11.3 Pretest: Quadrilaterals, volume, density, trigonometry, & review

1. Given parallelogram $ABCD$ with $m\angle A = 75°$, $AB = 8$, and $BC = 12$. Find the value of each angle measure or side length.

   (a) $m\angle B =$

   (b) $m\angle C =$

   (c) $m\angle D =$

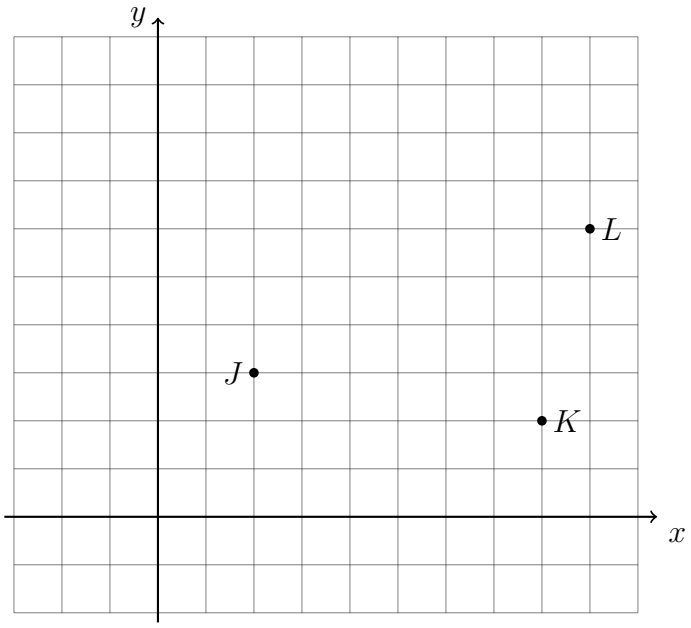
   (d) $CD =$

   (e) $AD =$

2. Circle Always, Sometimes, Never, as applies.

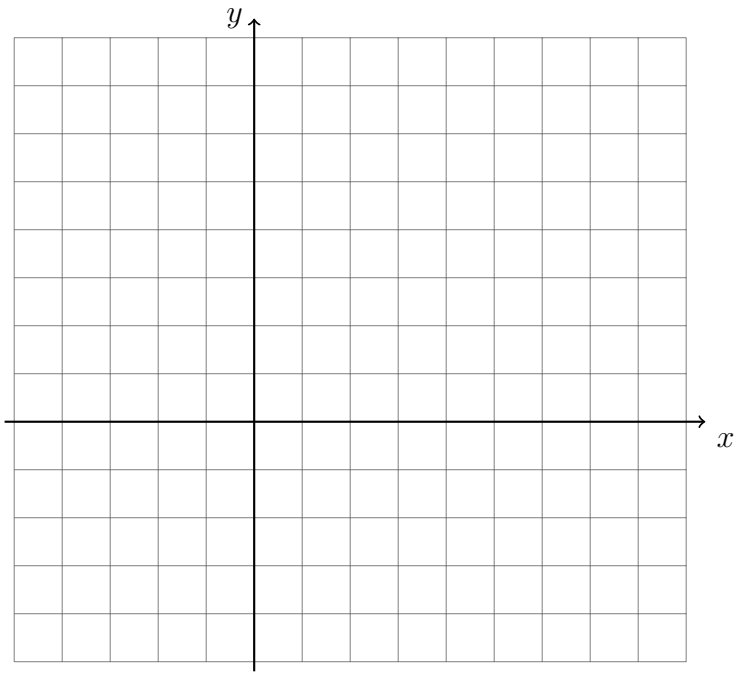
   (a) Always Sometimes Never Opposite sides or a parallelogram are congruent.
   (b) Always Sometimes Never Diagonals of a parallelogram are perpendicular.
   (c) Always Sometimes Never All four sides of a trapezoid are congruent.
   (d) Always Sometimes Never All four angles of a rhombus are congruent.

3. Three of the vertices of the parallelogram $JKLM$ are given: $J(2, 3)$, $K(8, 2)$, $L(9, 6)$. Determine and state the coordinates of the fourth vertex, M, and mark and label it on the grid below. Draw the sides of the parallelogram.



