Right Triangle Trig Applications (**Angle of Elevation and Depression notes)**

**#5-14. Solve the following application problems on a SEPARATE SHEET OF PAPER. You MUST draw a picture and write an equation for each problem. Calculator OK. Round your answers to the nearest tenth.**

5. The angle of elevation to the top of the Empire State Building in NYC is about $13.3°$ from a point on the ground 1 mile from the base of the building. Find the height of the Empire State Building in feet.

6. A plane is flying at an elevation of 35, 000 feet within sight of the Gateway Arch in St. Louis, Missouri. The pilot would like to estimate her distance from the Arch. She finds that the angle of depression to a point on the ground below the arch is .

1. What is the distance between the plane and the arch?
2. What is the distance between a point on the ground directly below the plane and the arch?

7. From the top of a 200 foot lighthouse, the angle of depression to a ship on the ocean is . How far is the ship from the base of the lighthouse?

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| Thank you for your purchase. For optimal safety, strength, and stability, please refer to the guide below:  |
| Ladder length | Height of ladder | Distance between bottom of ladder and the floor |
| 8ft |  |  |
| 10ft |  |  |
| 12ft |  |  |

8. The American Ladder Association recommends a $75.5°$ angle between the bottom of the ladder and the wall. You are tasked with creating a label that will be glued to the side of an extendable ladder that your company sells. Complete the chart and generalize a rule for the distance between the bottom of the ladder and the floor.

9. A 96 foot tree casts a shadow that is 120 feet long. What is the angle of elevation of the sun?

10. A man is lying on the beach, flying a kite. He holds the end of the kite string at ground level and estimates the angle of elevation of the kite to be . If the string is 450 feet long, how high is the kite above the ground?

11. From a point 100 feet in front of a public library, the angles of elevation to the base of the flagpole and to the top of the flagpole are  and , respectively. The flagpole is mounted on the roof of the library. Find the height of the flagpole.

12. The altitude of an equilateral triangle is 5 cm. What is the length of a side of the triangle?

13. Find the altitude of an isosceles triangle with base 4.24 feet. The vertex angle of the triangle measures .

14. A builder wishes to construct a ramp 24 feet long that rises to a height of 5 feet above the ground. Find the angle of elevation of the ramp.

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