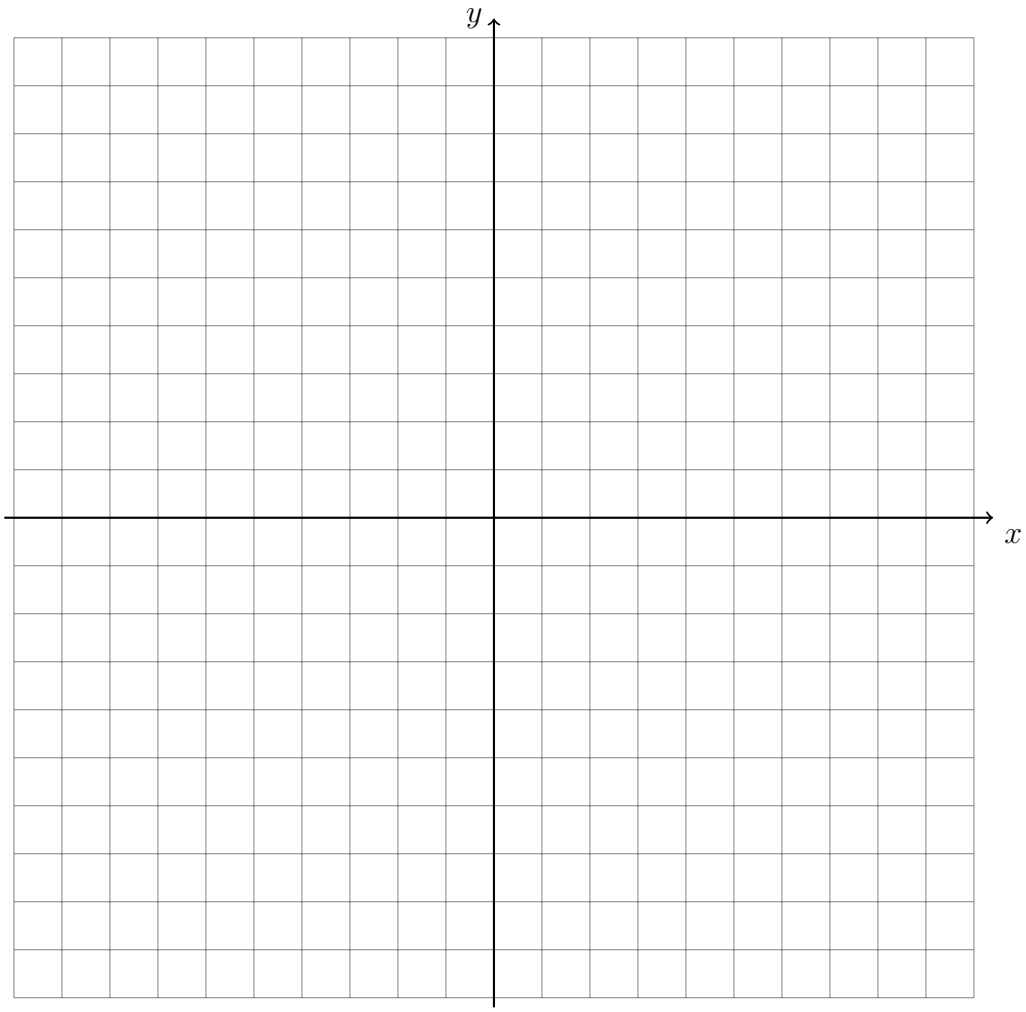
9.10 Test: Linear functions on the coordinate plane **HSA.REI.B.3**

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

   $y = \frac{1}{3}x + 5$ $3x + 2y = -12$

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



2. Find each value as a decimal rounded to three significant figures.

   (a) 5.53581 (c) $5 - \sqrt{3}$

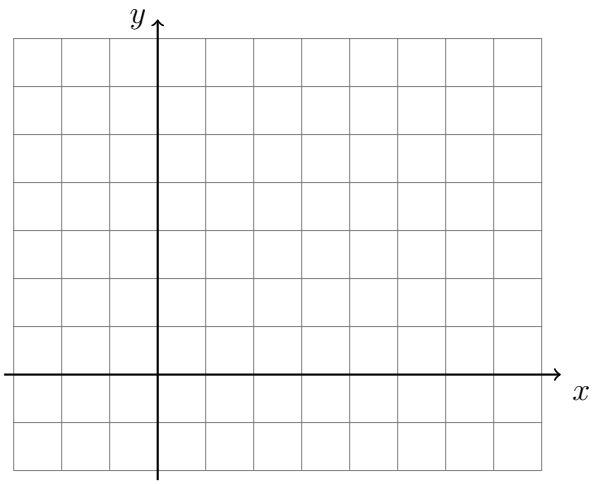
   (b) 24.34998 (d) 3π

3. The line l has the equation $y = -\frac{4}{3}x + 7$.

   (a) What is the slope of the line k, given $k \parallel l$?

