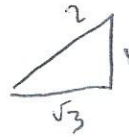
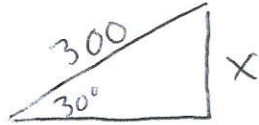


Right Triangle Trigonometry problems

(Always start by trying to draw a diagram)

- 1) You are taking a picture of a mountain. The angle of elevation to the top of the mountain is 30 degrees. If the distance in a straight line from where you are standing to the top of the mountain is 300 meters, what is the height of the mountain? (This is a problem you should be able to solve without a calculator, using the special triangles)

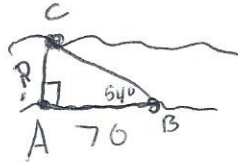


$$\frac{x}{300} \approx \frac{1}{2}$$

$$\frac{2x}{2} = \frac{300}{2}$$

$$x = 150 \text{ meters}$$

- 2) A biologist wants to know the width of a river in order to properly set instruments for studying pollutants in the water. From point A, the biologist walks downstream 70 feet and looks over to point C which is directly across the river from point A. From this spot to point C is a 54° angle. Using this information determine how wide the river is.

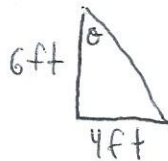


$$\tan 54^\circ = \frac{?}{70}$$

$$70 \cdot \tan 54^\circ = ?$$

$$96.35 \text{ ft} = ?$$

- 3) If a man is 6 foot tall, and casts a shadow that is 4 feet long, what is the angle from the top of the persons head to the ground? (Round answers to the nearest degree)

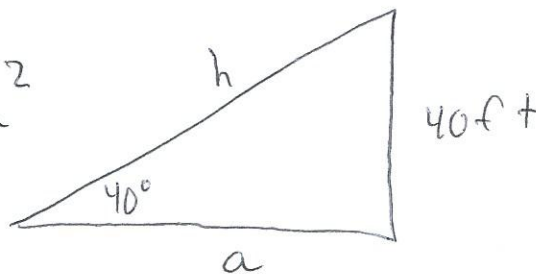


$$\tan^{-1}(\tan \theta) = \left(\frac{4}{6}\right)$$

$$\theta = \tan^{-1}\left(\frac{4}{6}\right)$$

$$\theta = 33.7^\circ$$

- 4) A wire runs from the ground to the top of a telephone pole. The telephone poll is 40 feet tall, and the angle formed between the wire and the ground is 40°. Use this information to find the length of the wire, as well as the length from the bottom of the ground to the bottom of the wire.



$$(62.23)^2 = (40)^2 + a^2$$

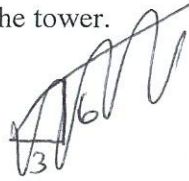
$$42.67 = a$$

$$h (\sin 40^\circ) = \frac{40}{h} \cdot h$$

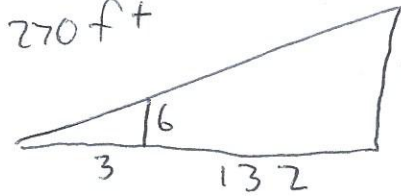
$$\frac{h \cdot \sin 40^\circ}{\sin(40^\circ)} = \frac{40}{\sin(40^\circ)}$$

$$h = 62.23 \text{ ft}$$

- 5) A six-foot person walks from the base of a broadcasting tower directly toward the tip of the shadow cast by the tower. When the person is 132 feet from the tower and 3 feet from the tip of the shadow, the person's shadow falls exactly in line with the tower's shadow. Using this information find the height of the tower.



$$x = 270 \text{ ft}$$



$$\frac{6}{3} = \frac{x}{132+x}$$

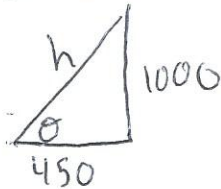
$$135 \cdot 2 = \frac{x}{270} = x$$

- 6) Lola went skiing with her friends. They got on the chair lift and went to the top of the hill. When the chair lift reached the top of the hill Lola and her friends noticed a map that said they were 450 west of their starting point and 1,000 ft higher. What is the angle of elevation from the chair lift to their new position, and what is the straight line distance they traveled on the lift?

$$\tan^{-1}(\tan \theta) = \left(\frac{1000}{450}\right)$$

$$\theta = \tan^{-1}\left(\frac{1000}{450}\right)$$

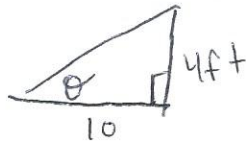
$$\theta = 65.77^\circ$$



$$h^2 = (1000)^2 + (450)^2$$

$$h = 1096.59$$

- 7) Mr. Doherty hurt his back because he is old and not good at basketball. To heal his doctor told him that he must lay at an angle between 20° and 30° . If he has a triangle that is 4 feet high and 10 feet in width, will this be useful to help him heal?



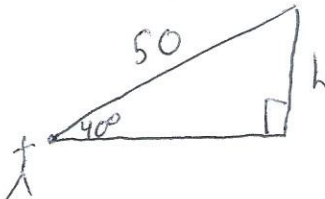
$$\tan \theta = \frac{4}{10}$$

$$\theta = \tan^{-1}\left(\frac{4}{10}\right)$$

$$\theta = 21.8^\circ$$

~~yes~~ ~~no~~ ~~heal~~ ~~&~~ ~~be~~ ~~awesom~~ ~~yes~~ ~~I~~ ~~will~~

- 8) You are flying a kite in the park. You are holding the handle 5 feet off the ground, and the string is fully extended to 50 feet. If your body and the kite create a 40° angle, how high is the kite from the ground?

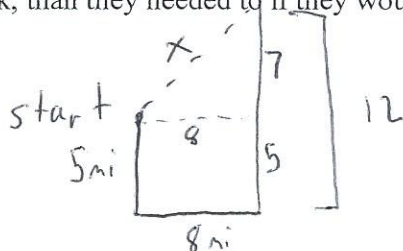


$$\sin 40 = \frac{x}{50}$$

$$32.14 \text{ ft} = x$$

$$32.14 + 5 = 37.14 \text{ ft}$$

- 9) A person leaves their house and starts walking. They go 5 miles directly south and then turn and go directly east for 8 miles. The person then realizes they have gone the wrong direction and goes 12 miles north and finally arrives at their destination. How many miles more did this person walk, than they needed to if they would have taken the straight line path for their destination?



$$8^2 + 7^2 = x^2$$

$$14.37 \text{ mi} = x$$