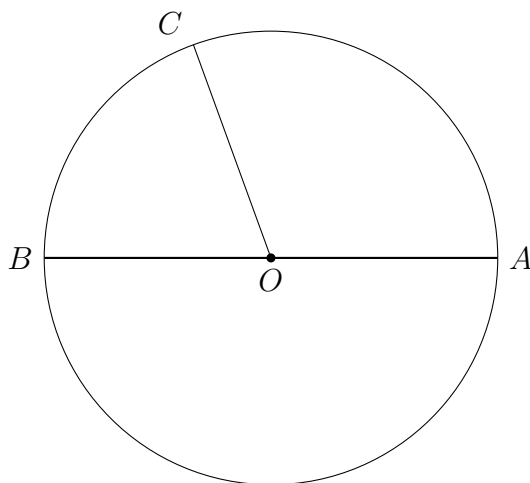


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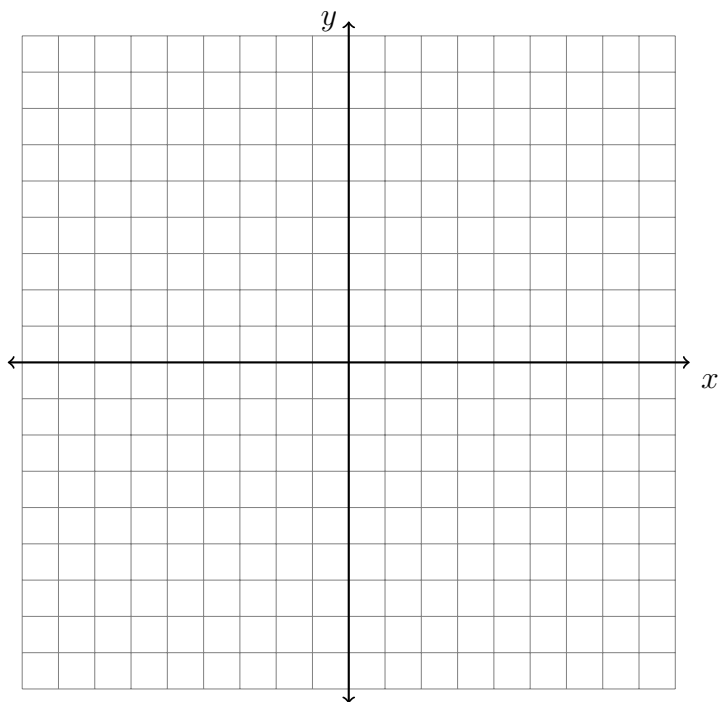
**9.7 Classwork: Area and volume calculations**

1. Circle  $O$  has a diameter  $AB = 6$ , as shown.



- (a) Find the area of circle  $O$ .
- (b) Find the perimeter of the semi-circle with diameter  $\overline{AB}$ , including the length of the diameter.
- (c) Given  $m\angle AOC = 110^\circ$ . Find the area of the sector  $AOC$ .
- (d) Find the perimeter of the sector  $AOC$ .

2. On the set of axes below, graph the quadrilateral  $ABCD$  having coordinates  $A(-3, -3)$ ,  $B(5, 1)$ ,  $C(6, 8)$ , and  $D(-2, 4)$ .



Show that the midpoints of the two diagonals,  $\overline{AC}$  and  $\overline{BD}$ , are the same point.

Prove  $ABCD$  is a parallelogram. Use the following theorem: A quadrilateral is a parallelogram if and only if its diagonals bisect each other.

Be sure to state the conclusion in your proof.

