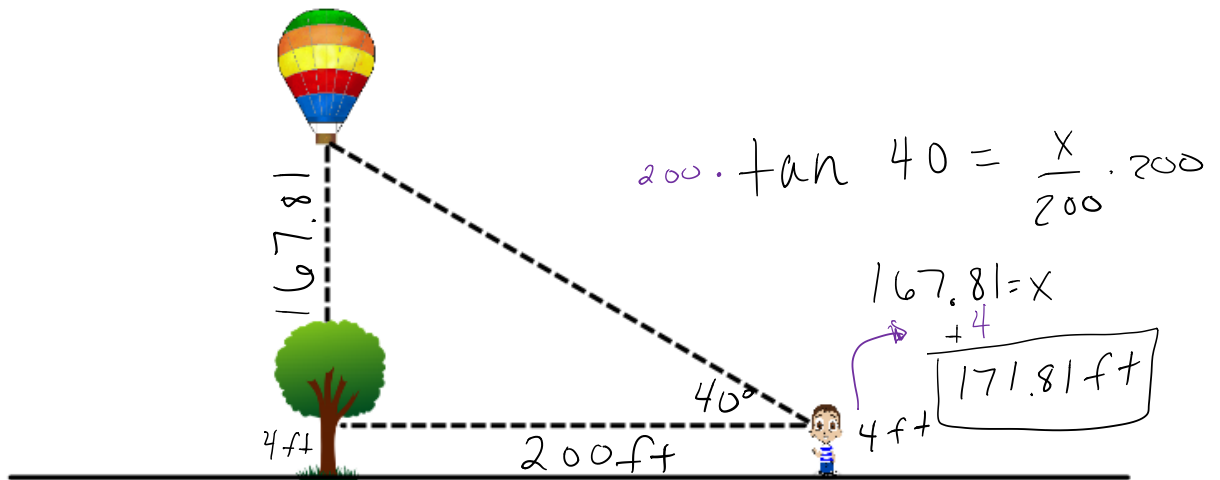# 8.5 Angles of Elevation and Depression
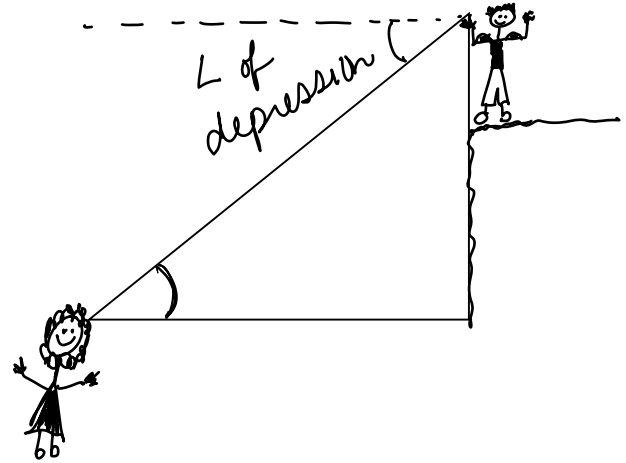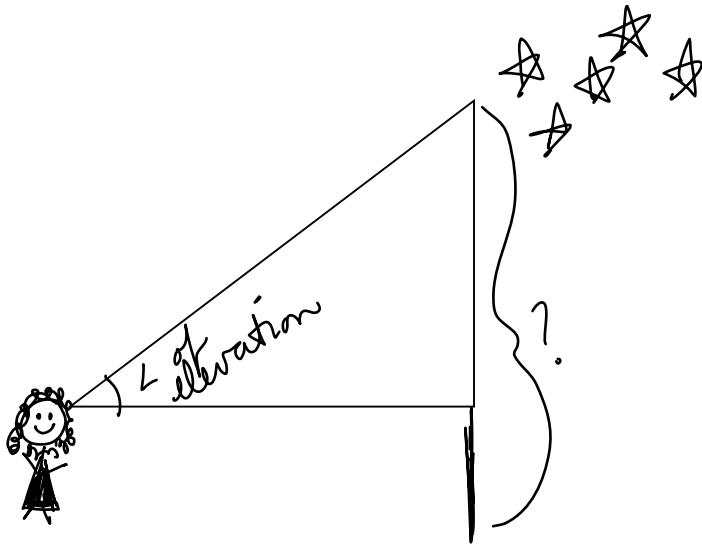
Goals Aligned to Common Core State Standards:

- **You will solve problems involving angles of elevation and depression.**
- **You will use the angles of elevation and depression to find the distance between two objects.**
- **MP 1, 4, 5**

$200 \cdot \tan 40 = \dfrac{X}{200} \cdot 200$
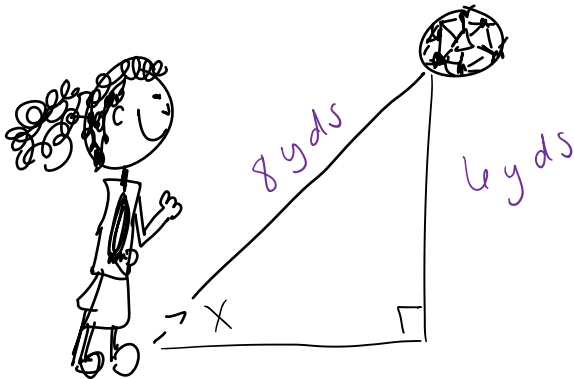
$167.81 = X$

$+4$

$\boxed{171.81 \, ft}$

A little boy standing 200 feet away from a tree sees a hot air balloon hovering directly over the tree. The angle of elevation from the boy's eyes to the balloon is 40°. If the distance from the ground to the boy's eyes is 4 feet, how far above the ground is the hot air balloon?

