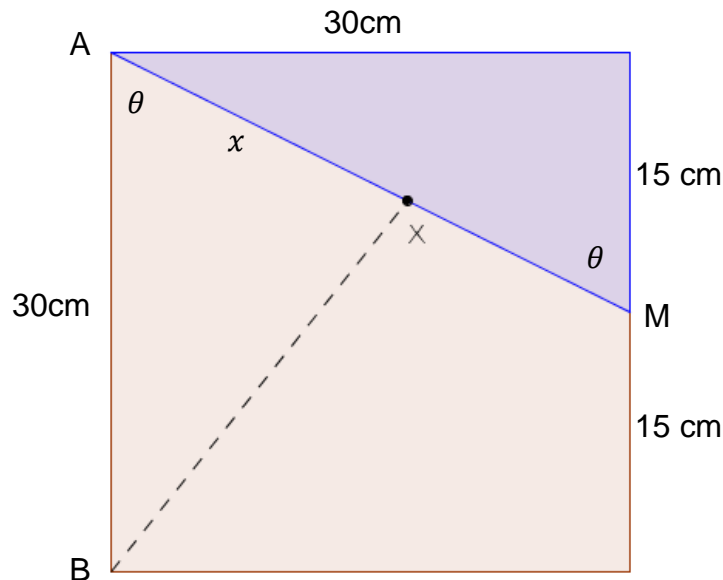


### Cube Slice

This is a challenging task

There are a number of possible approaches. This is just one of them.

The trick is to realise that it is only necessary to divide the area of the top surface into two equal sections.



$$\text{Area of trapezium} = (30 \times 30) - \left(\frac{1}{2} \times 30 \times 15\right) = 900 - 225 = 675 \text{ cm}^2$$

$$\text{Area of triangle ABX} = 675 \div 2 = 337.5$$

$$\text{Area of a triangle} = \frac{1}{2} ab \sin C$$

The right angled triangle that was initially removed can be used to find  $\sin \theta$

$$\text{hypotenuse} = \sqrt{15^2 + 30^2} = 15\sqrt{5}$$

$$\text{so } \sin \theta = \frac{30}{15\sqrt{5}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

Using the formula  $\frac{1}{2} ab \sin C$ , the area of triangle ABX could also be written as  $\frac{1}{2} \times 30 \times x \times \sin \theta$

$$\text{which simplifies to } 15x \times \frac{2\sqrt{5}}{5} = 6\sqrt{5} x$$

$$\text{so } 6\sqrt{5} x = 337.5 \text{ giving } x = \frac{45\sqrt{5}}{4} \text{ cm or } x = 25.2 \text{ cm to 3 s.f.}$$

So the cut should go from corner B to a point that is 25.2 cm along the line AM