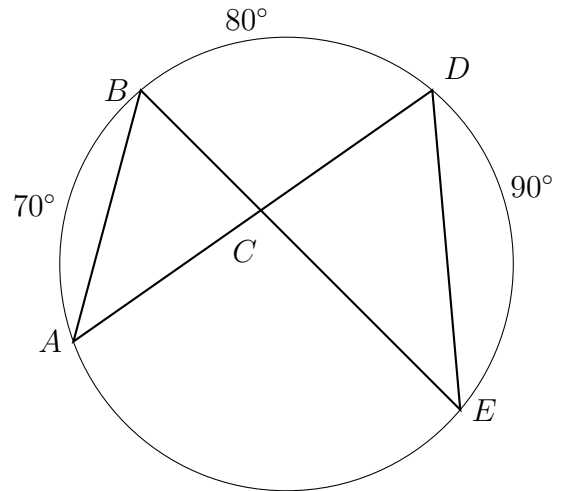
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3. Given circle  $O$  with chords  $\overline{AD}$  and  $\overline{BE}$  intersecting at  $C$ , as shown in the diagram. Given  $m\widehat{AB} = 70^\circ$ ,  $m\widehat{BD} = 80^\circ$ , and  $m\widehat{DE} = 90^\circ$ .

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

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

(c) Find the  $m\angle BCD$ .

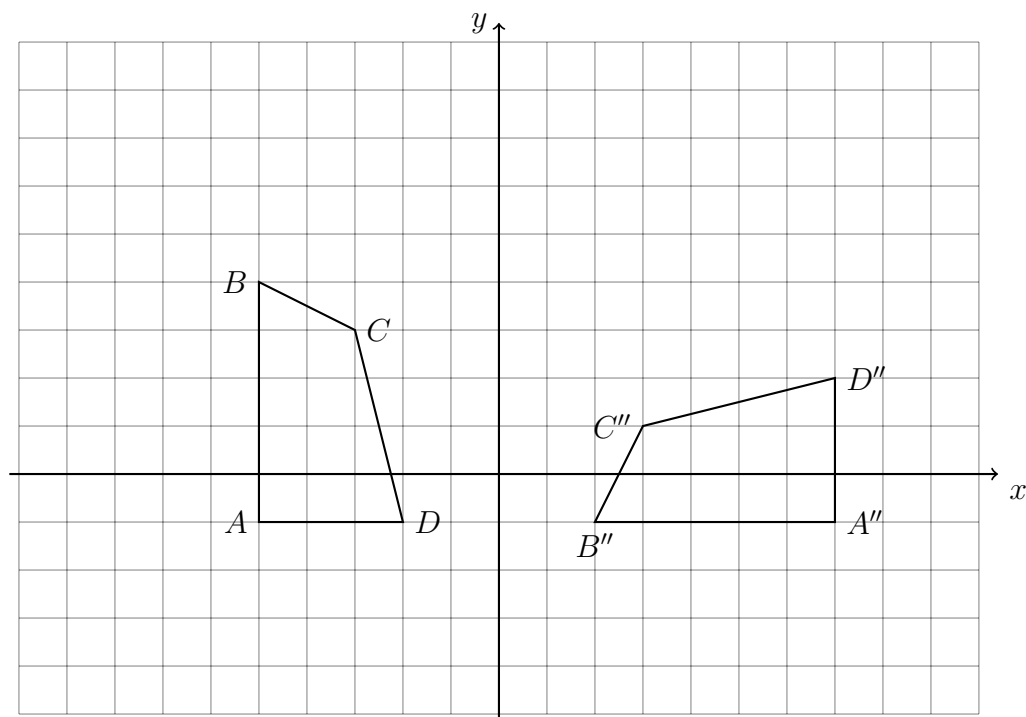


4. Given a rectangle with area 40, width  $x$ , and length  $x - 3$ .

(a) Find  $x$ .

(b) Find the perimeter of the rectangle.

5. Quadrilateral  $ABCD$  undergoes two transformations mapping it onto  $A''B''C''D''$ , as shown below. Specify the two transformations in detail.