   (b) What is the slope of the line m, given $m \perp l$?

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



5. Given $K(1, 6)$ and $L(7, 4)$, find the length of $\overline{KL}$, expressed as a simplified radical.

   Use: $l = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

6. A translation maps $A(1, 12) \to A'(-3, 2)$. What is the image of $B(10, -2)$ under the same translation?

In the following two problems, solve for the value of x.

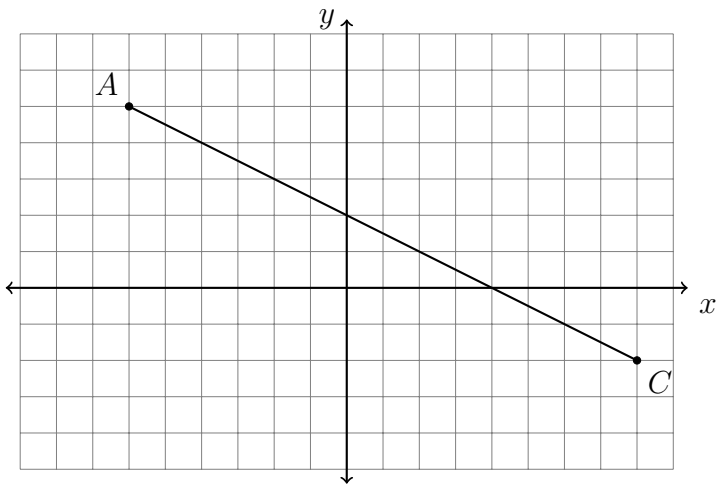
7. $\frac{1}{5}(10x + 5) = 3$

8. $\frac{2}{3}(5 - x) = -4$

9. Given $f(x) = \frac{1}{3}x + 3$. Solve for x such that for $f(x) = 2$.

10. Given $g(x) = -2x^2 - 5x + 3$. Simplify $g(1)$.

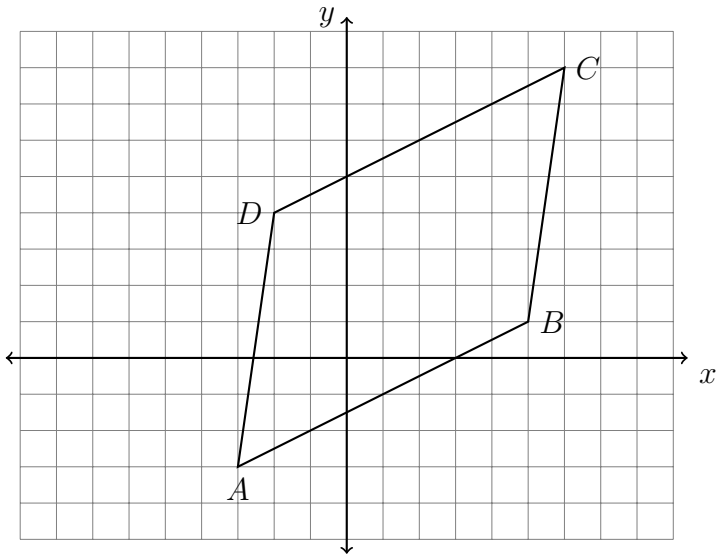
11. In the diagram below, $\overline{AC}$ has endpoints with coordinates $A(-6, 5)$ and $C(8, -2)$.



If B is a point on $\overline{AC}$ and $AB{:}BC = 2{:}5$, what are the coordinates of B?

12. $A(1, -3)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(5, 4)$. Find the other endpoint, B.

13. Spicy: Shown below is the quadrilateral $ABCD$ having coordinates $A(-3,-3)$, $B(5,1)$, $C(6,8)$, and $D(-2,4)$.



Given that $\overline{AD} \parallel \overline{BC}$.

(a) Find the slopes of $\overline{AB}$ and $\overline{CD}$

(b) Hence, show that $\overline{AB} \parallel \overline{CD}$

(c) Use the definition that a parallelogram is a quadrilateral with two pairs of parallel sides to prove $ABCD$ is a parallelogram.