

## Trig Word Problems

Use a trig table to evaluate.

**EXAMPLE**

Approximately how long is the building's shadow (round to the nearest tenth)?



↑ shadow = adj =  $x$

Set up the trig ratio first...

H: ???, O: 120, A:  $x \rightarrow TOA!$

$$\tan(40^\circ) = \frac{120}{x}$$

$$x = \frac{120}{\tan(40^\circ)}$$

$$x = \frac{120}{0.8391}$$

$$x = 143.010 \dots$$

The shadow is 143.0 feet long.

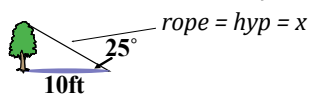
1. Approximately how long is the building's shadow (round to the nearest tenth)?



2. Approximately how long is the building's shadow (round to the nearest tenth)?

**EXAMPLE**

A rope is tied to the top of a tree and anchored to the ground 10 ft away. Approximately how long is the rope (round to the nearest tenth)?



rope = hyp =  $x$

H:  $x$ , O: ???, A: 10  $\rightarrow CAH!$

$$\cos(25^\circ) = \frac{10}{x}$$

$$x = \frac{10}{\cos(25^\circ)}$$

$$x = \frac{10}{0.9063}$$

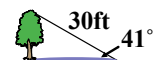
$$x = 11.0338 \dots$$

The rope is 11.0 feet long.

3. A rope is tied to the top of a 15-ft tree and anchored to the ground. Approximately how long is the rope (round to the nearest tenth)?



4. A rope is tied to the top of a tree and anchored to the ground 30 ft away. Approximately how tall is the tree (round to the nearest tenth)?

**EXAMPLE**

Approximately how long is the person's shadow (round to the nearest tenth)?



↑ shadow = adj =  $x$

H: ???, O: 5.2, A:  $x \rightarrow TOA!$

$$\tan(20^\circ) = \frac{5.2}{x}$$

$$x = \frac{5.2}{\tan(20^\circ)}$$

$$x = \frac{5.2}{0.3640}$$

$$x = 14.285 \dots$$

The shadow is 14.3 feet long.

5. Approximately how long is the person's shadow (round to the nearest tenth)?

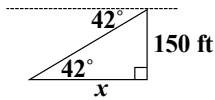


6. Approximately how long is the person's shadow (round to the nearest tenth)?



**EXAMPLE**

A ranger spots a fire from the top of a watchtower that is 150 ft tall. If the angle of depression from the top of the watchtower to the fire is  $42^\circ$ , what is the horizontal distance between them? Round to the nearest foot.



H: ???, O: 150, A:  $x \rightarrow$  TOA!

$$\tan(42^\circ) = \frac{150}{x}$$

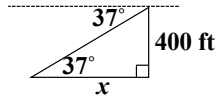
$$x = \frac{150}{\tan(42^\circ)}$$

$$x = \frac{150}{0.9004}$$

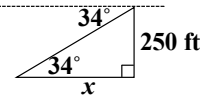
$$x = 166.592 \dots$$

The shadow is 167 feet long.

7. A ranger spots a fire from the top of a watchtower that is 400 ft tall. If the angle of depression from the top of the watchtower to the fire is  $37^\circ$ , what is the horizontal distance between them? Round to the nearest foot.

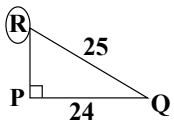


8. A ranger spots a fire from the top of a watchtower that is 250 ft tall. If the angle of depression from the top of the watchtower to the fire is  $34^\circ$ , what is the horizontal distance between them? Round to the nearest foot.

**EXAMPLE**

In a triangle where  $P$  is a right angle,  $PQ = 24$ , and  $QR = 25$ . Determine  $\cos R$  to the nearest hundredth.

First, draw it out. It doesn't matter what it looks like, so long as it's labeled correctly:



*labeled correctly:*  
 $P$  is a  $90^\circ$  angle,  
and the other two angles are  $Q$  &  $R$ .

H: 25, O: 24, A: ???

Normally, I'd say, "use SOH," but the problem asks for  $\cos R$ , which means I need *adj* and *hyp*.

Before I start, I'll use the **Pythagorean Theorem** to find *adj*.

$$a^2 + b^2 = c^2$$

$$a^2 + 576 = 625$$

$$a^2 = 49$$

$$\sqrt{a^2} = \sqrt{49}$$

$$a = 7$$

H: 25, O: 24, A: 7  $\rightarrow$  find  $\cos R$ .

$$\cos R = \frac{\text{adj}}{\text{hyp}}$$

$$\cos R = \frac{7}{25}$$

$$\cos R = \boxed{0.28}$$

The problem asked for what  $\cos R$  equals. You found it. Stop.

9. In a triangle where  $M$  is a right angle,  $LM = 5$ , and  $LN = 13$ . Determine  $\tan N$  to the nearest hundredth.

10. In a triangle where  $F$  is a right angle,  $DF = 6$ , and  $EF = 8$ . Determine  $\sin D$  to the nearest hundredth.