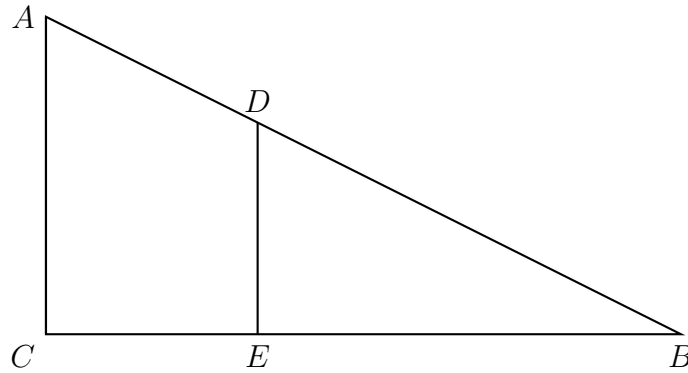


Rewrite each statement that is true and applies to this problem from the following list:

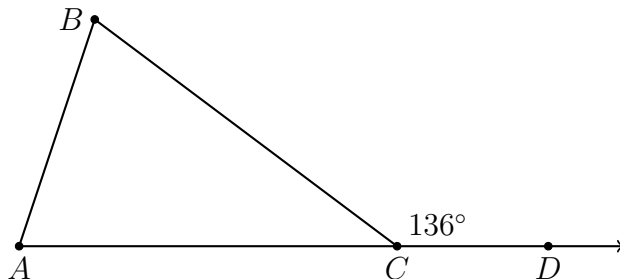
- Both transformations are rigid motions.
- The reflection preserves orientation.
- Lengths and angles are preserved so the quadrilaterals are congruent.

**9.7 Homework: Area and volume calculations**

1. In right triangle  $ABC$  shown below, point  $D$  is on  $\overline{AB}$  and point  $E$  is on  $\overline{BC}$  such that  $\overline{AC} \parallel \overline{DE}$ . Given  $BD = 10$ ,  $BC = 12$ , and  $EC = 4$ .



- (a) Find the length of  $\overline{BE}$ .
- (b) Find the scale factor,  $k$ , dilating  $\triangle DBE \rightarrow \triangle ABC$ , centered at  $B$ .
- (c) Find  $AD$ .
2. Given isosceles  $\triangle ABC$  with  $\overline{AC} \cong \overline{BC}$ , and  $m\angle BCD = 136^\circ$ . Find  $m\angle A$ .



3. Find the area of a semi-circle radius of 15.

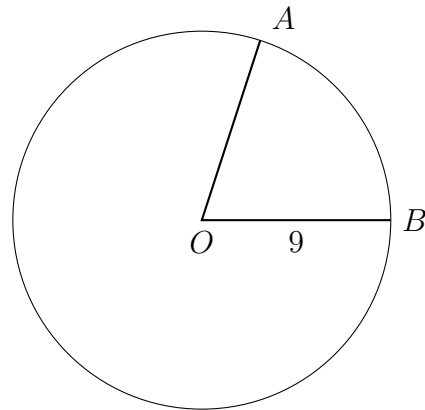
4. Given circle  $O$  with radius  $OB = 9$ .

(a) Find the circumference of circle  $O$ .

(b) Find its area.

(c) Given that  $m\angle AOB = 72^\circ$ , find  $m\widehat{AB}$ .

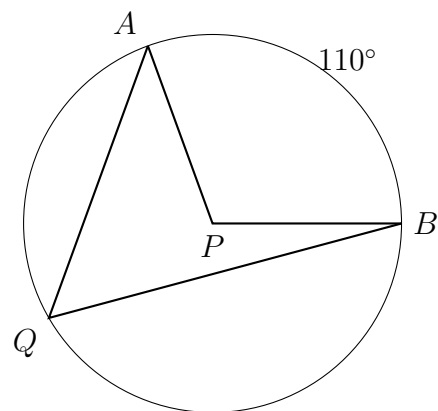
(d) Find the area of the sector  $AOB$ .



5. Given circle  $P$  with  $m\widehat{AB} = 110^\circ$ .

(a) Write down the  $m\angle APB$ .

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



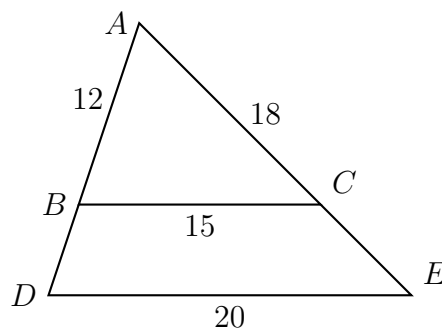
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6. Find the volume of a pyramid ( $V = \frac{1}{3}Bh$ ) having a height of 11.3 inches and with a square base having side lengths of 7 inches. Express your result to the *nearest cubic inch*.

