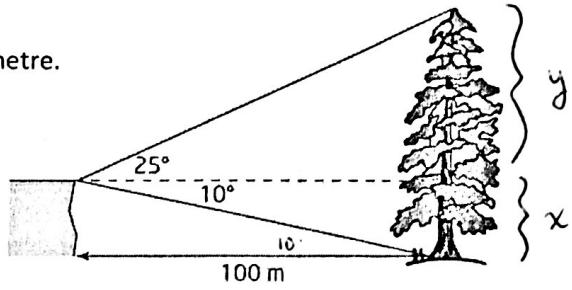
Problem Solving With SOHCAHTOA | MPM2D

Try 1 and 2 with your seat partners. We will go through 3 together.

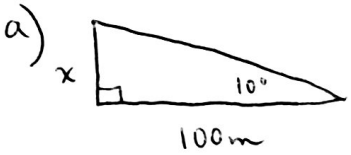
1) From a rock ledge, the angle of elevation to the top of a tree is 25°. The angle of depression to the bottom of the tree is 10°.

a) Find the height of the rock ledge to the nearest tenth of a metre.

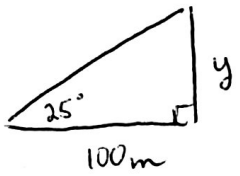
b) Find the height of the tree to the nearest tenth of a metre.



a)



b)



$\tan 10° = \frac{x}{100}$

$x = 100 \tan 10°$

$x = 17.6\text{m}$

$\tan 25° = \frac{y}{100}$

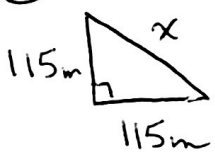
$y = 100 \tan 25°$

$y = 46.6\text{m}$

The rock face is 17.6m high. The tree is $17.6 + 46.6 = 64.2$m high.

2) The Great Pyramid of Cheops is a square-based pyramid with a height of 147 m and a base length of 230 m. Find the angle, to the nearest degree, that one of the edges of the pyramid makes with the base.

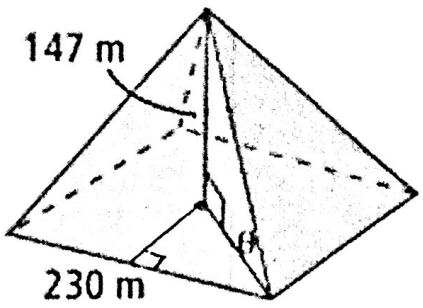
(1)



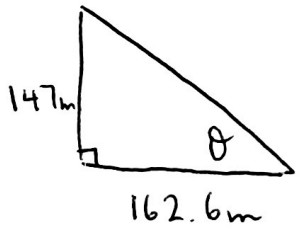
$x^2 = 115^2 + 115^2$

$x^2 = 26,450$

$x = 162.6\text{m}$



(2)



$\tan\theta = \frac{147}{162.6}$

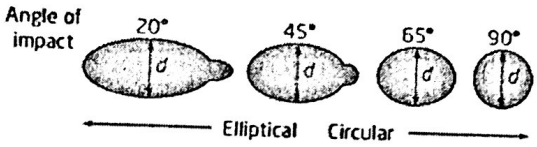
$\tan\theta = 0.9041$

$\theta = \tan^{-1}(0.9041)$

$\theta = 42.1°$

Problem Solving With SOHCAHTOA | MPM2D

3) Forensic scientists can recreate an accident or crime by examining bloodstains. A blood droplet starts out in the shape of a sphere. When it falls straight down to the floor, it usually forms a circle with the same diameter as the sphere. However, when blood hits the floor at an angle, due to the force of a blow, the circle becomes elongated into a shape called an ellipse. The ellipse's width is the same as the sphere's diameter, but because of the force in the direction of motion, its length is greater than the sphere's diameter.

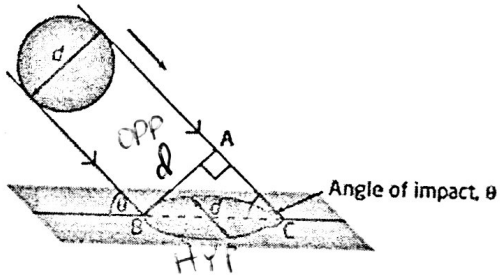


The angle of impact, θ, is the acute angle formed between the path of the blood drop and the floor.

a) Use geometric reasoning to show that the angle of impact can be found using the relationship $sin\theta = \frac{d}{BC}$.

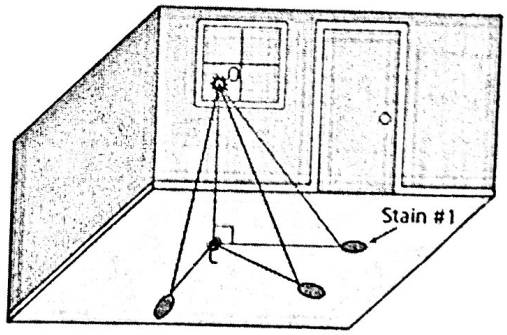
$\sin\theta = \frac{opp}{hyp}$

$\sin\theta = \frac{d}{BC}$



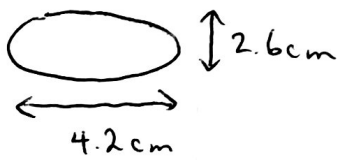
b) Three bloodstains from a victim are shown. The point of convergence, C, has been found by extrapolating the directions of these stains along the floor. The origin of the blow, O, is some height above C. Forensic analysis of Stain #1 provides the following data:

Length of bloodstain:	4.2 cm
Width of bloodstain:	2.6 cm
Distance from point of convergence	2.1 m



Determine the height at which the blow struck the victim.

(1)



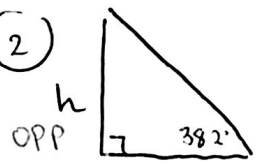
$\sin\theta = \frac{d}{BC}$

$= \frac{2.6}{4.2}$

$= 0.6190$

$\theta = 38.2°$

(2)



~~OPP~~ ADJ

$\tan 38.2° = \frac{h}{2.1}$

$h = 2.1 \tan 38.2°$

$h = 1.65m$

They were struck 1.65m high