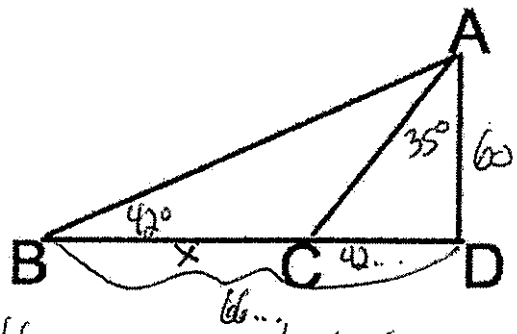
Name Schlansky
Mr. Schlansky

Date _____
Geometry

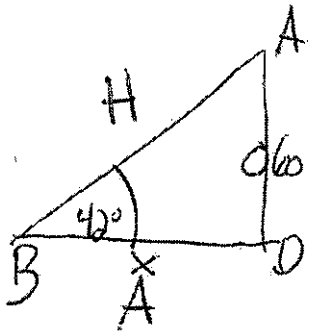
Compound Right Triangles (Subtraction)

1. In the diagram below, $m\angle CAD = 35$, $m\angle ABD = 42$, and $m\overline{AD} = 60$. Find to the nearest tenth, $m\overline{BC}$.

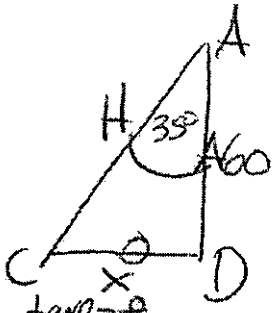


66...
−42..
246

$\frac{x\tan 42}{\tan 42} = \frac{60}{\tan 42}$
$x = 66...$



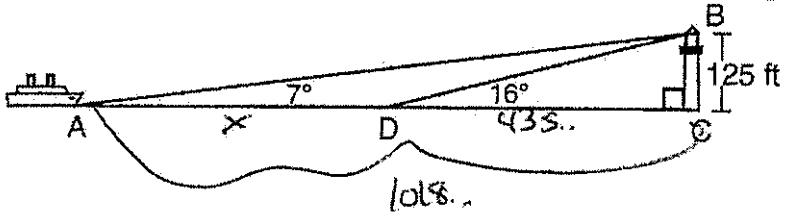
$\tan\theta = \frac{O}{A}$
$\frac{\tan 42}{1} = \frac{60}{x}$



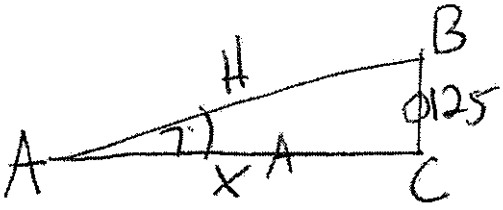
$\tan\theta = \frac{O}{A}$
$\tan 35 = \frac{x}{60}$
$x = 60\tan 35$
$x = 42...$

2. 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°.

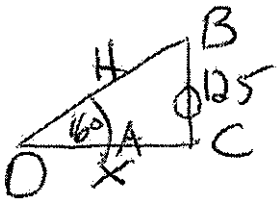
To the *nearest foot*, determine and state how far the ship traveled from point *A* to point *D*.



1018..
−435..
582

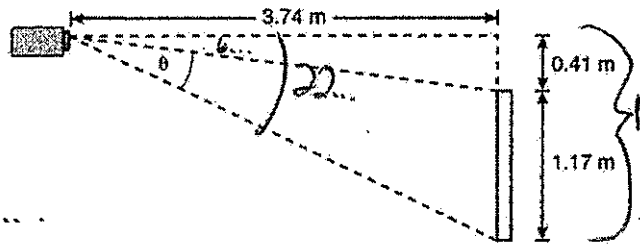


$\tan\theta = \frac{O}{A}$
$\tan 7 = \frac{125}{x}$
$\frac{x\tan 7}{\tan 7} = \frac{125}{\tan 7}$
$x = 1018..$

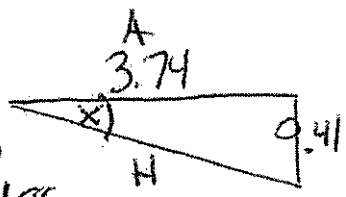


$\tan\theta = \frac{O}{A}$
$\tan 16 = \frac{125}{x}$
$\frac{x\tan 16}{\tan 16} = \frac{125}{\tan 16}$
$x = 435...$

3. As modeled below, a projector mounted on a ceiling is 3.74 m from a wall, where a whiteboard is displayed. The vertical distance from the ceiling to the top of the whiteboard is 0.41 m, and the height of the whiteboard is 1.17 m. Determine and state the projection angle, θ, to the *nearest tenth of a degree*.



