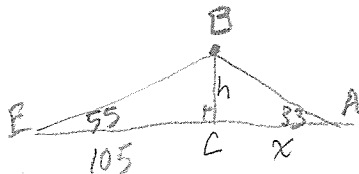


Review #2

For each problem, draw a diagram. Set up equations to solve the problems. Round final answers to the nearest tenth.

1. Two students, Eli and Apoorva, see a bald eagle in the sky between them. Eli and Apoorva see the eagle at angles of elevation of 55° and 33° , respectively. The horizontal distance from Eli to the point directly under the eagle is 105 feet (We know this because the eagle dropped a rock and we assume no friction in the air). How far apart are Eli and Apoorva?



$$\tan 55 = \frac{h}{105}$$

$$105 \tan 55 = h$$

$$h \approx 149.955$$

$$\tan 33 = \frac{h}{x}$$

$$x = \frac{h}{\tan 33}$$

$$x = \frac{149.955}{\tan 33}$$

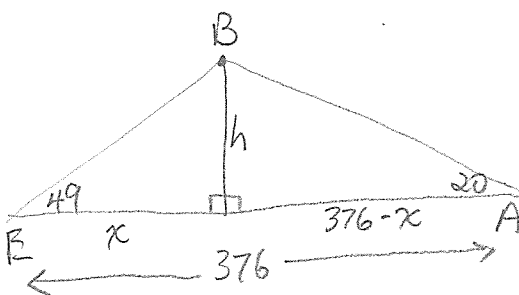
$$x \approx 230.91128$$

$$AE = 335.91128$$

$$\boxed{335.9 \text{ feet}}$$

2. The bald eagle in problem #1 flew and landed on the top of a telephone pole. Eli and Apoorva started running when the eagle started flying. Eli and Apoorva can now see the eagle with angles of elevation of 49° and 20° , respectively. They are also 376 feet apart from each other with the telephone between them.

- a. Who is closer to the eagle? By how many feet? Eli, by 195.3 feet
- b. What is the height of the telephone pole? 104.0 feet



$$\tan 49 = \frac{h}{x}$$

$$\tan 20 = \frac{h}{(376-x)}$$

$$\rightarrow x \tan 49 = h$$

$$(376-x) \tan 20 = h$$

$$x \tan 49 = (376-x) \tan 20$$

$$\downarrow = 376 \tan 20 - x \tan 20$$

$$x \tan 49 + x \tan 20 = 376 \tan 20$$

$$x(\tan 49 + \tan 20) = 376 \tan 20$$

$$x = \frac{376 \tan 20}{\tan 49 + \tan 20}$$

$$x \approx 90.3713$$

$$\text{Eli} \approx 90.3$$

$$\text{Apoorva} \approx 285.6287$$

$$\text{difference} \approx 195.2587$$

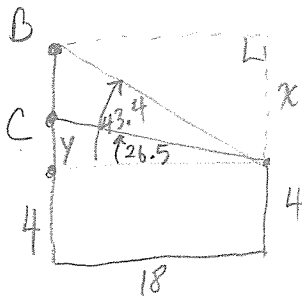
ht of pole

$$x \tan 49 = h$$

$$\boxed{103.960 \approx h}$$

$$h = \frac{376 (\tan 20) (\tan 49)}{(\tan 49 + \tan 20)} \leftarrow \text{exact}$$

3. From a point 18 feet from the base of a tree, Jenna, at an angle of elevation of 26.5° , sees a cat in the tree. She looks further up, at an angle of elevation of 43.4° , she spots a bird in the tree. How many feet away from the bird is the cat?



Who is 4 feet tall

$$\tan 43.4 = \frac{x}{18} \quad \tan 26.5 = \frac{y}{18}$$

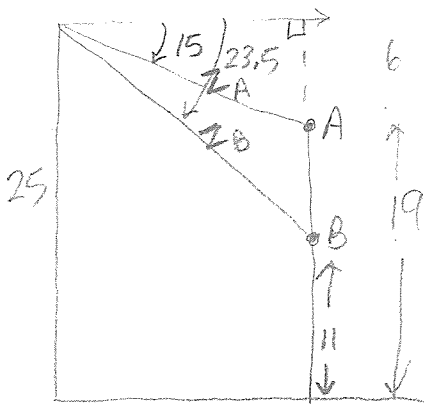
$$18 \tan 43.4 = x \quad 18 \tan 26.5 = y$$

$$x \approx 17.0217 \quad y \approx 8.9744$$

$$\text{Bird} \approx 21.0217 \quad \text{Cat} \approx 12.9744 \quad (8.0473)$$

Bird is away from cat by 8.0 feet.

4. Pranav has time to go on one zip line and wants to go on the longer zip-line. From a starting deck 25 feet above ground, there are two zip lines that Pranav can take. Zip-line A finishes at a deck 19 feet above ground and zip-line B finishes at 11 feet above ground. Zip-line A is connected to its other point at an angle of depression of 15° and B is connected to the other end an angle of depression of 23.5° . Which zip line should Pranav take and how much longer is it than the other zip line?



Do not use Pyth. Thm.

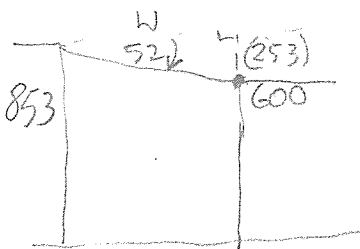
$$\sin 15 = \frac{6}{Z_A} \quad \sin 23.5 = \frac{14}{Z_B}$$

$$Z_A = \frac{6}{\sin 15} \quad Z_B = \frac{14}{\sin 23.5}$$

$$Z_A \approx 23.1822 \quad Z_B \approx 35.1097$$

Take Z_B ; longer by 11.9 feet.

5. The north rim of a canyon is 853 feet above sea level. The south rim of the canyon is 600 feet above sea level. From the north rim, Ethan can see a point on the south rim with an angle of depression of 52° . How wide (horizontal width) is it between the two sides of the canyon?



$$\tan 52 = \frac{253}{w}$$

$$w = \frac{253}{\tan 52}$$

$$w \approx 197.665$$

width ≈ 197.7 feet