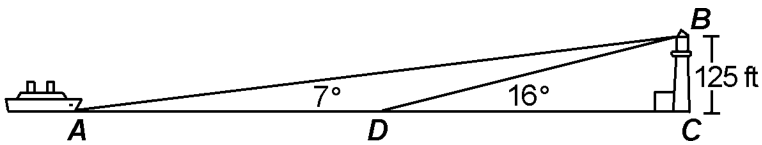
Name: ____

CC Geometry Honors

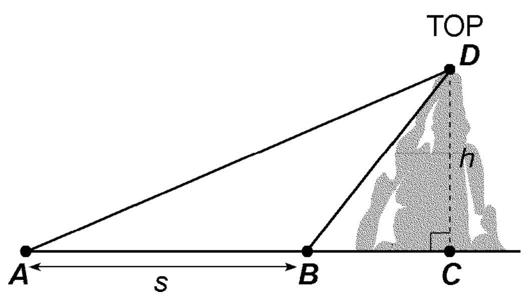
Solving Right Triangles Practice

1) As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point *A*, the angle of elevation from the ship to the light was $7°$. A short time later, at point *D*, the angle of elevation was $16°$.



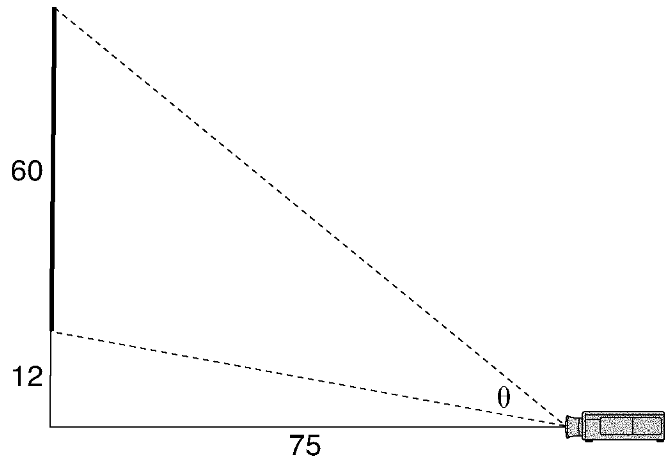
To the nearest foot, determine and state how far the ship traveled from point *A* to point *D*. [*Show all work*.]

2) A ship at sea heads directly toward a cliff on the shoreline. The accompanying diagram shows the top of the cliff, *D*, sighted from two locations, *A* and *B*, separated by distance *s*. [*Show all work*.]



If $m\angle DAC = 30°$, $m\angle DBC = 45°$, and $s = 30$ feet, what is the height of the cliff to the nearest foot? [*Show all work*.]

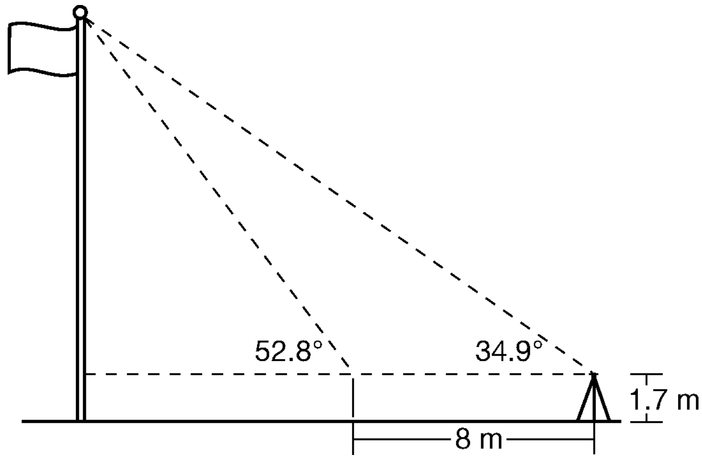
3) As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.



Determine and state, to the nearest tenth of a degree, the measure of θ, the projection angle. [*Show all work.*]

4) From two points 250 yards apart on a horizontal straight road running directly toward the launch pad, the angles of elevation to the top of a rocket measure $44°$ and $28°$. Find the height of the rocket to the nearest yard.

5) Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be $34.9°$. She walks 8 meters closer and determines the new measure of the angle of elevation to be $52.8°$. At each measurement, the survey instrument is 1.7 meters above the ground.



Determine and state, to the nearest tenth of a meter, the height of the flagpole. [*Show all work*.]

1) 582 ft

WORK SHOWN: $\tan = \frac{\text{opp}}{\text{adj}}$; $\tan 7 = \frac{125}{AC}$, $AC = \frac{125}{\tan 7} = 1018.043304$;

$\tan 16 = \frac{125}{DC}$, $DC = \frac{125}{\tan 16} = 435.9268055$; $AD = AC - DC = 582.116498 \approx 582$

2) 41 feet

WORK SHOWN: $m\angle ADB = 180 - 30 - (180 - 45) = 15°$; $\frac{a}{\sin A} = \frac{s}{\sin D}$, $\frac{a}{\sin 30°} = \frac{30}{\sin 15°}$, $a = \frac{30 \cdot \sin 30°}{\sin 15°} = 57.956$;
$h = a \cdot \sin 45° = 57.956 \cdot \sin 45° = 40.981 \approx 41$

3) 34.7°

WORK SHOWN: $\tan x = \frac{12}{75}$, $x = \tan^{-1}(\frac{12}{75})$, $x = 9.090276921$; $\tan y = \frac{60 + 12}{75}$, $y = \tan^{-1}(\frac{72}{75})$, $y = 43.83086067$; $\theta = y - x$,
$\theta = 43.83086067 - 9.090276921 = 34.7$

4) 296 yds.

5) 13.6 m

WORK SHOWN: $\tan 52.8 = \frac{y}{x}$, $y = x \tan 52.8$; $\tan 34.9 = \frac{y}{x + 8}$, $y = (x + 8) \tan 34.9$; $x \tan 52.8 = (x + 8) \tan 34.9$, $x \tan 52.5 =$
$x \tan 34.9 + 8 \tan 34.9$, $x \tan 52.5 - x \tan 34.9 = 8 \tan 34.9$, $x (\tan 52.5 - \tan 34.9) = 8 \tan 34.9$, $x = \frac{8 \tan 34.9}{(\tan 52.5 - \tan 34.9)}$, $x = 9.0037$;
$\tan 52.5 = \frac{y}{9.0037}$, $y = 9.0037 \tan 52.5$, $y = 11.8619$; height of flagpole (h) = $y + 1.7$, $h = 11.8619 + 1.7 = 13.56 \approx 13.6$