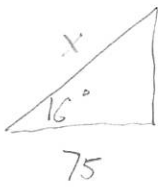
Trigonometric Word Problems Ad majorem Dei gloriam Accelerated Algebra 2 / Precalculus
Mr. Reis

Name KEY

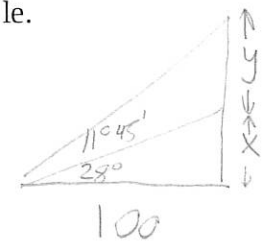
1. An electrician is running wire from the electric box on a house to a utility pole 75 feet away. The angle of elevation to the connection on the pole is 16 degrees . How much wire does the electrician need?



$\cos 16^\circ = \frac{75}{x}$

$x = \frac{75}{\cos 16} \approx$ **78.022 ft.**

2. From a point 100 feet in front of a public library, the angles of elevation to the base of the flagpole and the top of the flagpole are 28 degrees and 39 degrees, 45 minutes respectively. Find the height of the flagpole.



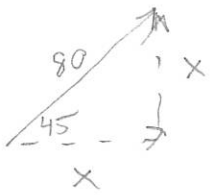
$\frac{x}{100} = \tan 28^\circ$ $\frac{x+y}{100} = \tan 39.75^\circ$

$x = 100 \tan 28$ $x + y = 100 \tan 39.75$

$y = 100 \tan 39.75 - 100 \tan 28$

$y \approx 29.998$ ft.

3. A ship leaves port at 8:00am and has a bearing of NE. The ship sails at 20 knots (or 20 nautical miles per hour). How many nautical miles north and how many nautical miles east does the ship travel by noon?



$x = \frac{80}{\sqrt{2}} = \frac{80\sqrt{2}}{2} =$ **$40\sqrt{2}$ nm.**

≈ 56.569 nm

4. Find the angle of depression from the top of a lighthouse 250 feet above water level to the water line of a ship 2 miles offshore.

$\tan \theta = \frac{250}{10560}$

$\theta = \tan^{-1}\left(\frac{250}{10560}\right)$

$\theta \approx 1.356^\circ$