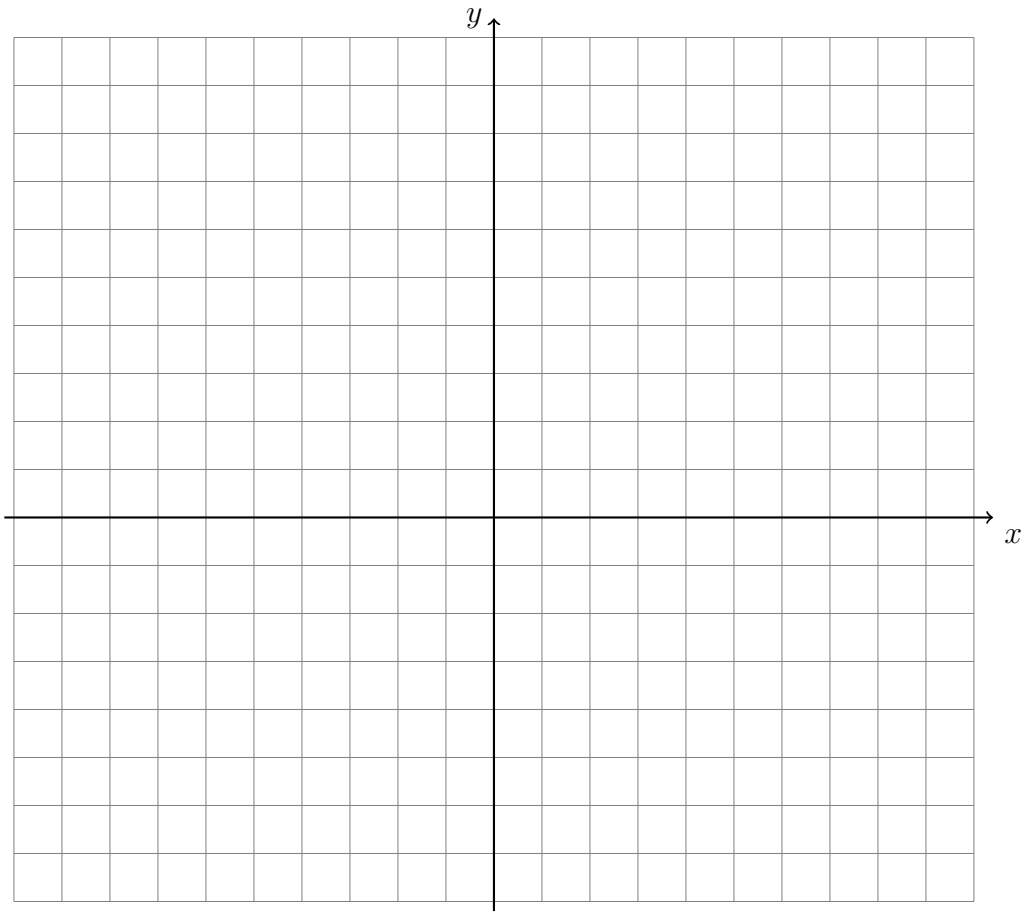
7-13 Break Packet: Linear & quadratic functions on the coordinate plane

1. 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.

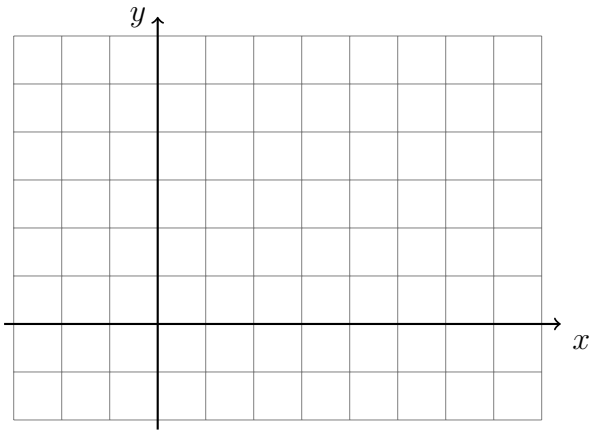


2. The line l has the equation $y = 3x + 2$.

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

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

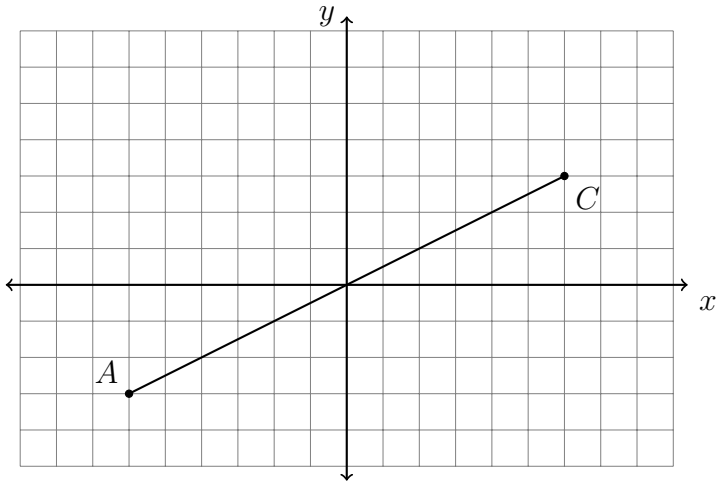
3. On the graph below, draw $\overline{AB}$, with $A(-1, 1)$ and $B(7, 3)$, labeling the end points. Determine and state the coordinates of the midpoint M of $\overline{AB}$ and mark and label it on the graph.



