Radius: $r^2 = a^2 + b^2$ **Theta:** $\text{Tan } \theta = \dfrac{y}{x} = \dfrac{opp}{adj}$

Given the following about an angle in standard position, find the requested information.
Draw and label a triangle in the appropriate quadrant!

1. $Tan\theta' = -\dfrac{12}{15}$ and θ' is in quadrant II. Find r and θ.

2. $\cot\theta' = \dfrac{2}{\sqrt{5}}$ and θ' is in quadrant III. Find r and θ.

3. $\tan\theta' = -\dfrac{3}{\sqrt{7}}$ and θ' is in quadrant II. Find r and θ.

4. $Tan\theta' = -\dfrac{\sqrt{6}}{\sqrt{10}}$ and θ' is in quadrant IV. Find r and θ.

5. The terminal side of θ passes through $(-2, 2\sqrt{15})$, find r and θ.

6. Triangle PQR – given that angle Q is the right angle, angle R is 33°, side p is 18 and side r is 15. Find hypotenuse and missing angle.

7. Triangle JKM – give that angle K is the right angle, angle M is 62.3°, side m is 9 and side j is 10. Find hypotenuse and missing angle.

8. Triangle SUT – given that angle T is the right angle, side u is 7.5 and side s is 7.5. Find hypotenuse and missing angles.

9. A line is used to tether a helium-filled balloon. Because of a breeze, the line makes an angle of approximately 75° with the ground. The height of the balloon is 29 feet. Find the horizontal distance the balloon traveled.

10. From a 60-foot observation tower on the coast, a Coast Guard officer sights a boat in difficulty. The angle of depression of the boat is 4.5°. How far is the boat from the base of the observation tower?

11. A passenger in an airplane flying at an altitude of 37,000 feet sees two towns directly to the left of the airplane. The angles of depression to the towns are 32° and 76°. How far apart are the towns?

12. A boat is 160 miles north and 85 miles east of port. What bearings should be taken to head directly back to port?

Law of Cosines: $a^2 = b^2 + c^2 - 2bcCosA$

13. Given: a = 15, b = 18, c = 20, find angle A   14.   Given: b = 40, c = 45, $A = 51^o$, find side a

15.   Determine the measure of the largest angle of a triangle with sides 12 feet, 14 feet, and 18 feet.

16. A boat race is run along a triangular course marked by buoys A, B, and C. The race starts with the boats headed due west from A. Find the bearing from B to C.

3500 ft

6500 ft

8000 ft
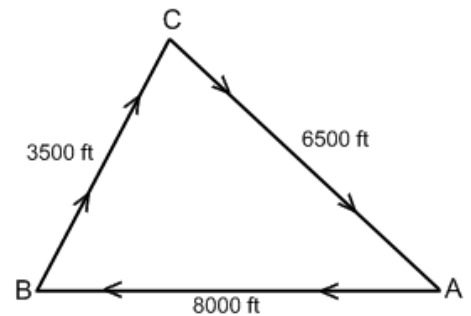
17.   Samantha files a helicopter to drop supplies to stranded flood victims. She will fly from the supply depot, S, to the drop point, P. Then she will return to the helicopter's base at B, as shown in the figure. The drop point is 15 miles from the supply depot. The base is 21 miles from the drop point. It is 33 miles between the supply depot and the base. Because the return flight to the base will be made after dark, Samantha wants to know in what direction to fly. What is the angle between the two paths at the drop point?

P

15 mi   21 mi

S

33 mi   B
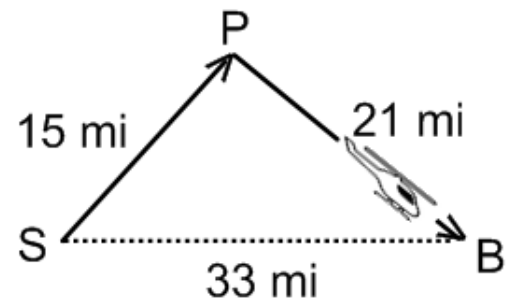
18.   A surveyor measures the three sides of a triangular field and gets lengths 114 m, 165 m, and 257 m. What is the measure of the largest angle of the triangular field?