4. Draw quadrilateral $ABCD$ with vertices $A(-2, 2)$, $B(5, -1)$, $C(6, 2)$, and $D(-1, 5)$ on the grid below. Prove that $ABCD$ is a parallelogram by using slopes to show $\overline{AB}||\overline{CD}$ and $\overline{AD}||\overline{BC}$.

   Calculate the slopes.



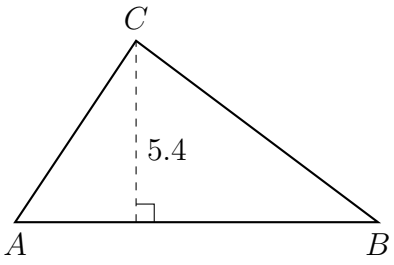
   State what slopes are equal to each other, and therefore, what sides are parallel.

   Finish with a concluding statement.

5. Find the volume of a cone with diameter of 6 feet and a height of 5 feet, to the *nearest cubic foot*.

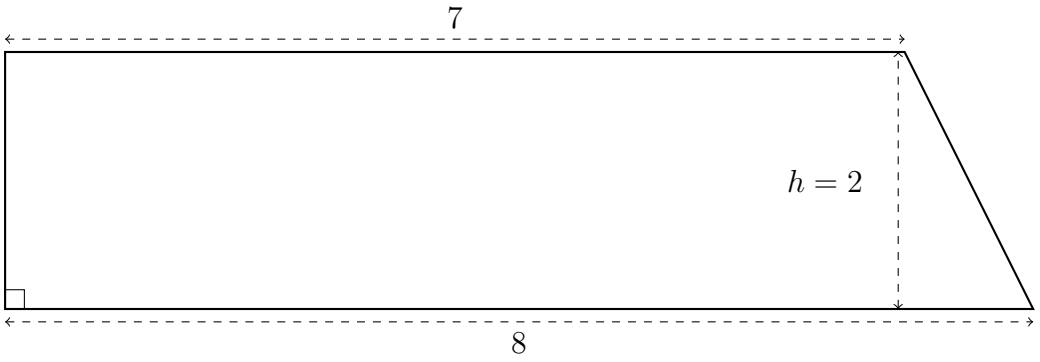
6. A box in the shape of a rectangular prism has a volume of 100 cubic centimeters. It's length is 10 cm and width 4 cm. How tall is it?

7. The area of $\triangle ABC$ is 21.6 square inches. The altitude of the triangle is 5.4 inches. Find the length of the base AB.



8. Find the weight of a steel ball with a diameter of 2 inches, to the *nearest tenth of an ounce*. (The density of steel is 4.6 ounce per cubic inch)

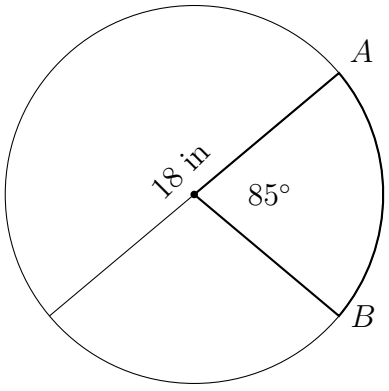
9. A trapezoid has a longer base of 8 and shorter base of 7. One side is perpendicular to the base, and the other is at an angle, as shown. Its height is 2.



Determine and state the area of the trapezoid.

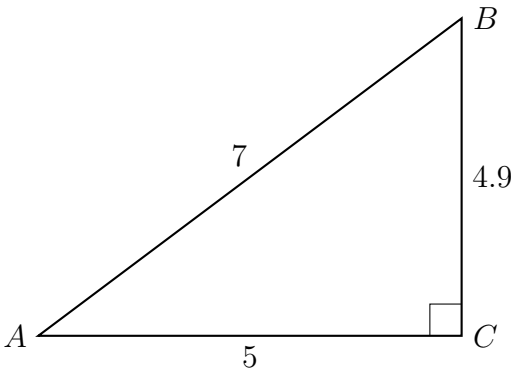
10. A circle with a diameter of 18 in and a central angle of 85° is drawn below.

(a) What is the area of the sector formed by the 85° angle, to the *nearest tenth of a square inch*?



