1) You are standing a little less than 100 feet from the Eiffel Tower in Paris, France.  You look up to the top of the tower at what you estimate is about a 85\* angle.  **Find the height of the Eiffel tower.** Describe the process you used, and why you knew to do each step.

I am given the angle and the distance from the Eiffel Tower (adjacent side). Since I am trying to find the height of the tower (opposite side), I will use the tangent ratio with opposite over adjacent.

$$\tan(\left(85°\right))=\frac{height}{distance}=\frac{x}{100}$$

$$\tan(\left(85°\right))∙100=x$$

$$x=1143 feet$$

The height of the Eiffel Tower is about 1143 feet.

2) From the top of the Grand Canyon, you can see that the deepest part is about 1500 feet in from the edge where you stand.  If you look down at 75\*, **what is the deepest point in the Grand Canyon?** Describe the process you used, and why you knew to do each step.

I am given the angle and the distance from the edge to the deepest part of the Grand Canyon (adjacent side). Since I am trying to find the deepest point (opposite side), I will use the tangent ratio with opposite over adjacent.

$$\tan(\left(75°\right))=\frac{x}{1500}$$

$$\tan(\left(75°\right))∙1500=x$$

$$x=5598$$

The deepest part of the Grand Canyon is about 5598 feet.

3) From the side of the Golden Gate Bridge in San Francisco, you can see the markings on the pillars that display the water depth.  After some calculations, you find that the bridge stands about 200 feet above the water at the center of the bridge.  The angle that you look down toward the water on is about 25\*.  **How far away from the center of the bridge are you standing?** Describe the process you used, and why you knew to do each step.

I am given the angle and the height of the bridge above the ocean (opposite side). Since I am trying to find the distance from the center of the bridge (adjacent side), I will use the tangent ratio with opposite over adjacent.

$$\tan(\left(25°\right))=\frac{200}{x} $$

$$\tan(\left(25°\right))∙x=200 $$

$$x=\frac{200}{tan⁡(25°)}=429 feet$$

I am standing about 429 feet from the center of the bridge.

4) While visiting Seattle, you decide to see the Space Needle.  You estimate that you are standing almost 500 feet away.  From this point, you look up at the top and see that it is about a 50\* angle.  **Based on this information, how tall is the Space Needle?**  Describe the process you used, and why you knew to do each step.

I am given the angle and the distance from the Space Needle (adjacent side). Since I am trying to find the height of the Space Needle (opposite side), I will use the tangent ratio with opposite over adjacent.

$$\tan(\left(50°\right))=\frac{x}{500}$$

$$\tan(\left(50°\right))∙500=x$$

$$x=596 feet$$

The Space Needle is about 596 feet tall.

5) In Bangladesh, India, the first man to attempt to find the size of Mt. Everest used Trigonometry.  Knowing this, you decide to calculate how tall the mountain is in the same way.  You know that you are about 5 miles away from the peak.  From here, you look up at about 45\* to the top of the mountain.  **Find the height of Mt. Everest.** (1 mile = 5280 feet)  Describe the process you used, and why you knew to do each step.

I am given the angle and the distance from the peak (hypotenuse). Since I am trying to find the height of Mt. Everest (opposite side), I will use the sine ratio with opposite over hypotenuse.

$$\sin(\left(45°\right))=\frac{x}{5}$$

$$\sin(\left(45°\right))∙5=x$$

$x=3.5 miles$

The height of Mt. Everest is about 3.5 miles.

6) On a sight-seeing cruise, you spot some Orca whales in a dive.  You figure that the whales are only about 80 feet from the surface of the water.  You are looking down on the whales at about a 60\* angle.  The cruise director wants to move so the ship is directly above the whales at  their current location.  **Find how far the ship needs to move.**  Describe the process you used, and why you knew to do each step.

I am given the angle and how deep the whales are form the surface of the water (opposite side). Since I am looking for how far the ship needs to move over the whales (adjacent side), I will use the tangent ratio with opposite over adjacent.

$$\tan(\left(60°\right))=\frac{80}{x}$$

$$\tan(\left(60°\right))∙x=80$$

$$x=\frac{80}{tan⁡(60°)}=46.2 feet$$

The ship needs to travel about 46.2 feet.

7) Using the links below, see how close your answers from questions 1-6 are to the actual answers.  For questions where you solved for how far away you are standing from a structure or object, check to see if the actual height you used in the problem matches with the actual height you find in your research.  Be sure to answer these 2 questions for EACH of the problems you solved previously:

1.      How accurate are your answers?

Answers will vary.

2.      Are you within 1 unit?  10 units?  100 units?

Answers will vary.

8)Research what “accuracy” means using the links below.  How can you explain the amount of accuracy in your answers?

The **accuracy** of a [measurement](http://en.wikipedia.org/wiki/Measurement) system is the degree of closeness of measurements of a [quantity](http://en.wikipedia.org/wiki/Quantity) to that quantity's actual (true) [value](http://en.wikipedia.org/wiki/Value_%28mathematics%29).

9) What could you do to make your answers for 1-6 more accurate?  How could you make your answers less accurate?

Answers will vary.

10) Under what circumstances would you need to be more accurate?  Give at least 2 different examples of when accuracy is necessary.

Answers will vary.