* calc. in DEGREE mode!

FOM 10

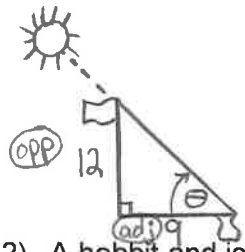
SOHCAHTOA

Name: KEY

8.4 Word Problems Using Right Triangle Trig

Draw pictures! Round all answers to the **nearest tenth.**

1) A 12 meter flagpole casts a 9 meter shadow. Find the angle of elevation of the sun.



TOA, so use tan!

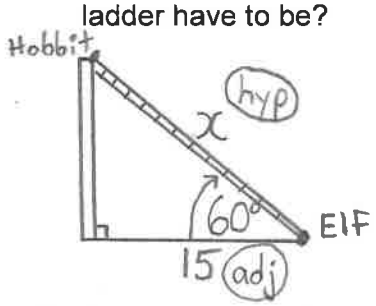
$\tan\theta = \frac{12}{9}$

$\angle\theta = \tan^{-1}\left(\frac{12}{9}\right)$

$\angle\theta = 53.1°$

The angle of elevation is 53.1°

2) A hobbit and is being held captive in a tower. His friend the elf is on the ground below with a ladder. When the elf friend stands 15 feet from the base of the tower and looks up at the hobbit, the angle of elevation to his window is 60 degrees. How long does the ladder have to be?



CAH, so use cos!

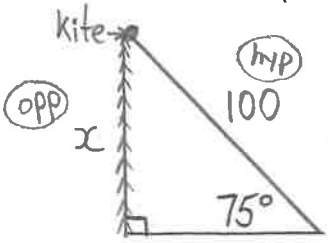
$\cos 60° = \frac{15}{x}$

$x = \frac{15}{\cos 60°}$

$x = 30$ ft

The ladder has to be 30 feet long

3) Suppose you're flying a kite, and it gets caught at the **top** of the tree. You've let out all 100 feet of string for the kite, and the angle that the string makes with the ground is 75 degrees. Instead of worrying about how to get your kite back, you wonder: "How tall is that tree?" *(Find the height of the tree!)*



SOH, so use sin!

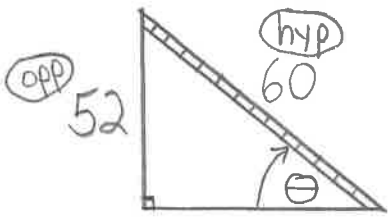
$(\sin 75°) = \left(\frac{x}{100}\right)$ $\times 100$ $\times 100$

$x = (\sin 75°) \times 100$

$x = 96.6$ ft

The height of the tree is 96.6 feet

4) A fire department's longest ladder is 60 metres long, and the safety regulation states that they can use it for rescues up to 52 metres off the ground. What is the maximum safe angle of elevation for the rescue ladder?



SOH, so use sin!

$\sin\theta = \frac{52}{60}$

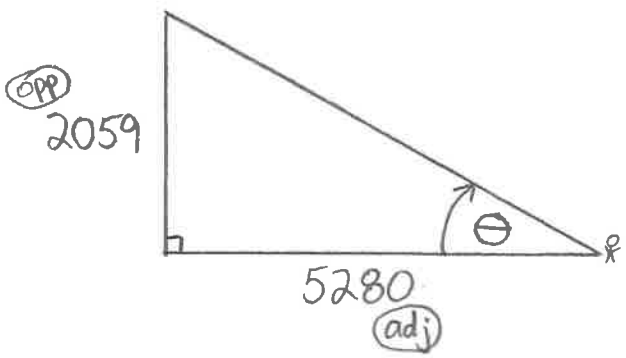
$\angle\theta = \sin^{-1}\left(\frac{52}{60}\right)$

$\angle\theta = 60.1°$

The max. safe angle of elevation is 60.1°

TURN OVER!

5) The tallest television transmitting tower in the world is in North Dakota, and it is 2059 feet tall. If you are on level ground exactly 5280 feet (one mile) from the Base of the tower, what is your angle of elevation looking up at the top of the tower?



TOA, so use tan!

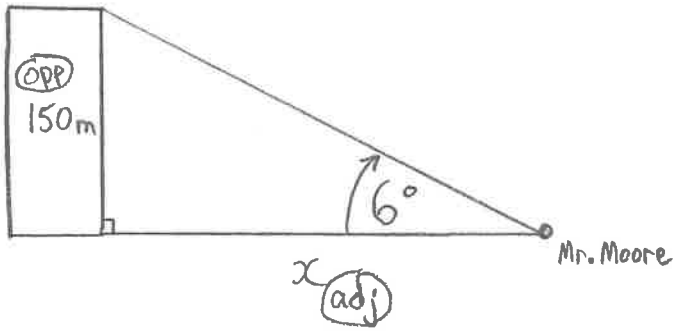
$\tan\theta = \frac{2059}{5280}$

$\angle\theta = \tan^{-1}\left(\frac{2059}{5280}\right)$

$\angle\theta = 21.3°$

The angle of elevation is 21.3°

6) Mr. Moore is walking to his office building which he knows is 150m high. The **angle of elevation** to the top of the building from his current location is 6°. How much further does he need to walk to get to his office building?



TOA, so use Tan!

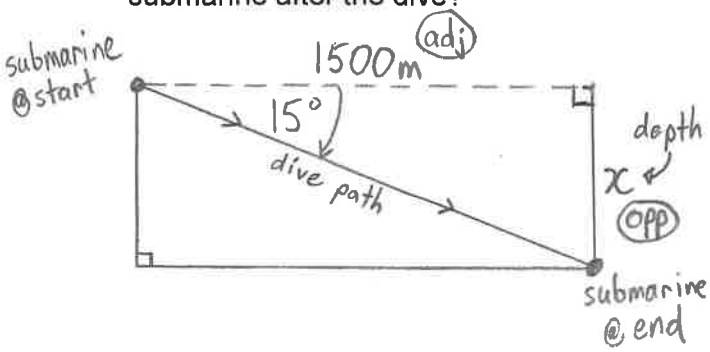
$\tan 6° = \frac{150}{x}$

$x = \frac{150}{\tan 6°}$

$x = 1427.2\text{m}$

Mr. Moore needs to walk 1427.2m to his office.

7) A submarine traveling at the water surface dives at an **angle of depression** of 15º. It travels a horizontal distance of 1500 metres during the dive. What is the depth of the submarine after the dive?



TOA, so use tan!

$(\tan 15°) = \left(\frac{x}{1500}\right) \times 1500$

$x = (\tan 15°) \times 1500$

$x = 401.9\text{ m}$

The depth of the submarine after the dive is 401.9m