4. Given $M(-1, 0)$ and $N(3, -2)$, find the length of $\overline{MN}$. Simplify the radical.

5. $A(-1, 7)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(1, 2)$. Find the other endpoint, B.

6. 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?

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

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

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

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

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

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

8. $\frac{1}{2}(3x + 5) = 7$

9. $\frac{2}{3}(6 - 12x) = -12$

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

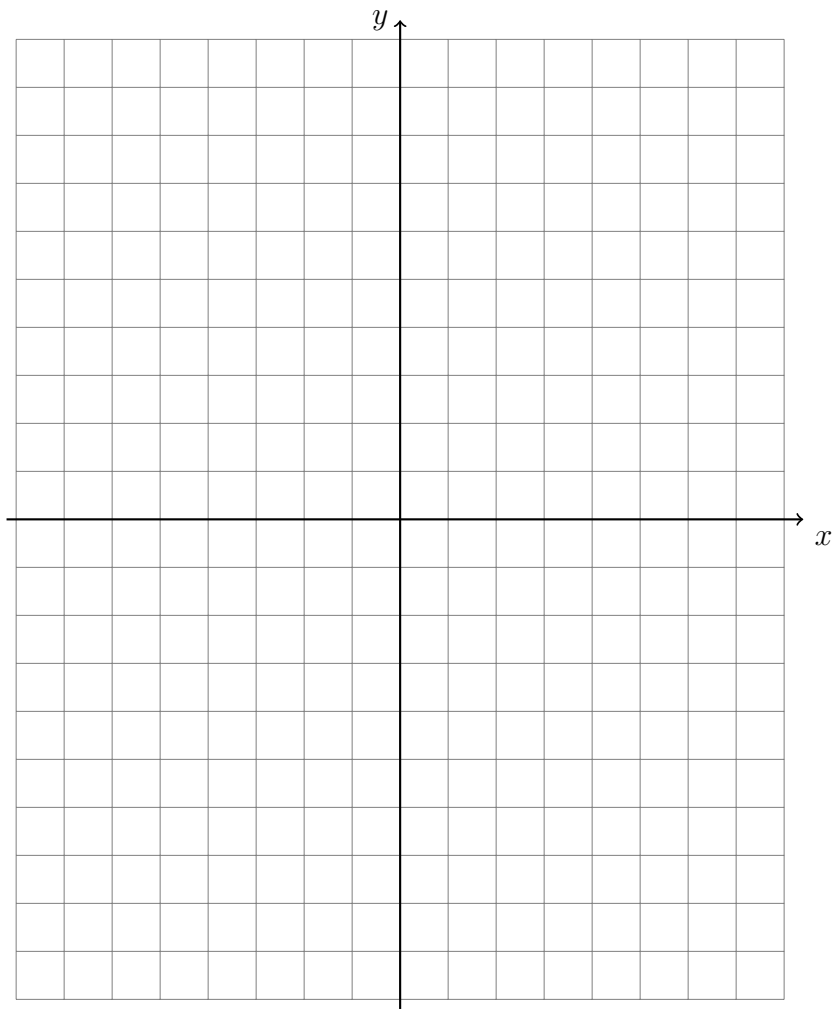
11. Given $g(x) = 2x^2 - 7x + 1$. Simplify $g(-1)$.

12. Given $h(x) = x^2 - 8x + 16$. Solve $h(x) = 0$.

13. Complete the t-chart for $x = -5, -4, -3, -2, -1, 0$, then graph and label the function on the grid below. Use pencil for graphs. Draw parabolas as smooth curves.

$$f(x) = (x+3)^2 - 4$$

x	$f(x)$

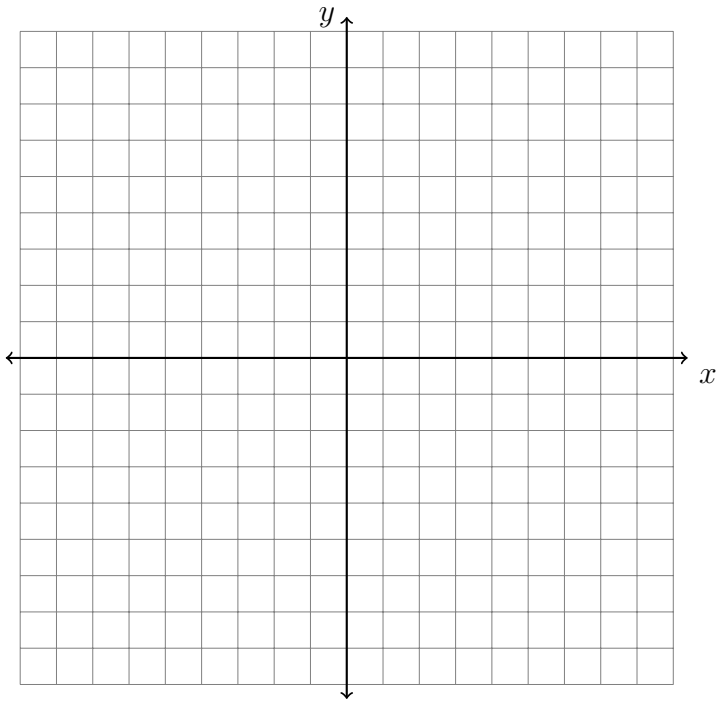


(a) Mark the vertex on the graph as an ordered pair.

(b) Write down the equation for the axis of symmetry.

(c) The function is translated four units to the right and three units up, $f \to g$. What is the equation of g?

14. Spicy: 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.