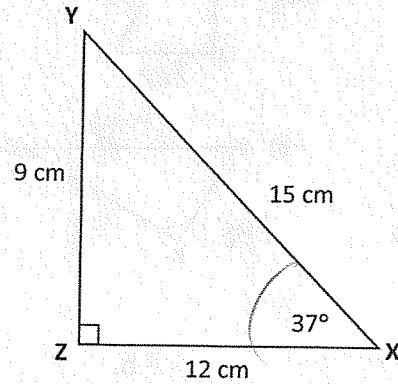
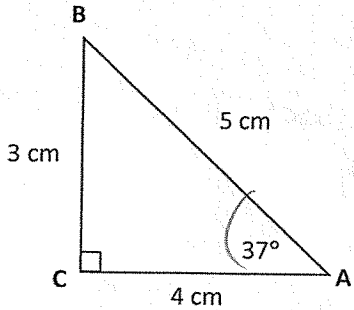


Investigation:

Complete the table below using the triangles provided. Round answers to one decimal place.

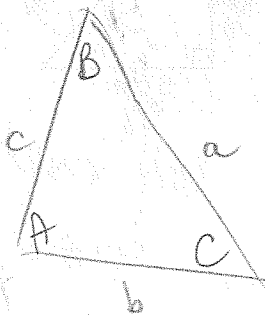


Triangle	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\sin A$	$\frac{\text{adjacent}}{\text{hypotenuse}}$	$\cos A$	$\frac{\text{opposite}}{\text{adjacent}}$	$\tan A$
$\triangle ABC$	$\frac{3}{5} = 0.6$	$\sin 37^\circ = 0.6018$	$\frac{4}{5} = 0.8$	$\cos 37^\circ = 0.7986$	$\frac{3}{4} = 0.75$	$\tan 37^\circ = 0.7535$
$\triangle XYZ$	$\frac{9}{15} = 0.6$		$\frac{12}{15} = 0.8$		$\frac{9}{12} = 0.75$	

1. What do you notice about the ratios of lengths of sides and the trigonometric ratios in both triangles?

- size of \triangle doesn't affect ratios
- trig ratio of angle gives similar output (not exact since angle is rounded)

2. Ways to label triangle angles and sides. Small case vs capitals.

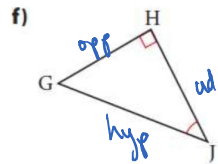
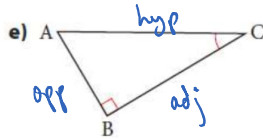
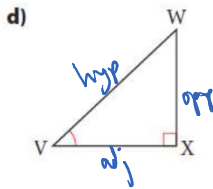
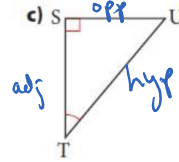
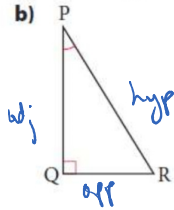
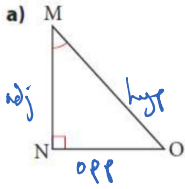


- Angles \rightarrow use capital letters or θ (all angles)
- \rightarrow record inside \triangle corner
 - \rightarrow record after $\sin/\cos/\tan$ in equation
 - \rightarrow round to whole #.

- Sides \rightarrow use small case letter (across from corresp. angle)
- \rightarrow record outside \triangle , between corners
 - \rightarrow record in fraction in eqn
 - \rightarrow round to tenth.

DAY 2 - Primary Trig Ratios – SOH CAH TOA – solving for sides

1. Practice labelling triangles using side names: opposite, adjacent, hypotenuse.



MAKE SURE your calculator is in DEGREE mode!