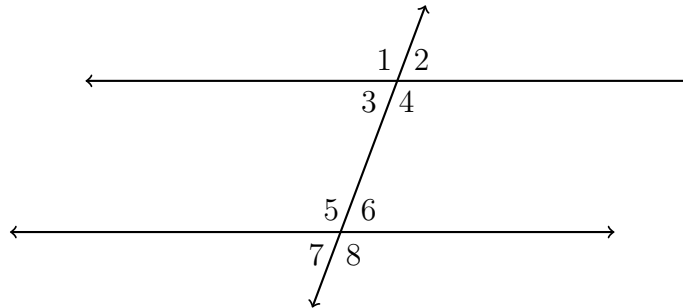
7. Find the volume of a hemisphere with a radius of 30 inches, to the *nearest whole cubic inch*. (The formula for the volume of a *sphere* is  $V = \frac{4}{3}\pi r^3$ )

8. Triangle  $ABC$  is dilated with a scale factor of  $k$  centered at  $A$ , yielding  $\triangle ADE$ , as shown. Given  $AB = 12$ ,  $BC = 15$ ,  $AC = 18$ , and  $DE = 20$ .

Find  $AD$ ,  $CE$ , and  $k$  (the scale factor).



9. Given two parallel lines and a transversal, as shown. Apply the theorem, “If a transversal intersects two parallel lines, then corresponding angles are congruent.”



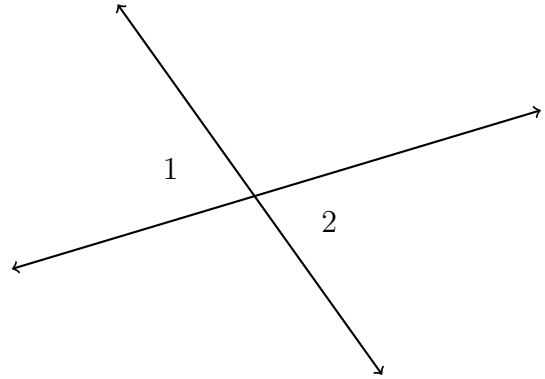
- (a) State the angle corresponding with  $\angle 2$ .
- (b) Given  $m\angle 8 = 115^\circ$  and  $m\angle 4 = 5x^\circ$ . Find  $x$ .
- (c) Given  $m\angle 7 = 65^\circ$ . Find  $m\angle 2$ .
- (d) In a proof, what reason would justify  $\angle 4 \cong \angle 5$ ? \_\_\_\_\_
10.  $A(-1, 7)$  is one endpoint of  $\overline{AB}$ . The segment's midpoint is  $M(1, 2)$ . Find the other endpoint,  $B$ .
11. Given  $R(-2, 0)$  and  $S(3, 5)$ , find the length of  $\overline{RS}$ . Simplify the radical.



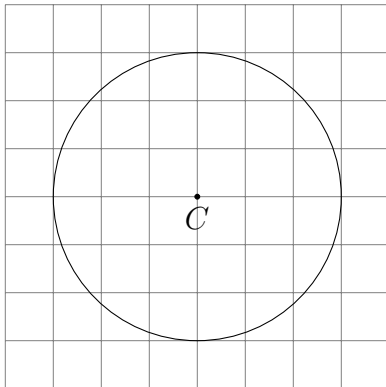
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### 9.8 Classwork: Analytical Geometry Practice

