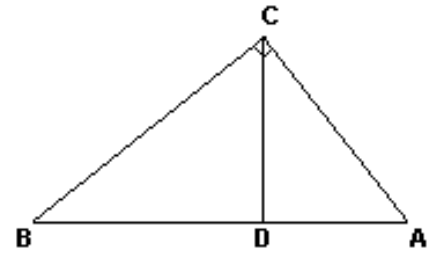
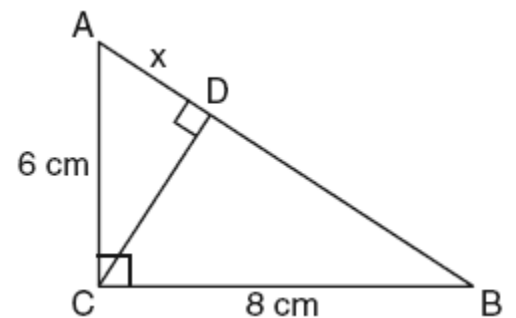


4. In the diagram of $\triangle ABC$, $m\angle ACB = 90$ and \overline{DC} is an altitude. If $AD = 2$ and $DB = 6$, find AC .



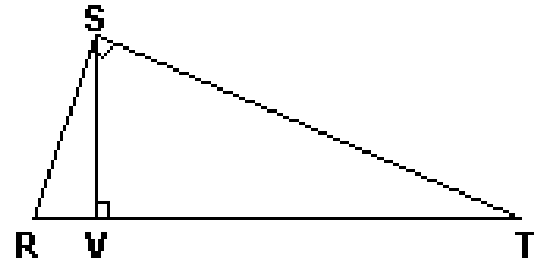
5. In similar triangles ABC and DEF , corresponding sides AB and DE equal 15 and 12. If the perimeter of $\triangle ABC = 40$, what is the perimeter of $\triangle DEF$?

6. In the diagram below, the length of the legs \overline{AC} and \overline{BC} of right triangle ABC are 6 cm and 8 cm, respectively. Altitude \overline{CD} is drawn to the hypotenuse of $\triangle ABC$. Find x to the *nearest tenth* of a centimeter.



Use the diagram below to answer #7 – 9. (Leave all answers in *simplest radical form*).

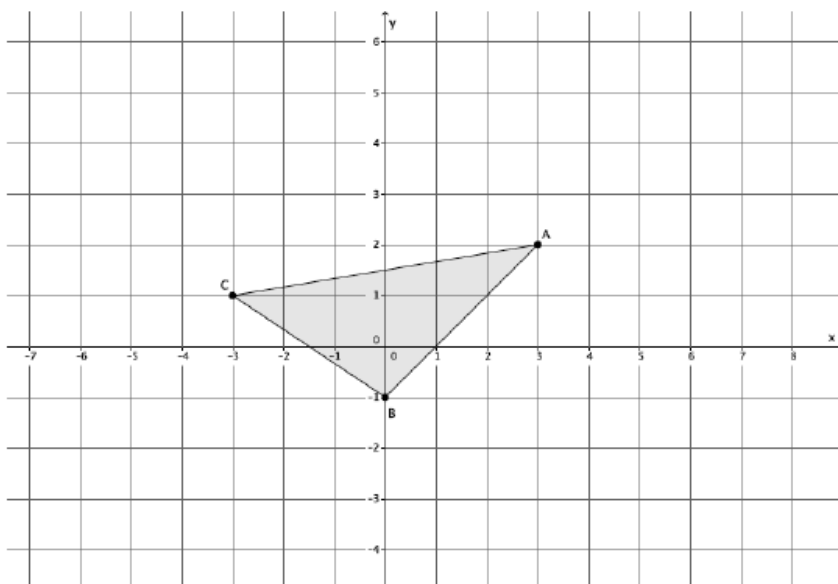
7. If $RS = 6$ and $RT = 9$, find RV .