2. Use a scientific calculator to find each value to four decimal places.

a) $\sin 65^\circ = 0.9063$

b) $\sin 48^\circ = 0.7431$

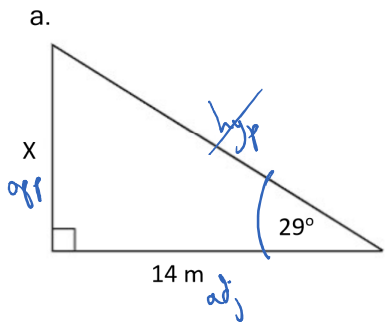
c) $\cos 35^\circ = 0.8192$

d) $\cos 58^\circ = 0.5299$

e) $\tan 75^\circ = 3.7321$

f) $\tan 39^\circ = 0.8098$

3. Solve for side x



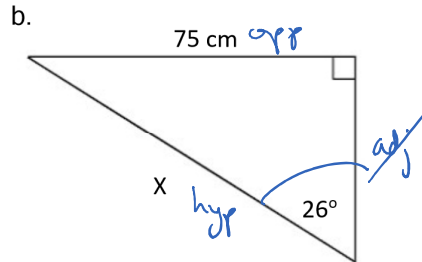
~~SOH CAH TOA~~

$$\tan 29^\circ = \frac{x}{14}$$

$$(\tan 29)(14) = x$$

$$(0.5543)(14) = x$$

$$7.8 \text{ m} = x$$



~~SOH CAH TOA~~

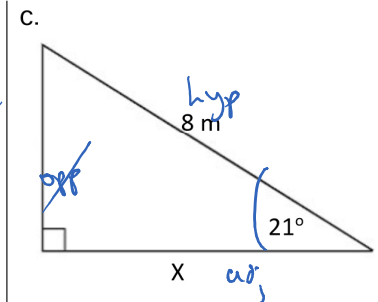
$$\sin 26^\circ = \frac{75}{x}$$

$$(\sin 26^\circ)(x) = 75$$

$$x = \frac{75}{\sin 26^\circ}$$

$$x = \frac{75}{0.4384}$$

$$x = 171.1 \text{ cm}$$



~~SOH CAH TOA~~

$$\cos 21^\circ = \frac{x}{8}$$

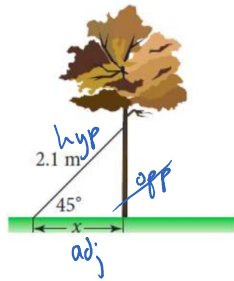
$$(\cos 21^\circ)(8) = x$$

$$(0.9336)(8) = x$$

$$7.5 \text{ m} = x$$

4.

Hannah wants to make a lean-to shelter against a tree. She starts with a plank that is 2.1 m long. If she wants to have a 45° angle between the ground and the lower end of the plank, how far away from the base of the tree should the lower end of the lean-to be?



$$\cos 45^\circ = \frac{x}{2.1}$$

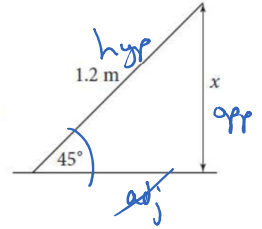
$$(\cos 45^\circ)(2.1) = x$$

$$1.5 = x$$

∴ lean to should be 1.5 m away from the tree

5.

Jeff will use right triangles in his design for the elevator to take resort guests down the cliff. He plans to have an angle of 45°, and a diagonal length of 1.2 m. How long will the vertical piece for this part of the elevator be?



$$\sin 45^\circ = \frac{x}{1.2}$$

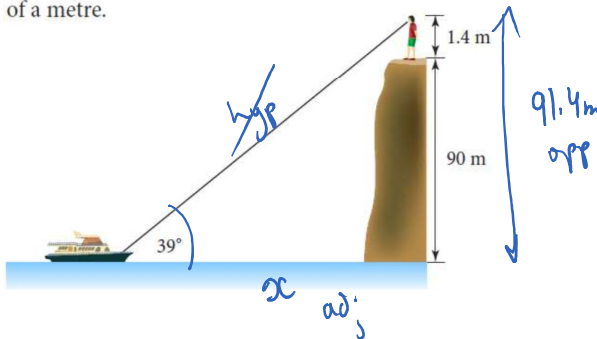
$$(\sin 45^\circ)(1.2) = x$$

$$0.8 = x$$

∴ vertical piece should be 0.8 m long.

6.

The Cathedral Bluffs in Toronto, Ontario, are eroded sandstone cliffs that rise 90 m above Lake Ontario. Natalie is 1.4 m tall. From her position at the top of the cliffs, the angle between the surface of the lake and her line of sight to a boat is 39°. Find the distance between the boat and the base of the cliffs to the nearest tenth of a metre.



$$\tan 39^\circ = \frac{91.4}{x}$$

$$(\tan 39^\circ)(x) = 91.4$$

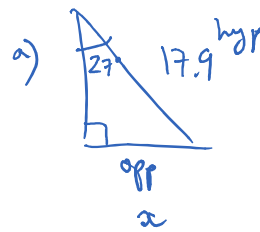
$$x = \frac{91.4}{\tan 39^\circ}$$

$x = 112.9$ ∴ boat is 112.9 m away from cliff.

7.

The hypotenuse of a right triangle is 17.9 cm long.

- How long is the side opposite an angle that measures 27°, to the nearest tenth of a centimetre?
- What is the measure of the third angle in this triangle?



$$\sin 27^\circ = \frac{x}{17.9}$$

$$(\sin 27^\circ)(17.9) = x$$

$8.1 \text{ cm} = x$
∴ opposite side should be 8.1 cm long

- All angles in Δ add to 180°
 $180^\circ - 90^\circ - 27^\circ = 63^\circ$
 ∴ 3rd angle is 63°