Precalculus                                          Name _____
Right Triangles WS I
Revised 8/29/12


**#1-3.  Use your calculator to find the value of each of the following.  Round your answer to four decimal places.**

**1.**  $\sin 43^0 19' 51''$                **2.**  $\sec 129^0$                **3.**  $\tan(-216.73^0)$


**You <u>MUST</u> draw a picture and write an equation for each problem.  Round your answers to the nearest tenth.  <u>Use a separate sheet of paper</u>.**

**#4-5.**  Solve right triangle ABC with right angle A, given the following information.

4.  a = 24.6 and  b = 12.9                                5.  $C = 42.1^o$ and  b = 4.8


6.  The angle of elevation to the top of the Empire State Building in New York is $11^o$ from a point on the ground 1 mile from the base of the building.  Find the height of the Empire State Building in feet.


7.  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 $22^o$.
        (a)  What is the distance between the plane and the arch?

        (b)  What is the distance between a point on the ground directly below the plane and the arch?   (along the ground)


8.  From the top of a 200 foot lighthouse, the angle of depression to a ship on the ocean is $23^o$.  How far is the ship from the base of the lighthouse?


9.   A 20 foot ladder leans against a building so that the angle between the ground and the ladder is $72^o$.  How high does the ladder reach on the building?


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


11.  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 $50^o$.  If the string is 450 feet long, how high is the kite above the ground?

12. 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 $28^o$ and $39^o45'$, respectively. The flagpole is mounted on the roof of the library. Find the height of the flagpole.

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

14. Find the altitude of an isosceles triangle with base 4.24 feet. The vertex angle of the triangle measures $85^o$.

15. 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.

16. A plane leaves the airport flying at 375 mph and follows a course with a bearing of $S47^0W$. After two hours, how far south and how far west is the plane from the airport?

17. A boat is 87 miles east and 29 miles south of the harbor. If the boat is heading directly for the harbor, what bearing should the captain follow?

18. A ship is due south of a lighthouse. After the ship sails 50 miles with a bearing of $N30^0E$, it is at a point due east of the lighthouse. At that point, how far is the ship from the lighthouse?

19. A pilot is 480 miles north and 110 miles west of the Jacksonville airport. What bearing should he follow if he wants to fly directly to the Jacksonville airport?

20. A ship sets sail from a shore which runs due north and south. The ship sails 150 miles with a bearing of $N22^030'E$. How far is the ship from the shore line?

ANSWERS:   1. .6862      2. -1.5890       3. -.7462      4. B = $31.6^0$ ; C = $58.4^0$ ; side c = 20.9
5. B = $47.9^0$ ; side c = 4.3 ; side a = 6.5      6. 1026.3 feet   7.(a) 93,431.4 feet  (b) 86,628.0 feet
8. 471.2 feet     9. 19.0 feet     10. $38.7^0$    11. 344.7 feet     12. 30 feet       13. 5.8 cm    14. 2.3 feet
15. $12.0^0$      16. west 548.5 miles; south 511.5 miles       17. $N71.6^0W$  or  $W18.4^0N$
18. 25 miles      19. $E77.1^0S$  or  $S12.9^0E$       20. 57.4 miles