(b) What is the length of the arc, AB, to the *nearest tenth of a inch*?

11. $\triangle ABC$ is shown with $m\angle C = 90°$ and the lengths of the triangle's sides are $BC = 4.9$, $AC = 5$, and $AB = 7$.



(a) State, as a decimal, the value of $\sin A$.

(b) Find the measure of $\angle A$, to the *nearest degree*.

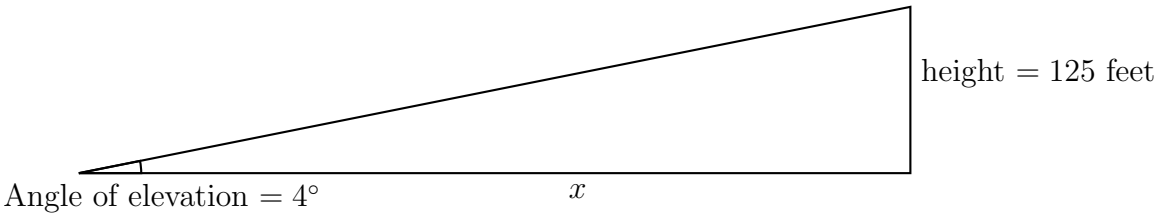
(c) Find the degree measure of $\angle B$.

12. Express each trigonometric ratio to the *nearest thousandth* and each angle measure to the nearest degree.

(a) $\sin 38° =$

(b) $\cos^{-1} 0.966 =$

13. A sailor observes the top of a lighthouse with an angle of elevation of 4°. She knows the lighthouse is 125 feet tall. Determine and state the distance x between the sailor and the lighthouse, to the *nearest foot*.



14. The line l has the equation $y = -\frac{3}{2}x+5$. To each line below, circle whether l is parallel, perpendicular, or neither.

    (a) parallel perpendicular neither $y = \frac{2}{3}x - 2$

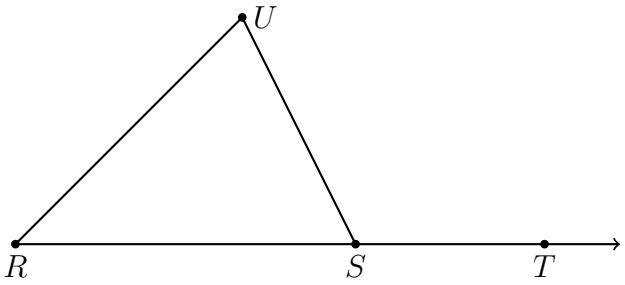
    (b) parallel perpendicular neither $y = \frac{3}{2}x + 7$

    (c) parallel perpendicular neither $y = -\frac{2}{3}x + 5$

    (d) parallel perpendicular neither $3x + 2y = 6$

15. Write an equation of the line that is parallel to the line whose equation is $y = \frac{2}{5}x + 1$ and passes through the point $(2, -3)$.

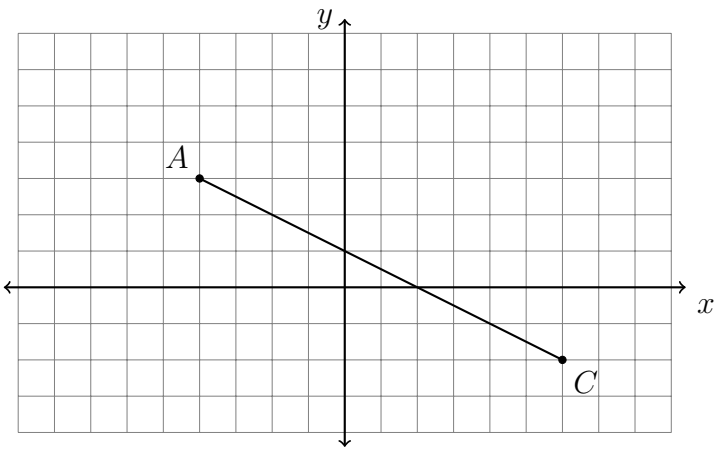
16. Given $m\angle R = 35$ and $m\angle U = 75$. Find $m\angle UST$.



17. Write down the center and radius of each circle, expressing the result as a simplified radical if necessary (not a decimal).