22...
− 6...
16.6°

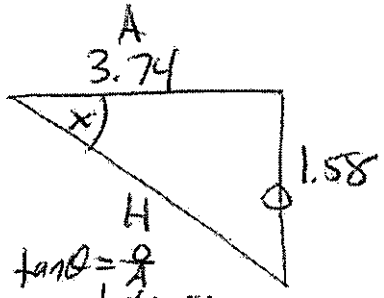


$\tan\theta = \frac{O}{A}$

$\tan^{-1}\tan x = \tan^{-1}\frac{.41}{3.74}$

$x = \tan^{-1}\left(\frac{.41}{3.74}\right)$

$x = 6...$



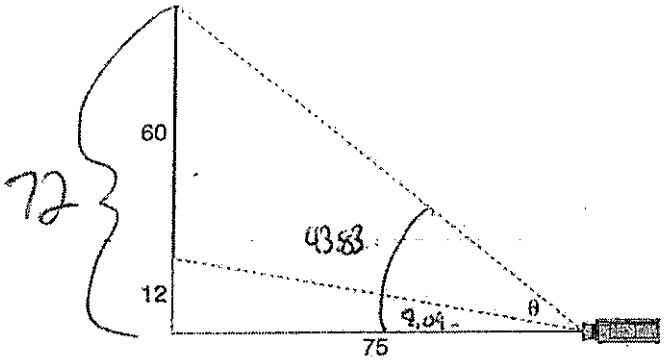
$\tan\theta = \frac{O}{A}$

$\tan^{-1}\tan x = \tan^{-1}\frac{1.58}{3.74}$

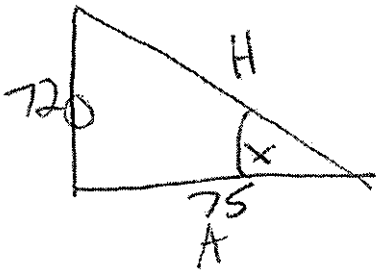
$x = \tan^{-1}\left(\frac{1.58}{3.74}\right)$

$x = 22...$

4. 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.



43.83...
− 9.09...
34.7°

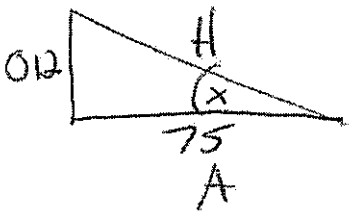


$\tan\theta = \frac{O}{A}$

$\tan^{-1}\tan x = \tan^{-1}\frac{72}{75}$

$x = \tan^{-1}\left(\frac{72}{75}\right)$

$x = 43.83...$



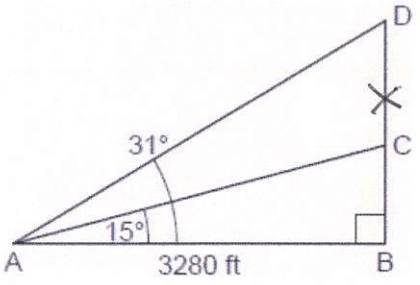
$\tan\theta = \frac{O}{A}$

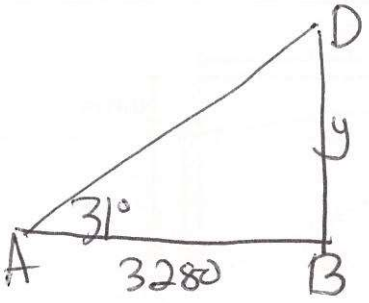
$\tan^{-1}\tan x = \tan^{-1}\frac{12}{75}$

$x = \tan^{-1}\left(\frac{12}{75}\right)$

$x = 9.09...$

5. Cape Canaveral, Florida is where NASA launches rockets into space. As modeled in the diagram below, a person views the launch of a rocket from observation area *A*, 3280 feet away from launch pad *B*. After launch, the rocket was sighted at *C* with an angle of elevation of 15°. The rocket was later sighted at *D* with an angle of elevation of 31°. Determine and state, to the *nearest foot*, the distance the rocket traveled between the two sightings, *C* and *D*.

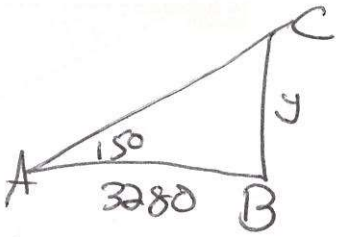




$\tan 31 = \frac{y}{3280}$

$y = 3280 \tan 31$

$y = 1970..$



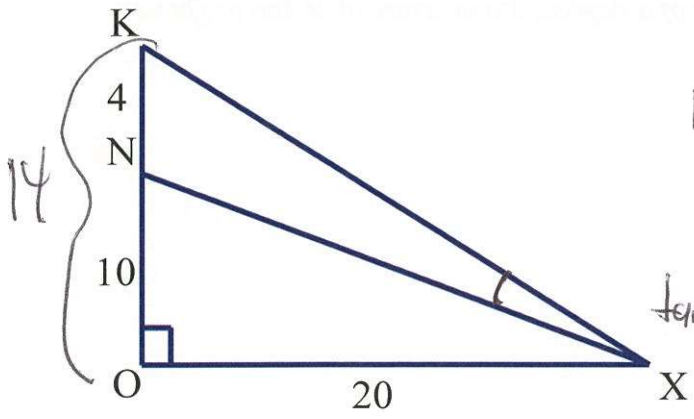
$\tan 15 = \frac{y}{3280}$

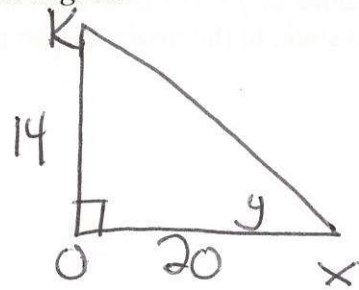
$y = 3280 \tan 15$

$y = 878..$

$1970.. - 878.. = 1092$

6. Find the measure of $\angle KXN$ below the *nearest degree*.



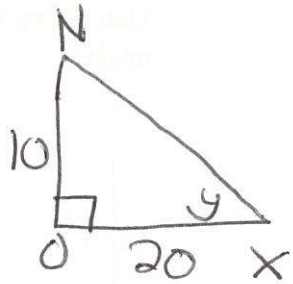


$\tan^{-1}$ $\tan^{-1}$

$\tan y = \frac{14}{20}$

$y = \tan^{-1} \frac{14}{20}$

$y = 34..$



$\tan^{-1}$ $\tan^{-1}$

$\tan y = \frac{10}{20}$

$y = \tan^{-1} \frac{10}{20}$

$y = 26..$

$34.. - 26.. = 8°$