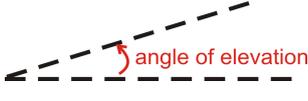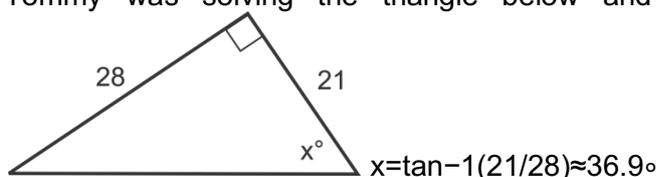## Trigonometry word problems.

Angle of Depression: The angle measured from the horizon or horizontal line, down.	Angle of Elevation: The angle measure from the horizon or horizontal line, up.	1 mile: 5280 feet
‌angle of depression	‌angle of elevation	

1. Kristin is swimming in the ocean and notices a coral reef below her. The angle of depression is 35∘ and the depth of the ocean, at that point is 250 feet. How far away is she from the reef?

250 ft   35°   x ft

2. The Leaning Tower of Pisa currently "leans" at a 4∘ angle and has a vertical height of 55.86 meters. How tall was the tower when it was originally built?

55.86 m

3. The angle of depression from the top of an apartment building to the base of a fountain in a nearby park is 72∘. If the building is 78 ft tall, how far away is the fountain?

4. William spots a tree directly across the river from where he is standing. He then walks 20 ft upstream and determines that the angle between his previous position and the tree on the other side of the river is 65∘. How wide is the river?

5. Diego is flying his kite one afternoon and notices that he has let out the entire 120 ft of string. The angle his string makes with the ground is 52∘. How high is his kite at this time?

6. A tree struck by lightning in a storm breaks and falls over to form a triangle with the ground. The tip of the tree makes a 36∘ angle with the ground 25 ft from the base of the tree. What was the height of the tree to the nearest foot?

7. Upon descent an airplane is 20,000 ft above the ground. The air traffic control tower is 200 ft tall. It is determined that the angle of elevation from the top of the tower to the plane is 15∘. To the nearest mile, find the ground distance from the airplane to the tower.

8. A 75 foot building casts an 82 foot shadow. What is the angle that the sun hits the building?

9. Over 2 miles (horizontal), a road rises 300 feet (vertical). What is the angle of elevation?

10. A boat is sailing and spots a shipwreck 650 feet below the water. A diver jumps from the boat and swims 935 feet to reach the wreck. What is the angle of depression from the boat to the shipwreck?

11. Elizabeth wants to know the angle at which the sun hits a tree in her backyard at 3 pm. She finds that the length of the tree's shadow is 24 ft at 3 pm. At the same time of day, her shadow is 6 ft 5 inches. If Elizabeth is 4 ft 8 inches tall, find the height of the tree and hence the angle at which the sunlight hits the tree.

12. Alayna is trying to determine the angle at which to aim her sprinkler nozzle to water the top of a 5 ft bush in her yard. Assuming the water takes a straight path and the sprinkler is on the ground 4 ft from the tree, at what angle of inclination should she set it?

13. Tommy was solving the triangle below and made a mistake. What did he do wrong?

28   21   x° $x = \tan^{-1}(21/28) \approx 36.9∘$

14. Tommy then continued the problem and set up the equation: $\cos 36.9∘ = 21/h$. By solving this equation he found that the hypotenuse was 26.3 units. Did he use the correct trigonometric ratio here? Is his answer correct? Why or why not? How could Tommy have found the hypotenuse in the triangle another way and avoided making his mistake?