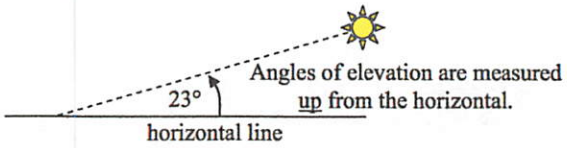
Notes Section 11.1B Name: _____

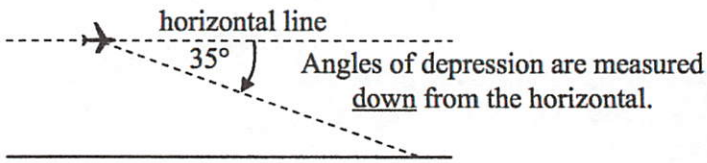
11.1B Special Triangles and Context Problems

I can use angles of elevation and depression to solve real world problems.
I can use special triangles to find side lengths
I know the trig values of 30°, 45°, and 60°

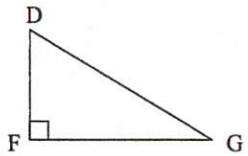
Angle of elevation:



Angle of depression:



Example 1: Consider right ΔDFG pictured at right. Classify each angle as an angle of elevation, an angle of depression, or neither.



Example 2: Michael, whose eyes are six feet off the ground, is standing 36 feet away from the base of a building, and he looks up at a 50° angle of elevation to a point on the edge of building's roof. To the nearest foot, how tall is the building?

Step 1:

Step 2:

Step 3:

Step 4:

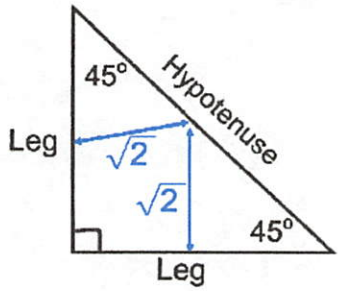
Step 5:

Example 3: A pilot is traveling at a height of 35,000 feet above level ground. According to her GPS, she is 40 miles away from the airport runway, as measured along the ground. At what angle of depression will she need to look down to spot the runway ahead?

Special Right Triangles: 45° - 45° - 90°

Hypotenuse = Leg * $\sqrt{2}$ $\sqrt{2}$

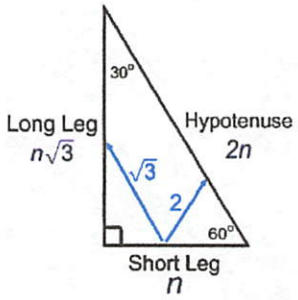
$$\text{Leg} = \frac{\text{hypotenuse}}{\sqrt{2}}$$



Special Right Triangles: 30° - 60° - 90°

Hypotenuse = 2 * Short Leg

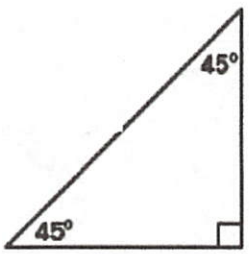
Long Leg = Short Leg * $\sqrt{3}$



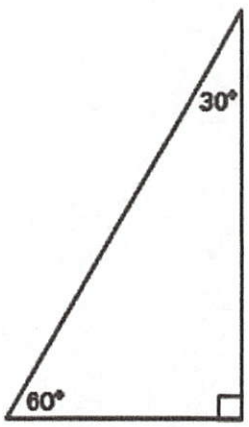
TRIGONOMETRIC VALUES FOR SPECIAL ANGLES

The table below gives the values of the six trigonometric functions for the angles 30°, 45°, and 60°. You can obtain these values from the triangles shown.

θ	sin θ	cos θ	tan θ
30°			
45°			
60°			



θ	csc θ	sec θ	cot θ
30°			
45°			
60°			



Notes Section 11.1B Name: _____

11.1B Special Triangles and Context Problems

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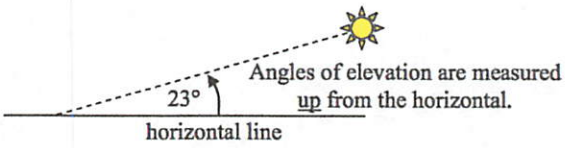
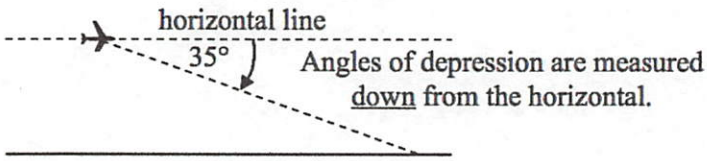
Angle of elevation:



Angle of depression:



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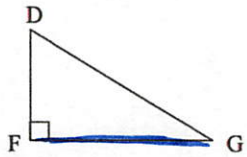


∠G angle of elevation
∠D and ∠F neither

mark horizontal!!