8. If $RV = x$, $VT = x + 5$, and $SV = 6$, find RT .

9. If $RS = 10$, $VT = 21$, and $RV = x$, find RV .

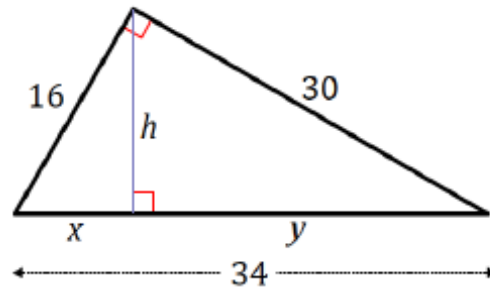
10. The coordinates of $\triangle ABC$ are shown on the coordinate plane below. The triangle is dilated from the origin by scale factor $r = 2$.



a. Identify the coordinates of the dilated $\triangle A'B'C'$

b. Is $\triangle ABC \sim \triangle A'B'C'$? *Explain.*

11. The side lengths of the following right triangle are 16, 30, and 34. An altitude of a triangle from the right angle splits the hypotenuse into line segments of length x and y .



- a. What is the relationship between the large triangle and the two sub-triangles? Why?
- b. Solve for h , x , and y . (Round to the *nearest tenth*).

12. Answer the following questions based on the diagram below.

- a. Find the sine and cosine values of angles r and s .
Leave answers as fractions.

$$\sin r =$$

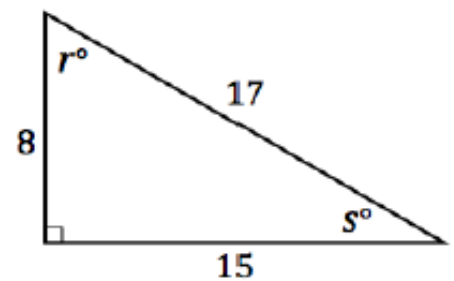
$$\sin s =$$

$$\cos r =$$

$$\cos s =$$

$$\tan r =$$

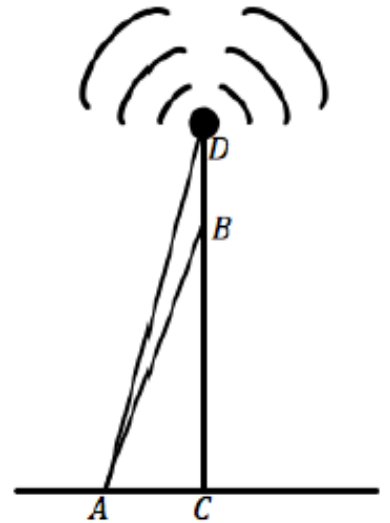
$$\tan s =$$



- b. Why is the sine of an acute angle the same value as the cosine of its complement?

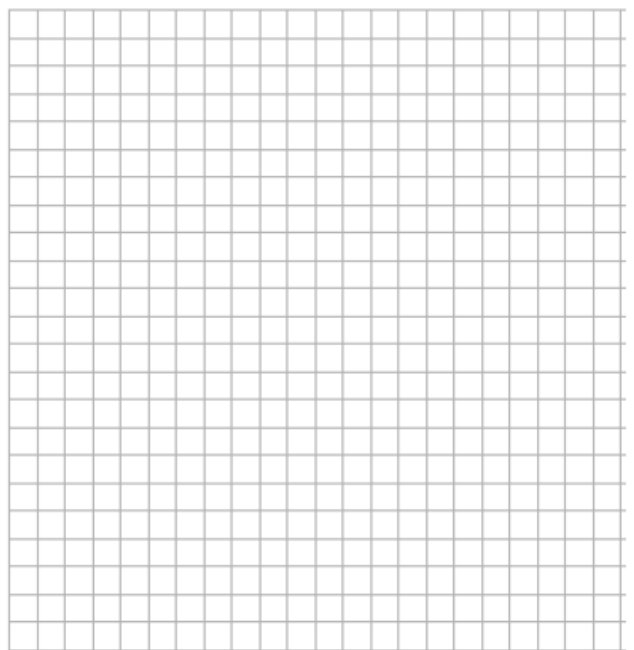
13. A radio tower is anchored by long cables called guy wires, such as AB in the figure below. Point A is 250m from the base of the tower, and $\angle BAC = 59^\circ$

a. How long is the guy wire? Round to the *nearest tenth*.



