7-16 Pre-test: Applying Algebra to Geometric Situations

1. Write down the slope perpendicular to the given slope.

   (a) $m = \frac{3}{2}$ $m_\perp =$

   (b) $m = -4$ $m_\perp =$

   (c) $m = 0.25$ $m_\perp =$

   (d) $m = -\frac{1}{3}$ $m_\perp =$

2. The line l has the equation $y = 2x - 5$.

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

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

   In the following problems, use the point-slope formula: $y - y_A = m(x - x_A)$

3. What is the equation of a line through the point $A(5, -1)$ and parallel to the line $y = x - 5$?

4. *Spicy* What is an equation of the perpendicular bisector of $\overline{QR}$ with $Q(5, -3)$ and $R(1, 5)$?

5. Simplify each expression. (Leave it in radical form if necessary, not a decimal.)

   (a) $\sqrt{49}$

   (b) $\sqrt{20}$

   (c) $\sqrt{75}$

   (d) $\sqrt{\frac{1}{16}}$

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

   (a) $(x-6)^2 + y^2 = 36$

   (b) $(x+2)^2 + (y+1)^2 = 18$

   (c) $(x-1)^2 + (y-9)^2 = 7^2$

   (d) $(x+3)^2 + (y-4)^2 = 18$

7. In the quadratic function below, a constant value, p, "completes the square".

$$f(x) = x^2 + 6x + p - p$$

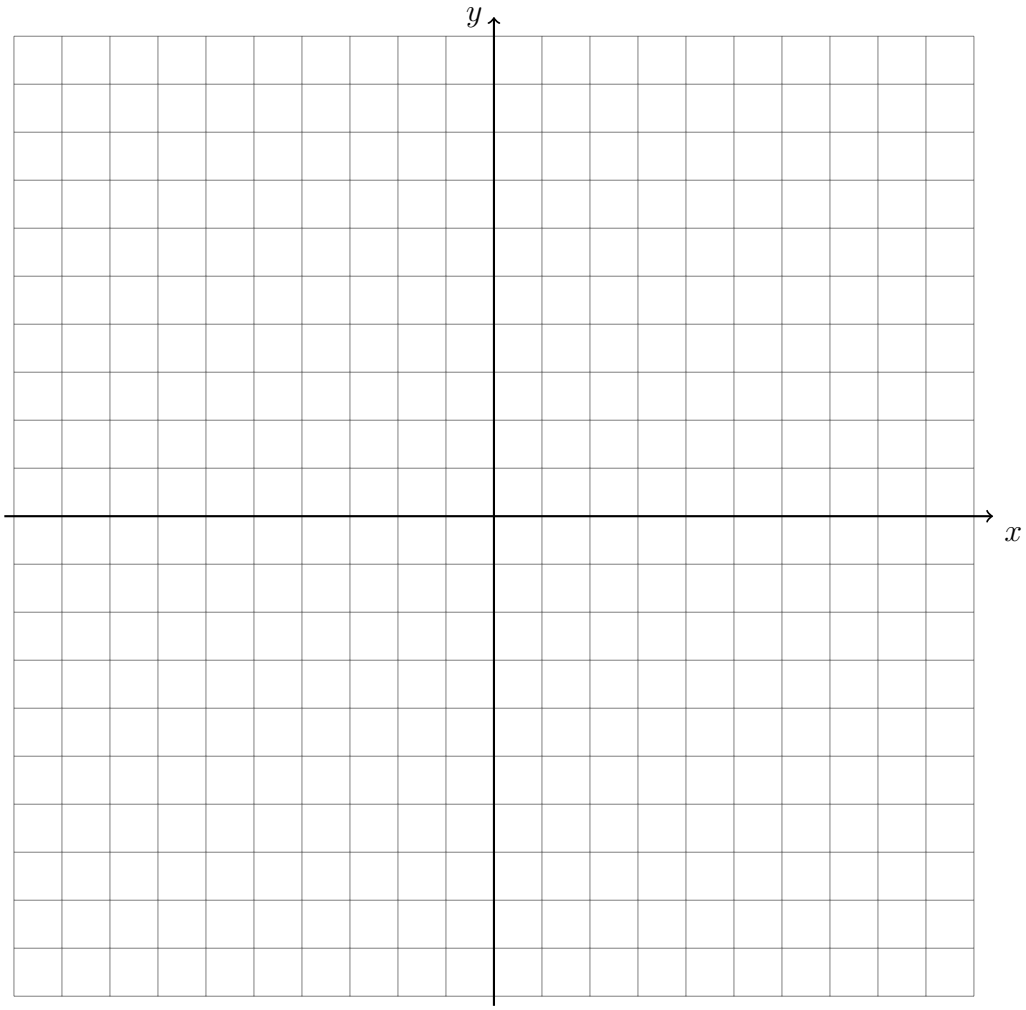
   (a) What value of p would complete the square?