Example 2: Michael, whose eyes are six feet off the ground, is standing 36 feet away from the base of a building, and he looks up at a 50° angle of elevation to a point on the edge of building's roof. To the nearest foot, how tall is the building?

Step 1: Draw a picture

Step 2: label the unknown variable (what am I solving for?)

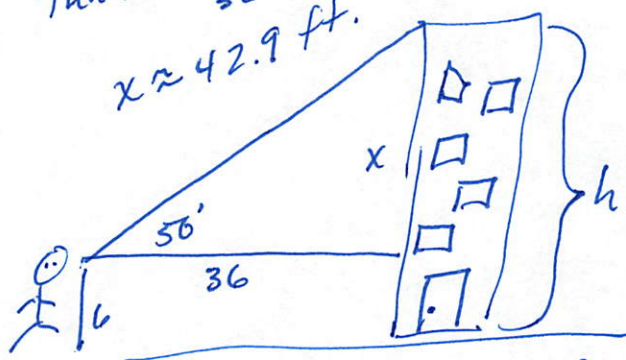
Step 3: Use Soh Cah Toa

Step 4: Write equation

Step 5: Solve / Check that it's a reasonable solution.

$\tan 50 = \frac{x}{36}$

$x \approx 42.9$ ft.



$h = 42.9 + 6 = 48.9$ ft

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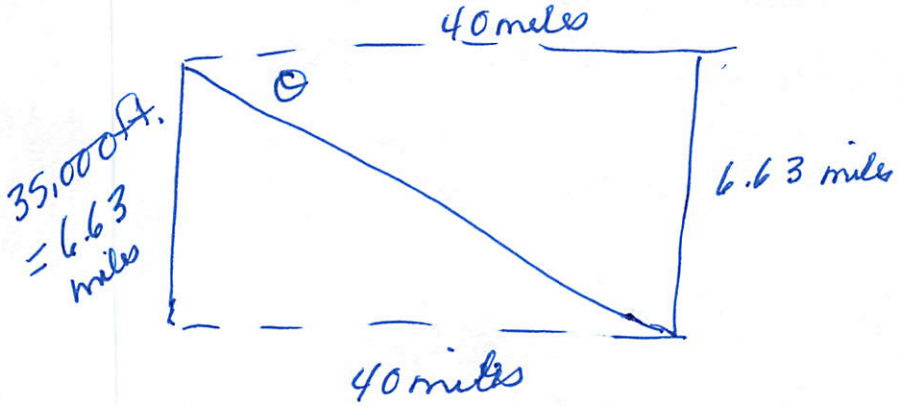
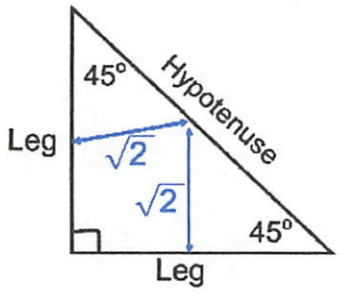


$\tan\theta = \frac{6.63}{40}$

$\theta \approx 9.4$ miles

Special Right Triangles: 45° - 45° - 90°

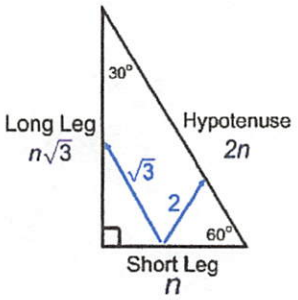


Hypotenuse = Leg * $\sqrt{2}$ $\sqrt{2}$

Leg = $\frac{\text{hypotenuse}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

Leg = $\frac{h\sqrt{2}}{2}$

Special Right Triangles: 30° - 60° - 90°



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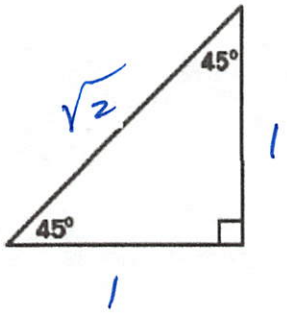

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