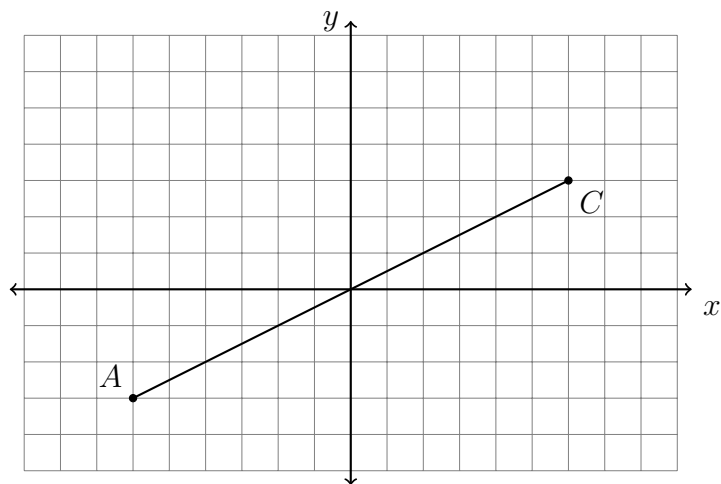
1. Given two vertical angles,  $m\angle 1 = 5x + 9$ ,  $m\angle 2 = 6x - 1$ . Find  $m\angle 1$ .  
For full credit, check by comparing to  $m\angle 2$ .



2. Given the circle  $C$  with circumference  $10\pi$ .
- (a) Write down the formula for the circumference of a circle and solve for the radius yielding a circumference of  $6\pi$ .
- (b) Find the area of the circle.



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



If  $B$  is a point on  $\overline{AC}$  and  $AB:BC = 1:3$ , what are the coordinates of  $B$ ?

4. Write down the center and radius of each circle.

(a)  $(x - 4)^2 + (y - 3)^2 = 9$

(c)  $x^2 + y^2 = 4$

(b)  $(x + 5)^2 + (y - 2)^2 = 4^2$

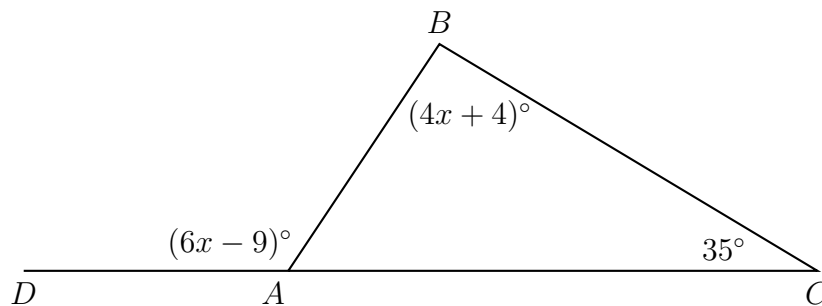
(d)  $(x + 7)^2 + (y - 2)^2 = 9^2$

Name:

5. Find the volume of a cone ( $V = \frac{1}{3}\pi r^2 h$ ) having a height of 12 inches and with a radius of 3 inches. Express your result to the *nearest cubic inch*.

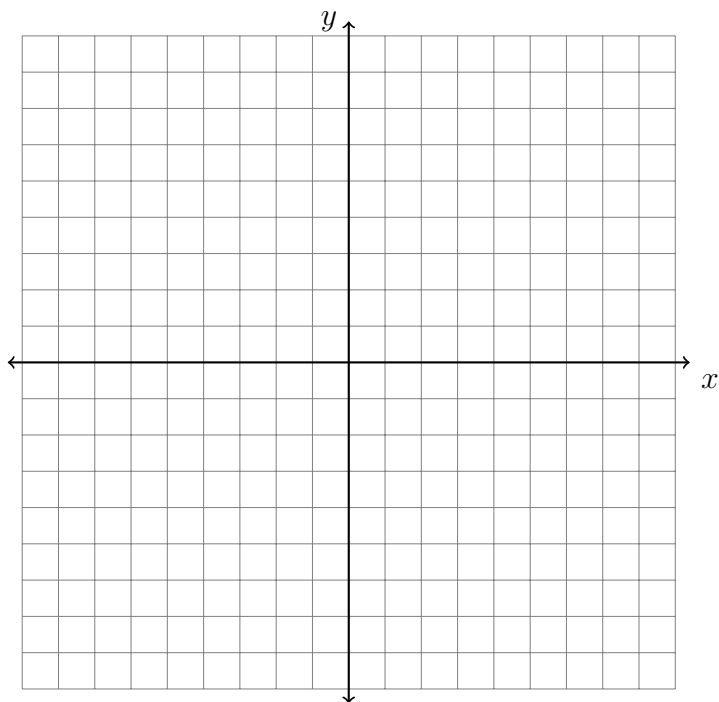
6. Find the volume of a cylinder 10 inches tall with a radius of 6 inches, to the *nearest whole cubic inch*. (The formula for the volume of a *cylinder* is  $V = \frac{4}{3}\pi r^3$ )

