

Test #1 (Part 2, Calculator Okay)

Math 150, Prof. Beydler

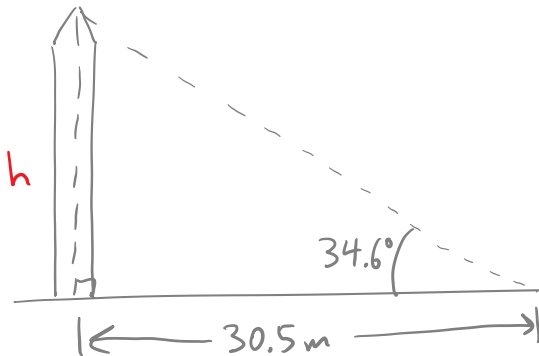
Name: Solutions

Thursday, March 23, 2017

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). Write your answers in the indicated places, or box your answers. Good luck!

1. (2 points) The shadow of a vertical tower is 30.5 m long when the angle of elevation of the sun is 34.6° . Find the height of the tower.

Answer: 21.0 m

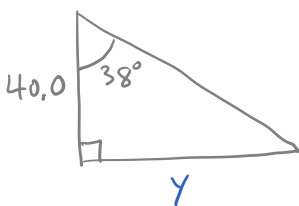
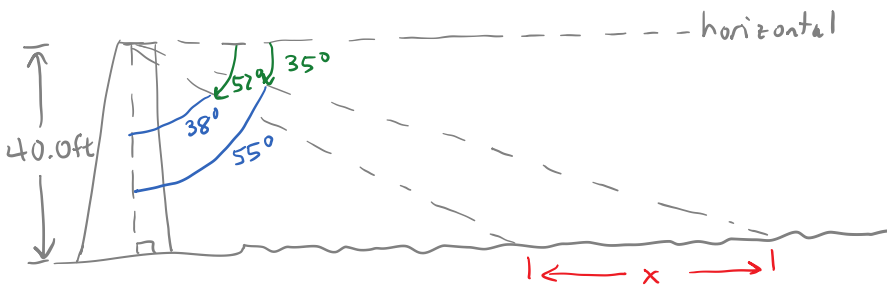


$$\tan 34.6^\circ = \frac{h}{30.5}$$

$$h = 30.5 \tan 34.6^\circ$$
$$\approx 21.0$$

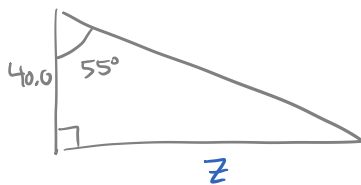
2. (4 points) From a lighthouse 40.0 ft above the water, you see two boats directly in front of you. The angle of depression to one boat is 52° , and the angle of depression to the other boat is 35° . What is the distance between the boats?

Answer: 26 ft



$$\tan 38^\circ = \frac{y}{40.0}$$

$$y = 40.0 \tan 38^\circ$$
$$\approx 31.25$$



$$\tan 55^\circ = \frac{z}{40.0}$$

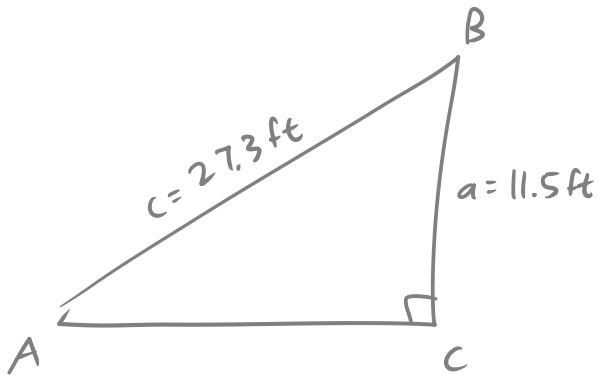
$$z = 40.0 \tan 55^\circ$$
$$\approx 57.13$$

$$x = z - y$$

$$\approx 57.13 - 31.25$$

$$= 25.88$$

3. (3 points) Solve right triangle ABC , if $a = 11.5$ ft and $c = 27.3$ ft. (Assume $C = 90^\circ$, and give 3 significant digits for your answers. Write $\angle A$ and $\angle B$ in degrees.)



$$b = \underline{24.8 \text{ ft}}$$

$$\angle A = \underline{24.9^\circ}$$

$$\angle B = \underline{65.1^\circ}$$

$$\sin A = \frac{11.5}{27.3}$$

$$A = \sin^{-1}\left(\frac{11.5}{27.3}\right)$$

$$\approx 24.9^\circ$$

$$\angle B \approx 90^\circ - 24.9^\circ = 65.1^\circ$$

$$(11.5)^2 + b^2 = (27.3)^2$$

$$b^2 = 613.04$$

$$b \approx 24.8$$

4. (1 point) Convert -150° into radians.

Answer: $\underline{-\frac{5\pi}{6}}$

$$\frac{-150^\circ}{1} \times \frac{\pi}{180^\circ} = -\frac{5\pi}{6}$$

5. (1 point) Convert $\frac{5\pi}{12}$ into degrees.

Answer: $\underline{75^\circ}$

$$\frac{5\pi}{\cancel{12}} \times \frac{\cancel{180}^\circ}{\cancel{\pi}} = 75^\circ$$

6. (0 points) How many hours of sleep did you get last night? _____