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ANGLES OF  
ELEVATION AND  
DEPRESSION

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8-4

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TO USE ANGLES OF  
ELEVATION AND DEPRESSION  
TO SOLVE PROBLEMS

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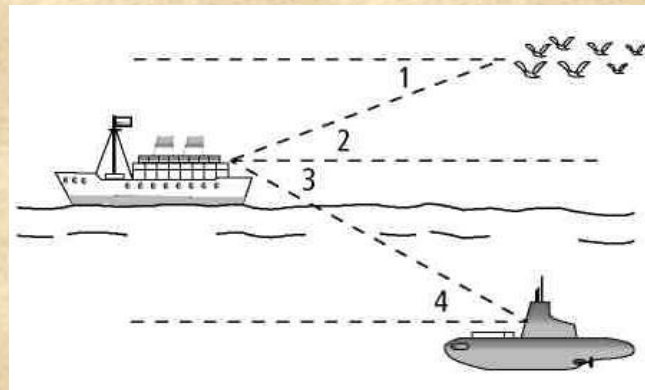
OBJECTIVE



# VOCABULARY

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Angle of Elevation – angle formed by a horizontal line and the line of sight to something above the horizontal line



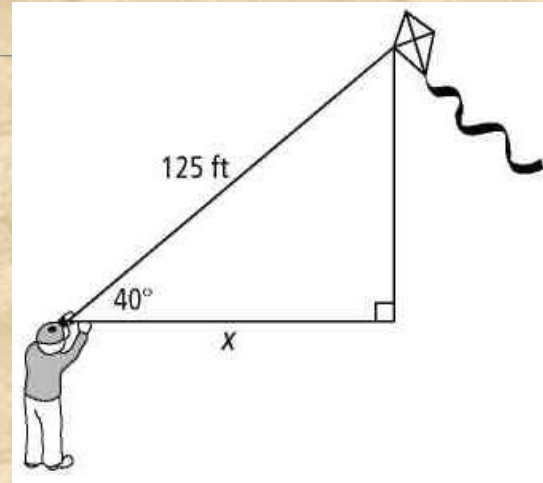
Angle of Depression – angle formed by a horizontal line and the line of sight to something below the horizontal line

The angles of elevation and depression between the same objects are congruent (alternate interior angles).

# CLASS WORK

Find the value of  $x$ .  
Round to the nearest tenth of a unit.

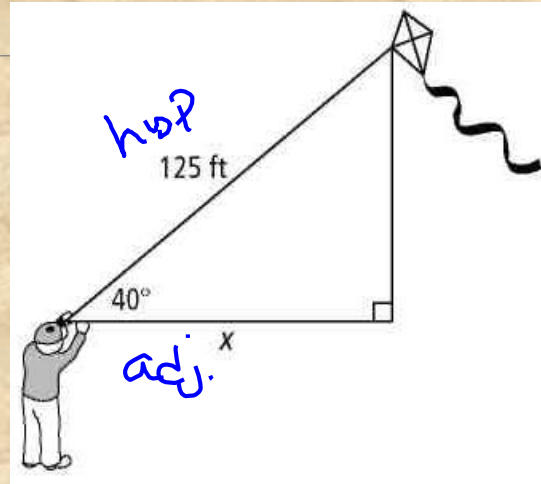
1.



# CLASS WORK

Find the value of  $x$ .  
Round to the nearest tenth of a unit.

1.



$$\cos 40 = \frac{x}{125}$$

$$x = 125 (\cos 40) = 95.8 \text{ ft}$$

# CLASS WORK

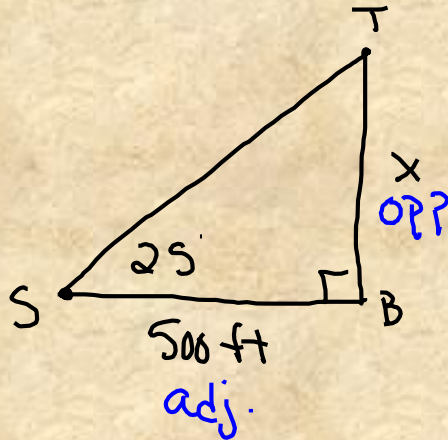
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2. A spectator looks up at an angle of  $25^\circ$  to the top of a building 500 feet away. How tall is the building?