    (a) $(x-1)^2 + (y-7)^2 = 100$ (b) $x^2 + (y+3)^2 = 20$

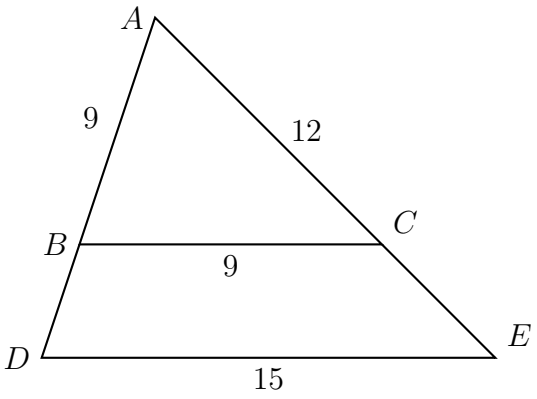
18. In the diagram below, $\overline{AC}$ has endpoints with coordinates $A(-4, 3)$ and $C(6, -2)$.



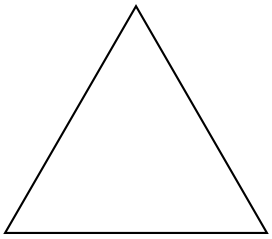
If B is a point on $\overline{AC}$ and $AB{:}BC = 2{:}3$, what are the coordinates of B?

19. Triangle ABC is dilated with a scale factor of k centered at A, yielding $\triangle ADE$, as shown. Given $AB = 9$, $BC = 9$, $AC = 12$, and $DE = 15$.

Find BD, AE, and k (the scale factor).

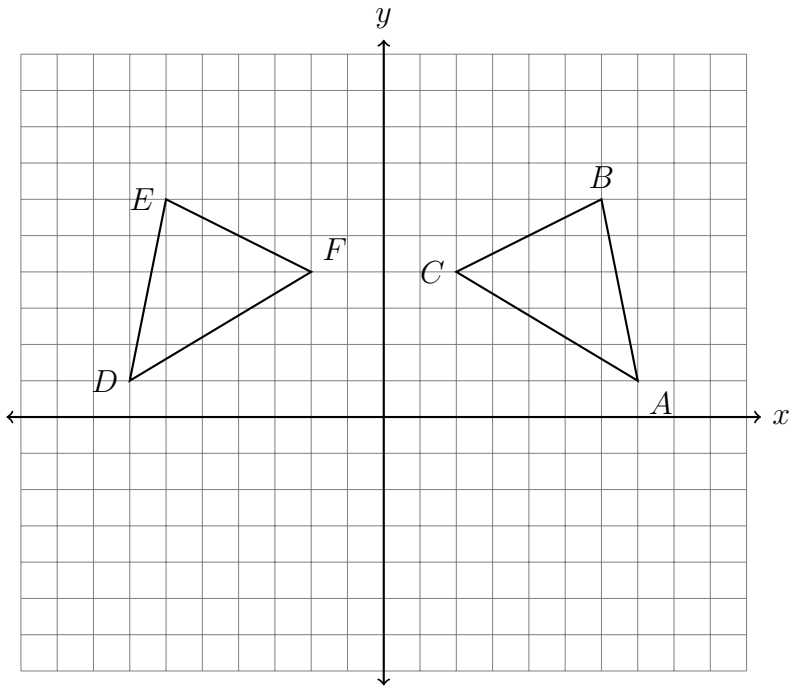


20. What is the smallest non-zero angle of rotation about its center that would map the equilateral triangle onto itself?