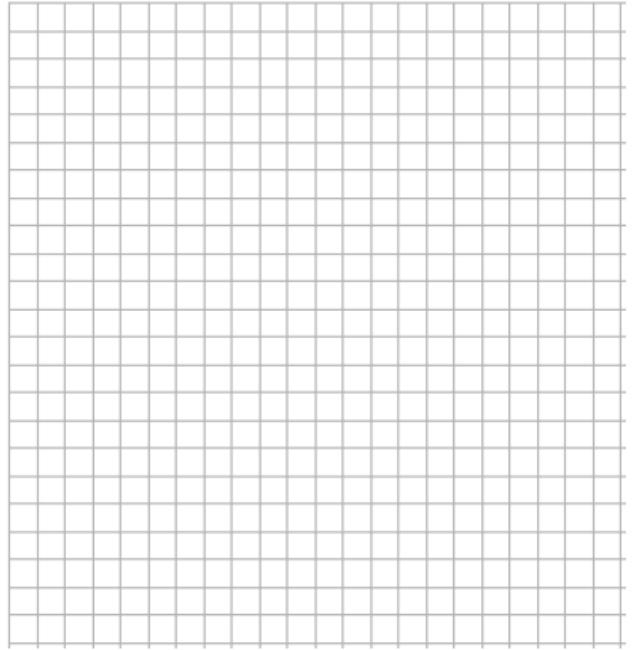
b. How far above the ground is it fastened to the tower?

14. Is $\triangle RST$, where $R(1,5)$, $S(5,1)$, $T(-1,-1)$, a right triangle? If so, which angle is the right angle?
Justify your answer.



15. Consider the quadrilateral with vertices $(-2, -1)$, $(2, 2)$, $(5, -2)$ and $(1, -5)$.

a. Show that the quadrilateral is a rectangle.



b. Is the quadrilateral a square? *Explain.*

c. What is the area of the quadrilateral?

16. Write the equation of the line that contains the point $(-2, 7)$ and is:

a. Parallel to the line $x = 3$.

b. Perpendicular to the line $x = -3$.

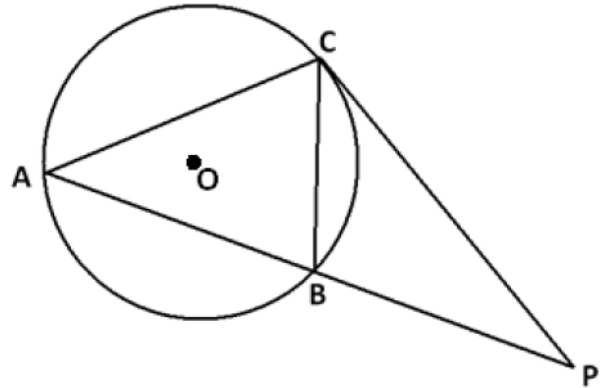
c. Parallel to the line $y = 6x - 13$.

d. Perpendicular to the line $y = 6x - 13$.

17. Find the point on the directed line segment from $(0,3)$ to $(6,9)$ that divides the segment in the ratio of $2:1$.

18. In the figure below, the circle with center O circumscribes $\triangle ABC$. Points $A, B,$ and P are collinear, and the line through P and C is tangent to the circle at C . The center of the circle lies inside $\triangle ABC$.

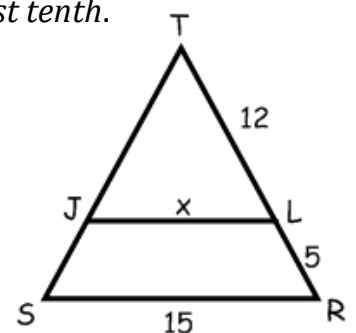
- a. Find two angles in the diagram that are congruent, and *explain* why they are congruent.



