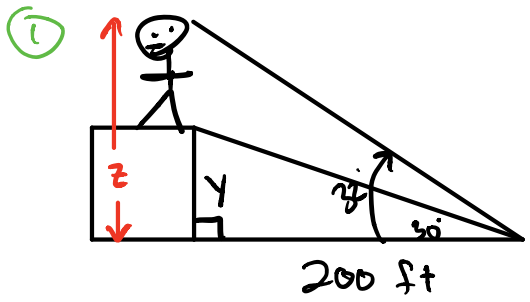
Trigonometry – Systems of Equations

G.SRT.C.8 Notes Section 9.4 Name_____

#1) A homeless giant is at the top of a building. 200 feet from the base of the building, the angle of elevation of the top of the hobo is 32° and the angle of elevation of the bottom of the hobo is 30°. Determine the height of the hobo (to the nearest foot).



2) $\tan(32^\circ) = \frac{z}{200}$

$200\tan(32^\circ) = z$

$124.97 \approx z$

3) $\tan(30^\circ) = \frac{y}{200}$

$200\tan(30^\circ) = y$

$115.47 \approx y$

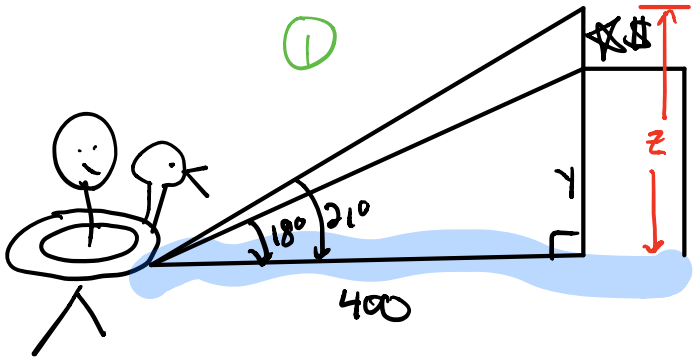
4) $man + y = z$

$man + 115.47 = 124.97$

$man = 9.5$

The hobo is about 9.5 feet tall.

#2) In a rubber ducky floaty 400 feet from the base of the Cliffs of Insanity, George sees the base of the Starbucks at 18° and the top of the Starbucks at 21°. How tall is the Starbucks (to the nearest foot)?



2) $\tan(18^\circ) = \frac{y}{400}$

$400\tan(18^\circ) = y$

$129.97 \approx y$

3) $\tan(21^\circ) = \frac{z}{400}$

$400\tan(21^\circ) = z$

$153.55 \approx z$

4) $\bigstar\$ + y = z$

$\bigstar\$ + 129.97 = 153.55$

$\bigstar\$ = 23.58$

The Starbucks is about 24 feet tall.

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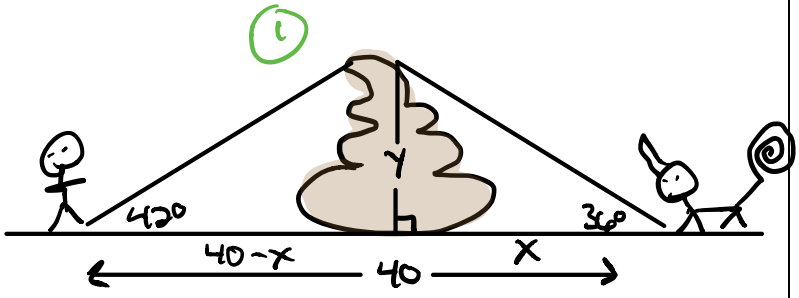
#3) George and his paradoxasaur are on either side of a giant steamy pile of paradoxasaur poop and are 40 feet apart. George sees the top of the poop at 42° and his paradoxasaur sees the top of the poop at 36°. How high is the pile of poop (to the nearest foot)?



3) $\tan(42°) = \frac{y}{40-x}$

$\tan(42°) = \frac{x\tan 36°}{40-x}$

2) $\tan(36°) = \frac{y}{x}$

$x\tan(36°) = y$

$(40-x)\tan(42°) = x\tan(36°)$

$40\tan(42°) - x\tan 42° = x\tan(36°)$

$40\tan(42°) = x\tan(36°) + x\tan(42°)$

$40\tan(42°) = x(\tan(36°) + \tan(42°))$

$\frac{40\tan(42°)}{\tan(36°)+\tan(42°)} = x$

$22.14 \approx x$

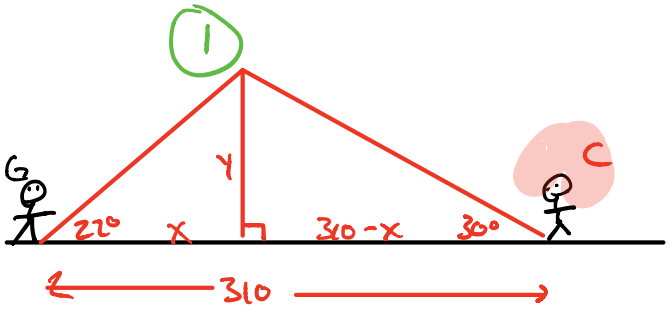
4) $x\tan(36°) = y$

$22.14\tan(36°) \approx y$

$16.09 \approx y$

The poop is about 16 feet tall.

#4) On a sightseeing trip to the garbage dump, George spots a mound of Atari ET cartridges at 22° and Cathy spots the same mound at 30°. If the two nitwits are 310 feet apart, determine the height of the mound (to the nearest foot).



2) $\tan(22°) = \frac{y}{x}$

$x\tan(22°) = y$

3) $\tan(30°) = \frac{y}{310-x}$

$\tan(30°) = \frac{x\tan(22°)}{310-x}$

$(310-x)\tan(30°) = x\tan(22°)$

$310\tan(30°) - x\tan(30°) = x\tan(22°)$

$310\tan(30°) = x\tan(22°) + x\tan(30°)$

$310\tan(30°) = x(\tan(22°) + \tan(30°))$

$\frac{310\tan(30°)}{\tan(22°)+\tan(30°)} = x$

$182.38 \approx x$

4) $x\tan(22°) = y$

$182.38\tan(22°) = y$

$73.69 \approx y$

The mount is about 74 feet high.