7. In  $\triangle ABC$  shown below, side  $\overline{AC}$  is extended to point  $D$  with  $m\angle DAB = (6x - 9)^\circ$ ,  $m\angle C = 35^\circ$ , and  $m\angle B = (4x + 4)^\circ$ .



What is  $m\angle BAC$ ?

8. On the set of axes below, graph the quadrilateral  $ABCD$  having coordinates  $A(-3, -3)$ ,  $B(5, 1)$ ,  $C(6, 8)$ , and  $D(-2, 4)$ .



Show that the midpoints of the two diagonals,  $\overline{AC}$  and  $\overline{BD}$ , are the same point.

Prove  $ABCD$  is a parallelogram. Use the following theorem: A quadrilateral is a parallelogram if and only if its diagonals bisect each other.

Be sure to state the conclusion in your proof.

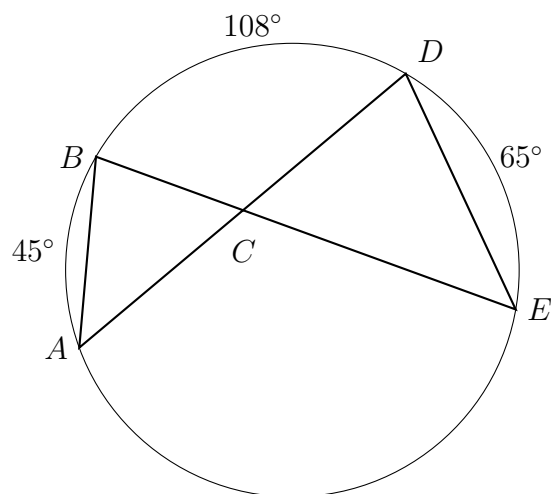
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### 9.8 Homework: Review Problem Set

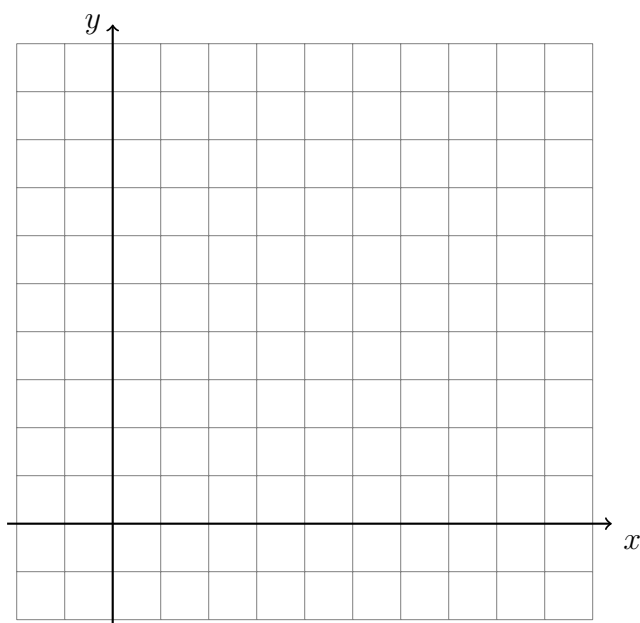
- Given circle  $O$  with chords  $\overline{AD}$  and  $\overline{BE}$  intersecting at  $C$ , as shown in the diagram. Given  $m\widehat{AB} = 45^\circ$ ,  $m\widehat{BD} = 108^\circ$ , and  $m\widehat{DE} = 65^\circ$ .