   (b) Rewrite the function f in vertex form.

   (c) Write down the value of the vertex of the graph of f as a coordinate pair.

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

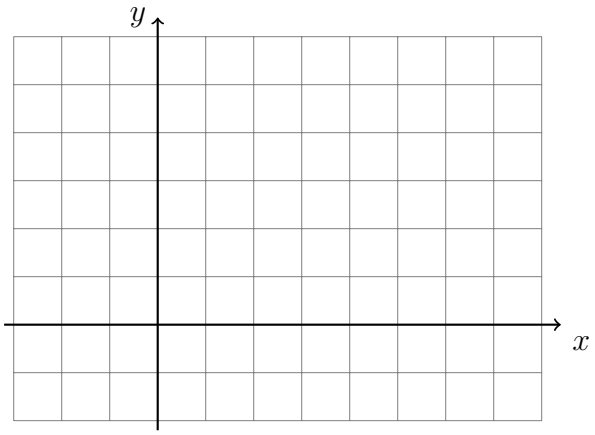
$y = \frac{3}{2}x - 8$ $2x + 6y = 18$



Are the lines parallel, perpendicular, or neither? Justify your answer, stating the values of the lines' slopes.

9. Given $J(2, 6)$ and $K(-1, 3)$, find the length of $\overline{JK}$. Leave the result in simplified radical form (not a decimal).

10. On the graph below, draw $\overline{AB}$, with $A(-2, -1)$ and $B(4, 7)$, labeling the end points.

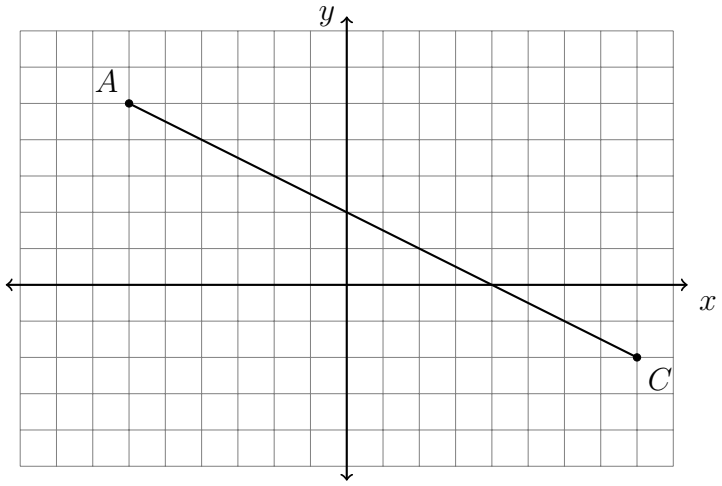


(a) Determine and state the coordinates of the midpoint M of $\overline{AB}$. Mark M and label it on the graph.

(b) Find the slope of $\overline{AB}$.

(c) Find the length of $\overline{AB}$.

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

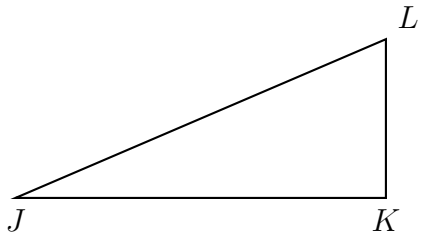


If B is a point on $\overline{AC}$ and $AB{:}BC = 4{:}3$, what are the coordinates of B?

12. $A(-2, 5)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(3, 3)$. Find the other endpoint, B.