- b. If B is the midpoint of \overline{AP} and $PC = 7$, what is PB ? Round your answer to the *nearest hundredth*.

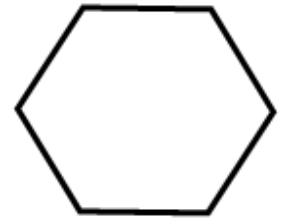
- c. If $m\angle BAC = 50^\circ$, and the measure of $\angle C = 130^\circ$, what is $m\angle P$?

19. Given $\triangle TSR \sim \triangle TJJL$, find the value of x ? Round your answer to the *nearest tenth*.



20. Which of the following transformations can carry this regular polygon onto itself?

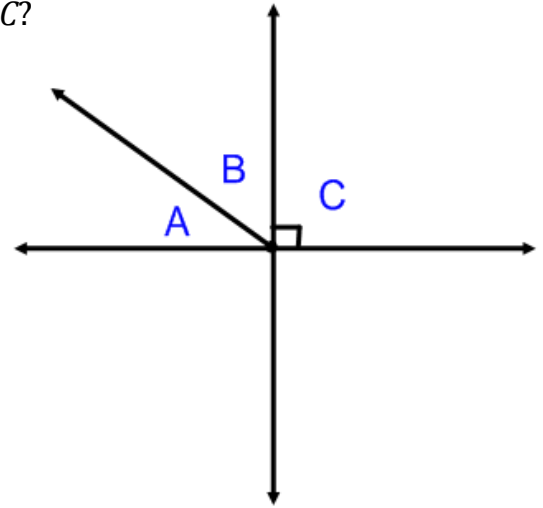
- (1) Rotation 45° clockwise.
- (2) Rotation 90° counterclockwise.
- (3) Rotation 120° counterclockwise.
- (4) Rotation 60° counterclockwise



Use the diagram below to answer questions 21 – 23. Given $m\angle A = (2x + 10)^\circ$ and $m\angle B = (3x + 5)^\circ$

21. Which equation best describes the values of angles A , B , and C ?

- (1) $180^\circ = 90^\circ + (2x + 10) + (3x + 5)$
- (2) $90^\circ = 180^\circ + (2x + 10) + (3x + 5)$
- (3) $180^\circ = (2x + 10) + (3x + 5) - 90^\circ$
- (4) None of these

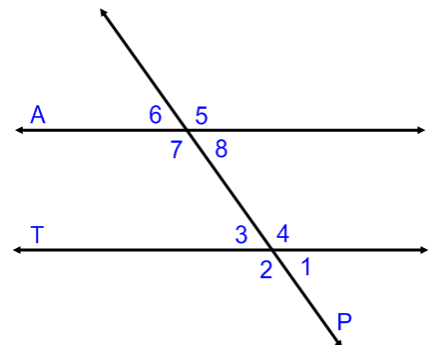


22. What is the measure of $\angle A$.

23. What is the measure of $\angle B$.

24. In the below diagram Lines A and T are drawn. Line P is a transversal. Which statement would prove that lines A and T are parallel?

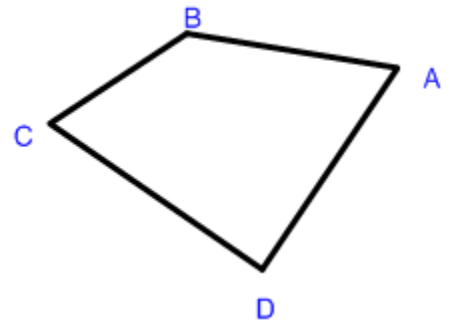
- (1) $\angle 6 \cong \angle 8$
- (2) $\angle 6 \cong \angle 1$
- (3) $\angle 3$ and $\angle 4$ are supplementary
- (4) $\angle 8$ and $\angle 4$ are complementary



25. David buys the largest television he could find. Television screen sizes are rated by the diagonal length. If David's television is 65 inches wide and 45 inches tall, To the *nearest inch*, what is the size of this television screen?