Can we use trigonometry to solve this problem?

∠ elevation
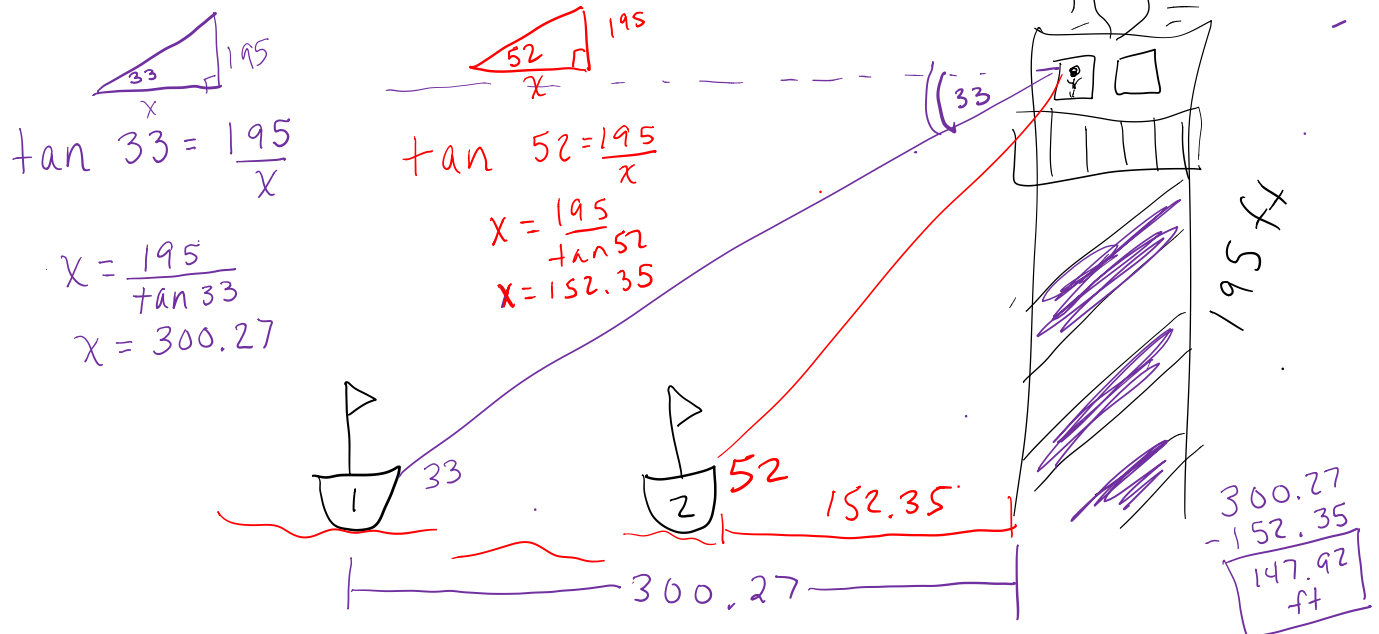
∠ of depression

?

Ex. 1 Mrs. McMahan kicks a soccer ball. When the ball traveled 8 yards, the ball is 6 yards high. What is the angle of elevation?

8 yds

6 yds

x

$$\sin x = \frac{6}{8}$$

$$\sin^{-1}\left(\frac{6}{8}\right) = 48.6°$$

Ex. 2 Hannah is in a lighthouse that is 195ft tall. She observes two sailboats due east of the lighthouse. The angles of depression to the two boats are 33° and 52°. What is the distance between the sailboats?

$$\tan 33 = \frac{195}{x}$$

$$x = \frac{195}{\tan 33}$$

$$x = 300.27$$

$$\tan 52 = \frac{195}{x}$$

$$x = \frac{195}{\tan 52}$$

$$x = 152.35$$

$$\begin{array}{r} 300.27 \\ -152.35 \\ \hline 147.92 \\ ft \end{array}$$

Goals Aligned to Common Core State Standards:

- *You will solve problems involving angles of elevation and depression.*
- *You will use the angles of elevation and depression to find the distance between two objects.*

Homework: 8.5 wkst

Why do Irish people hate trig?

They can't TAN

Why do Catholics hate trig?

They can't SIN

Why does everyone else hate trig?

Just COS