13. A translation maps $A(-2, 4) \rightarrow A'(-5, 7)$. What is the image of $B(1, -3)$ under the same translation?

14. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 7.8$, $m\angle J = 33°$. Find the length JK, *rounded to the nearest hundredth.*



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

15. $\frac{1}{4}(7x + 5) = 3$

16. $\frac{4}{3}(6 - 3x) = 4$

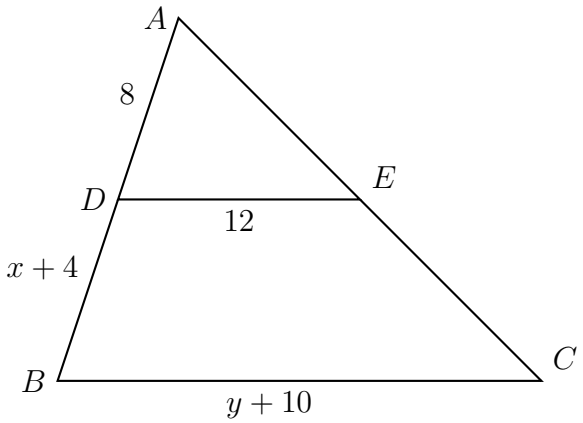
17. Given $f(x) = \frac{3}{2}x + 2$. Solve for x such that for $f(x) = 5$.

18. Given $g(x) = -x^2 - 7x - 6$. Simplify $g(-1)$.

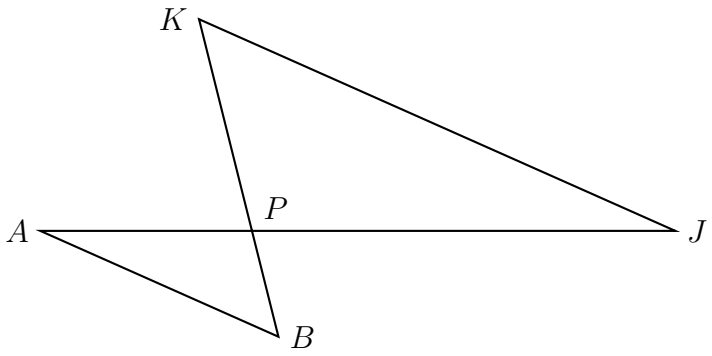
19. Given $h(x) = x^2 + x - 6$. Solve $h(x) = 0$.

20. Given triangle ABC with D the midpoint of $\overline{AB}$ and E the midpoint of $\overline{AC}$, as shown. Given $AD = 8$, $BD = x + 4$, $DE = 12$, and $BC = y + 10$.

    Find x and y.



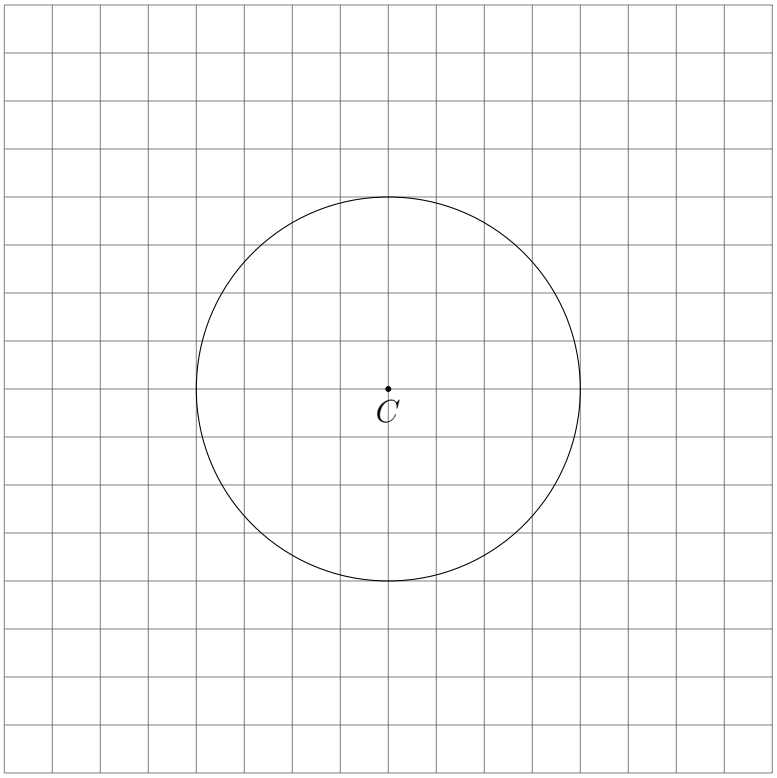
21. Given $\triangle ABP$ and $\triangle JKP$ as shown below. $\overline{AB} \parallel \overline{JK}$. $AP = 3.8$, $JP = 9.5$, and $JK = 16.5$. Find AB.



22. Given the circle C with circumference 8π.

    (a) Write down the formula for the circumference of a circle and solve for the radius yielding a circumference of 8π.

    (b) Find the area of the circle.



23. Given a circle O with radius 5.

    (a) Find the circumference of O.

    (b) Find the area of O.