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

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



- On the graph, draw polygon ABCDEF with vertices A(1, 1), B(1, 4), C(3, 4), D(3, 7), E(8, 7), and F(8, 1). Find the perimeter and the area of the polygon.

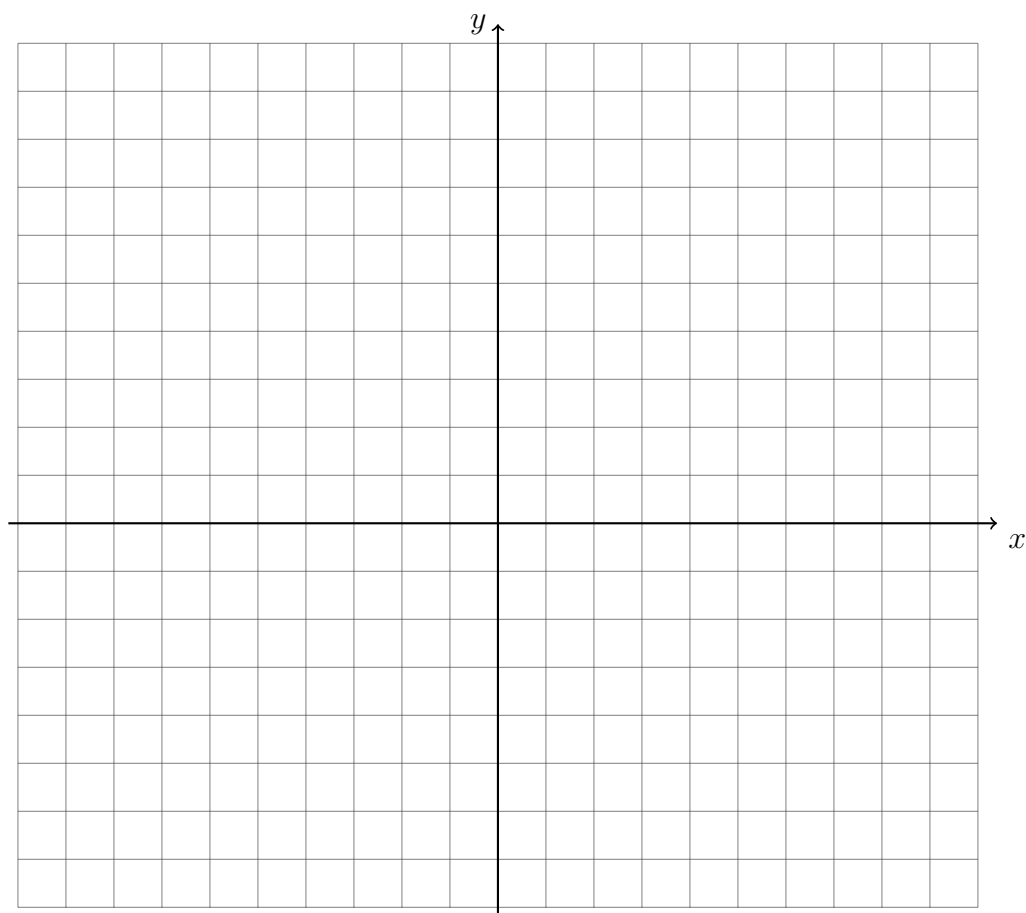


3. Graph and label the two equations. Mark their intersection as an ordered pair.

$$y = -4x - 6$$

$$x - 3y = -21$$

Are the lines parallel, perpendicular, or neither? Justify your answer.



4. The line  $l$  has the equation  $y = 3x + 2$ .
- (a) What is the slope of the line  $k$ , given  $k \parallel l$ ?
- (b) What is the slope of the line  $m$ , given  $m \perp l$ ?