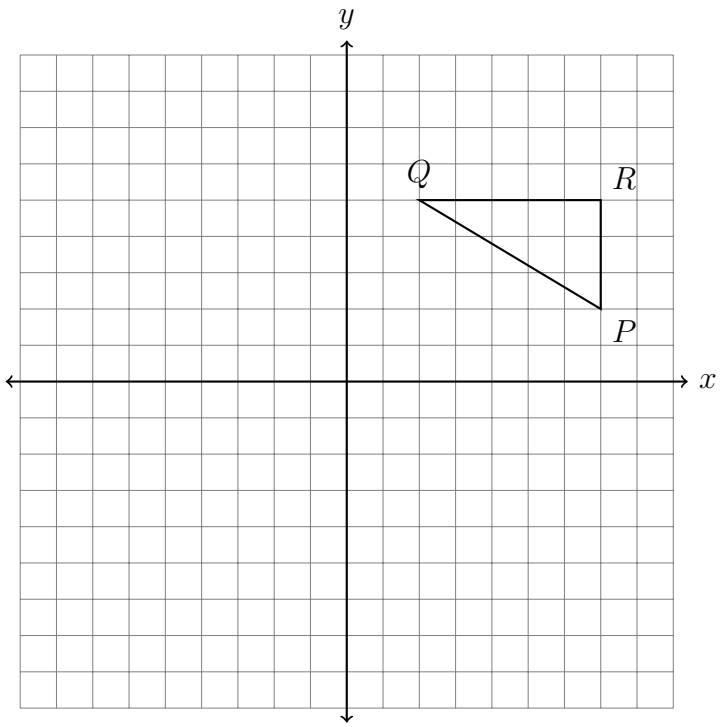


21. A translation maps $A(1, 6) \to A'(-2, 4)$. What is the image of $B(4, 5)$ under the same translation?

22. What transformation maps $\triangle ABC$ onto $\triangle DEF$, shown below? Fully specify the transformation.

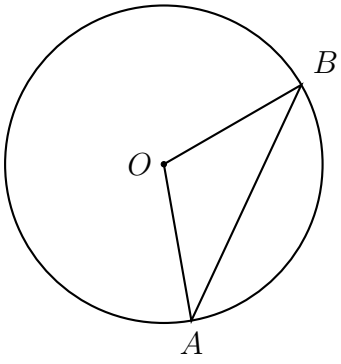


23. Reflect $\triangle PQR$ across the x-axis, drawing its image $\triangle P'Q'R'$ and labeling its vertices.



24. If $\sin(2x - 8)^\circ = \cos 42^\circ$, what is the value of x?

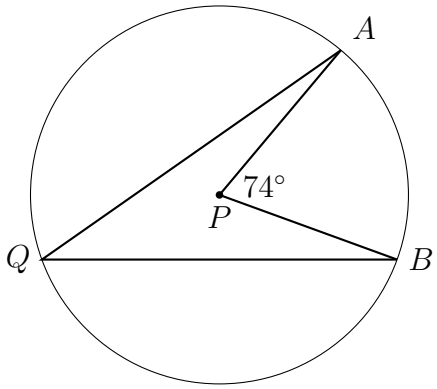
25. Given circle O with inscribed $\triangle AOB$. $m\angle O = 110$. Find $m\angle A$.



26. Given circle P with $m\angle APB = 74°$.

    (a) Write down the $m\widehat{AB}$.

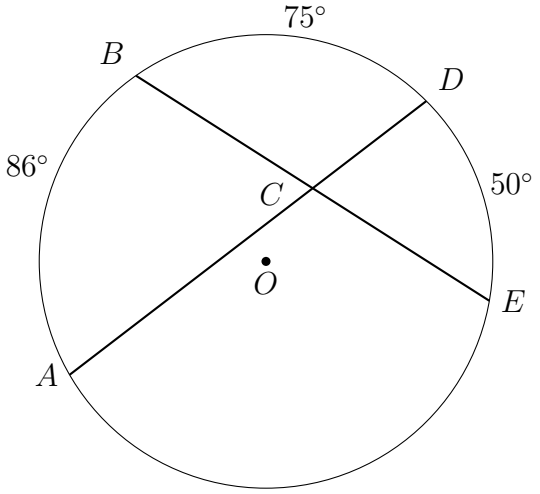
    (b) Find the $m\angle AQB$.