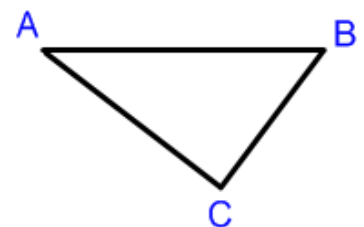
26. The radius of sphere D is 3 inches. The radius of sphere M is 6 inches. How many times larger is the volume of sphere R as compared to sphere D?

27. In the below diagram, $m\angle A = 76^\circ$, $m\angle B = 98^\circ$, and $m\angle C = 83^\circ$. What is the measure of angle D ?



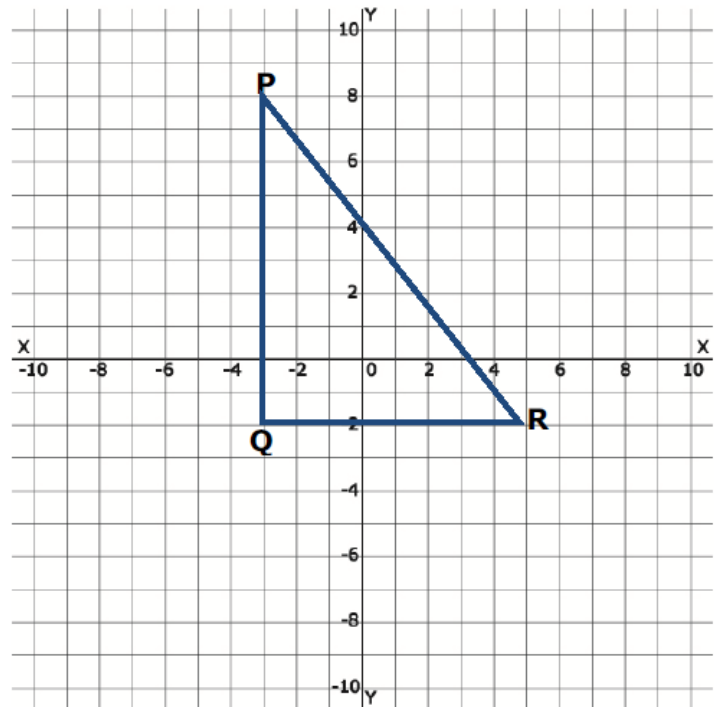
28. In triangle ABC , $m\angle A = 58^\circ$ and $m\angle B = 43^\circ$. If we were to order the length of sides of the triangle from least to greatest, which inequality below would be *correct*?

- (1) $\overline{AC} < \overline{AB} < \overline{BC}$
- (2) $\overline{AB} < \overline{AC} < \overline{BC}$
- (3) $\overline{AC} < \overline{BC} < \overline{AB}$
- (4) $\overline{BC} < \overline{AC} < \overline{AB}$



Use the diagram below to answer questions 29 & 30.

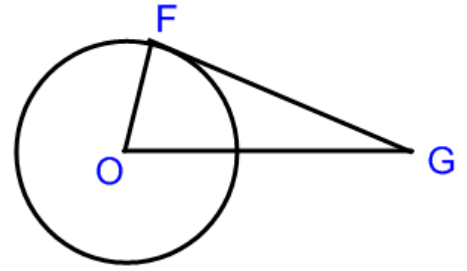
29. What is the area of $\triangle PQR$?



30. What is the perimeter of $\triangle PQR$?

31. A person is standing 85 feet from the base of a tree. The person standing on the ground measures an angle of elevation of 43° to the top of the tree. To the *nearest tenth* of a foot, how tall is the tree?

32. In Circle O below, \overline{GF} is tangent to the circle, \overline{EF} is a radius, $EF = 8"$, $GF = 15"$. What is the length of OG ?



33. Given: $\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 4$, $\angle 1 \cong \angle 6$.

Prove: $\angle M \cong \angle F$