# CLASS WORK

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$$\tan 25 = \frac{x}{500}$$

$$x = 500(\tan 25)$$

$$x = 233 \text{ ft.}$$

# CLASS WORK

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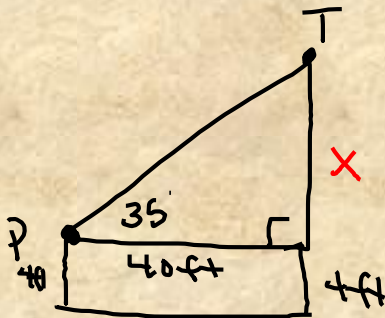
3. A person is standing 40 ft from a flagpole and can see the top of the pole at a  $35^\circ$  angle of elevation. The person's eye level is 4 ft from the ground. What is the height of the flagpole to the nearest foot?



# CLASS WORK

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$$\tan 35 = \frac{x}{40}$$

$$x = 40(\tan 35) = 28$$

$$\text{height} = \begin{array}{r} 28 \\ +4 \\ \hline 32 \text{ ft} \end{array}$$

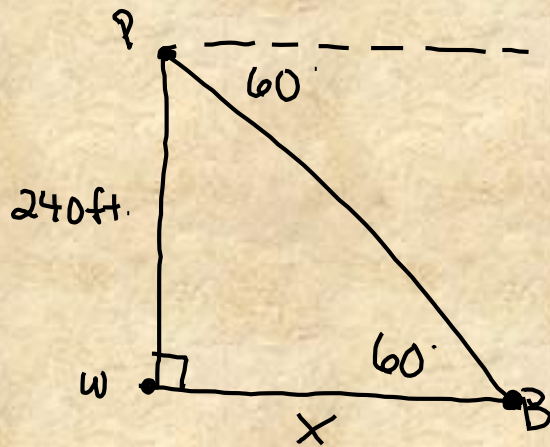
# CLASS WORK

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4. A worker looks down from the top of a bridge 240 feet above a river at a barge. The angle of depression is  $60^\circ$ . How far is the barge from the base of the bridge?

# CLASS WORK

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$$\tan 60 = \frac{240}{x}$$

$$x = \frac{240}{\tan 60} = 139 \text{ ft}$$

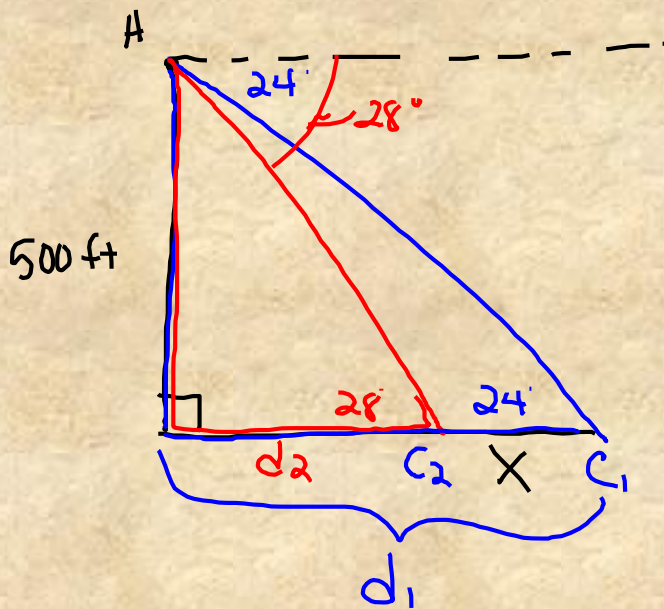
# CLASS WORK

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5. A helicopter pilot hovers 500 feet above a straight and flat road. The pilot looks down at two cars using  $24^\circ$  and  $28^\circ$  as angles of depression. How far apart are the cars? Show your work.

# CLASS WORK

5. A helicopter pilot hovers 500 feet above a straight and flat road. The pilot looks down at two cars using  $24^\circ$  and  $28^\circ$  as angles of depression. How far apart are the cars? Show your work.



$$\tan 24 = \frac{500}{d_1} \quad d_1 = \frac{500}{\tan 24} = 1123 \text{ ft}$$

$$\tan 28 = \frac{500}{d_2} \quad d_2 = \frac{500}{\tan 28} = 940 \text{ ft}$$

$$X = d_1 - d_2 = 183 \text{ ft}$$

# HOMework

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10 – 24 EVEN; 28, 30

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