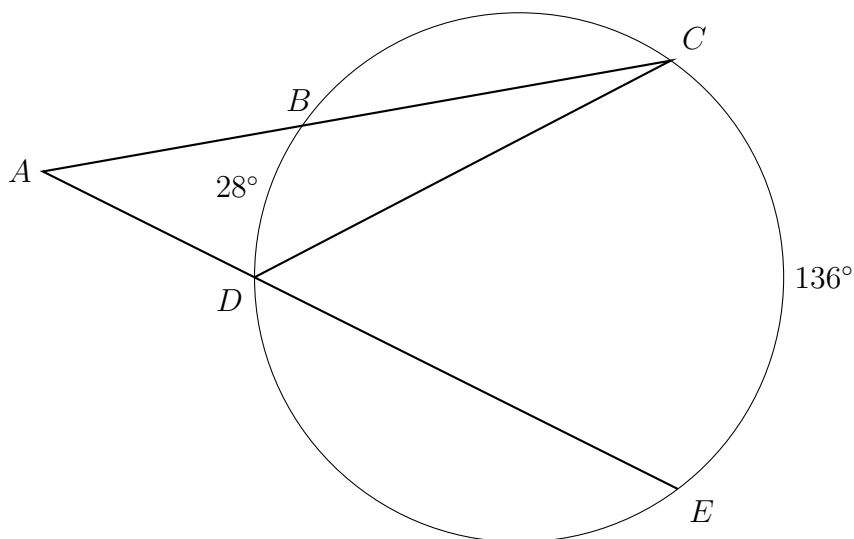
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5. The secants  $\overline{ABC}$  and  $\overline{ADE}$  intersect the circle  $O$ , as shown in the diagram. Given  $m\widehat{BD} = 28^\circ$  and  $m\widehat{CE} = 136^\circ$ .

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

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

(c) Find the  $m\angle A$ .



6. Express the result to the nearest thousandth.

(a)  $\sin 35^\circ =$

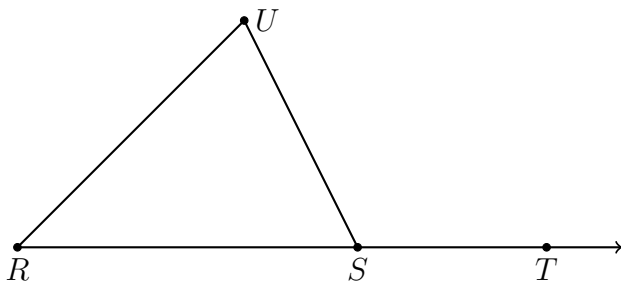
(c)  $\sin 78^\circ =$

(b)  $\tan 70^\circ =$

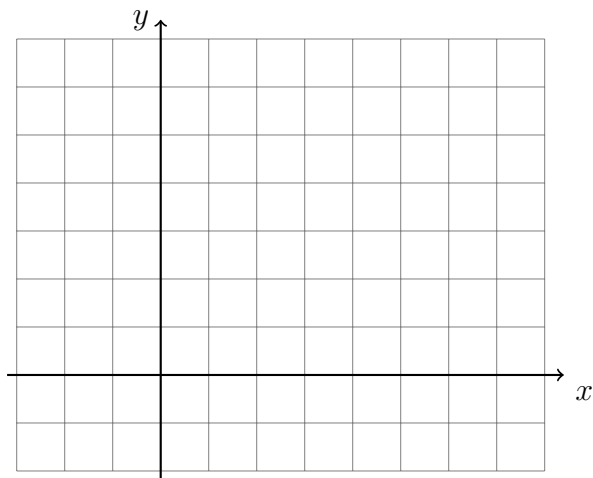
(d)  $\cos 12^\circ =$

7. Given  $P(7,0)$  and  $Q(3,2)$ , find the length of  $\overline{PQ}$ . Simplify the radical.

8. Given  $m\angle R = 45$  and  $m\angle UST = 110$ . Find  $m\angle U$ .



9. On the graph below, draw  $\overline{AB}$ , with  $A(5, 3)$  and  $B(-1, -3)$ , labeling the end points. Determine and state the coordinates of the midpoint  $M$  of  $\overline{AB}$  and mark and label it on the graph.



10. Given  $\overline{ABC}$ ,  $AC = 18$ , and the point  $B$  partitions  $\overline{AC}$  in a ratio of 2:7.

Find  $AB$ .