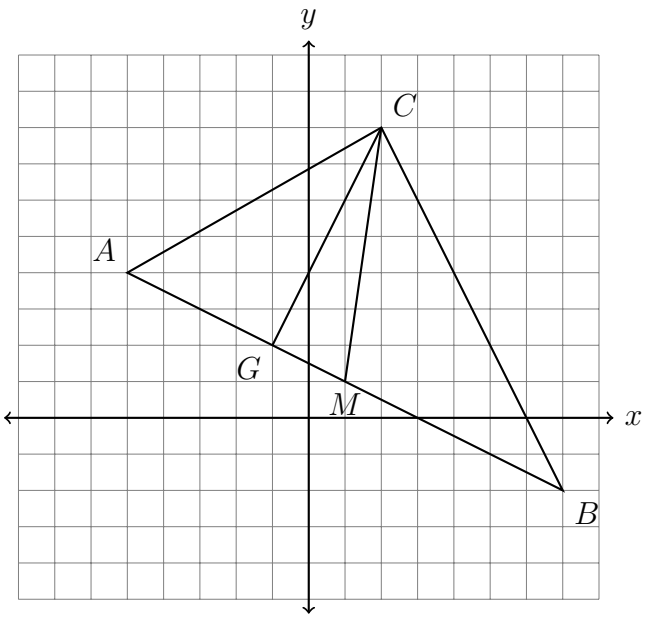
27. Given circle O with chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, as shown in the diagram. Given $m\widehat{AB} = 86°$, $m\widehat{BD} = 75°$, and $m\widehat{DE} = 50°$.

    (a) Find the $m\angle ACB$.

    (b) Find the measure of the minor arc, $m\widehat{AE}$.



28. On the set of axes below, $\triangle ABC$, altitude $\overline{GC}$, and median $\overline{MC}$ are drawn.



Determine which equations represent the area of the triangle, circling True or False.

(a) T F $Area_{\triangle} = \dfrac{(CG)(AB)}{2}$

(b) T F $Area_{\triangle} = \dfrac{(CM)(AB)}{2}$

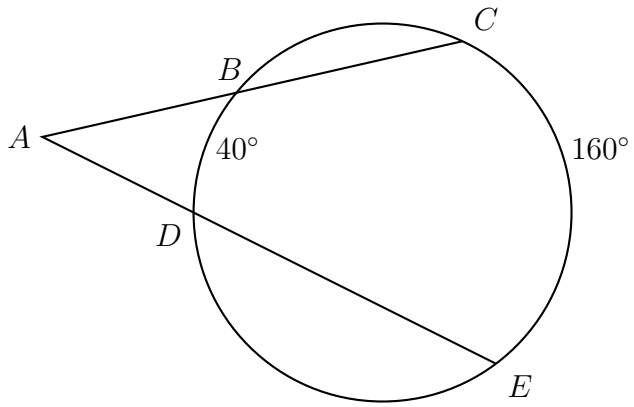
(c) T F $Area_{\triangle} = \dfrac{(AC)(AB)}{2}$

(d) T F $Area_{\triangle} = \dfrac{(CG)(BC)}{2}$

29. A monument in the shape of a pyramid with a square base has a volume of 128 cubic feet. If its height measures 6 feet, what is the length of the side of the base?

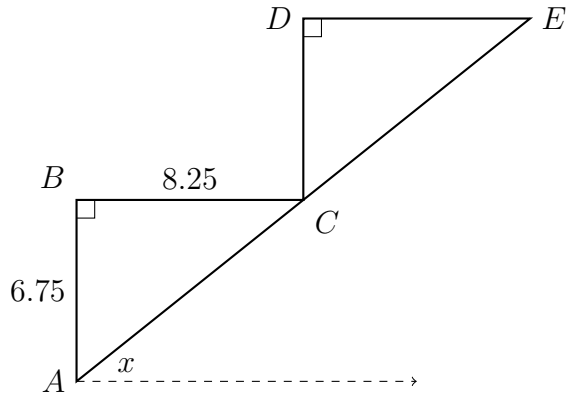
Early finishers

30. The secants $\overline{ABC}$ and $\overline{ADE}$ intersect the circle O, as shown in the diagram. Given $m\widehat{BD} = 40°$ and $m\widehat{CE} = 160°$. Find the $m\angle A$.



31. A staircase riser is cut as a series of congruent triangles with each step's "rise" equal to 6.75 inches, and the "run" of each step is 8.25 inches, as shown below. ($AB = 6.75$ and $BC = 8.25$)

    (a) What is the angle of inclination of the staircase, x, rounded to the *nearest degree*?



    (b) Find the diagonal length of the two-step riser, the distance AE, to the *nearest tenth of an inch.*