

1 March 2019

Name:

7-17 Exam: Applying Algebra to Geometric Situations

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

(a) $m = -\frac{4}{3}$ $m_{\perp} =$

(c) $m = 0.5$ $m_{\perp} =$

(b) $m = 3$ $m_{\perp} =$

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

2. The line l has the equation $y = \frac{2}{3}x + 1$. To each line below, circle whether l is parallel, perpendicular, or neither.

(a) parallel perpendicular neither $y = -\frac{2}{3}x - 1$

(b) parallel perpendicular neither $y = \frac{3}{2}x + 4$

(c) parallel perpendicular neither $2x - 3y = -7$

(d) parallel perpendicular neither $3x + 2y = 5$

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 $A(3, -2)$ and parallel to the line $y = 3x - 1$?
4. What is an equation of the perpendicular bisector of \overline{QR} with $Q(2, 0)$ and $R(6, 2)$?

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

(a) $\sqrt{121}$

(c) $\sqrt{50}$

(b) $\sqrt{27}$

(d) $\sqrt{\frac{1}{4}}$

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

(a) $(x + 1)^2 + y^2 = 64$

(c) $(x - 3)^2 + (y - 9)^2 = 6^2$

(b) $(x - 4)^2 + (y + 6)^2 = 8$

(d) $(x + 1)^2 + (y + 7)^2 = 16$

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

$$f(x) = x^2 + 10x + p - p$$

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

(b) Rewrite the function f in vertex form.

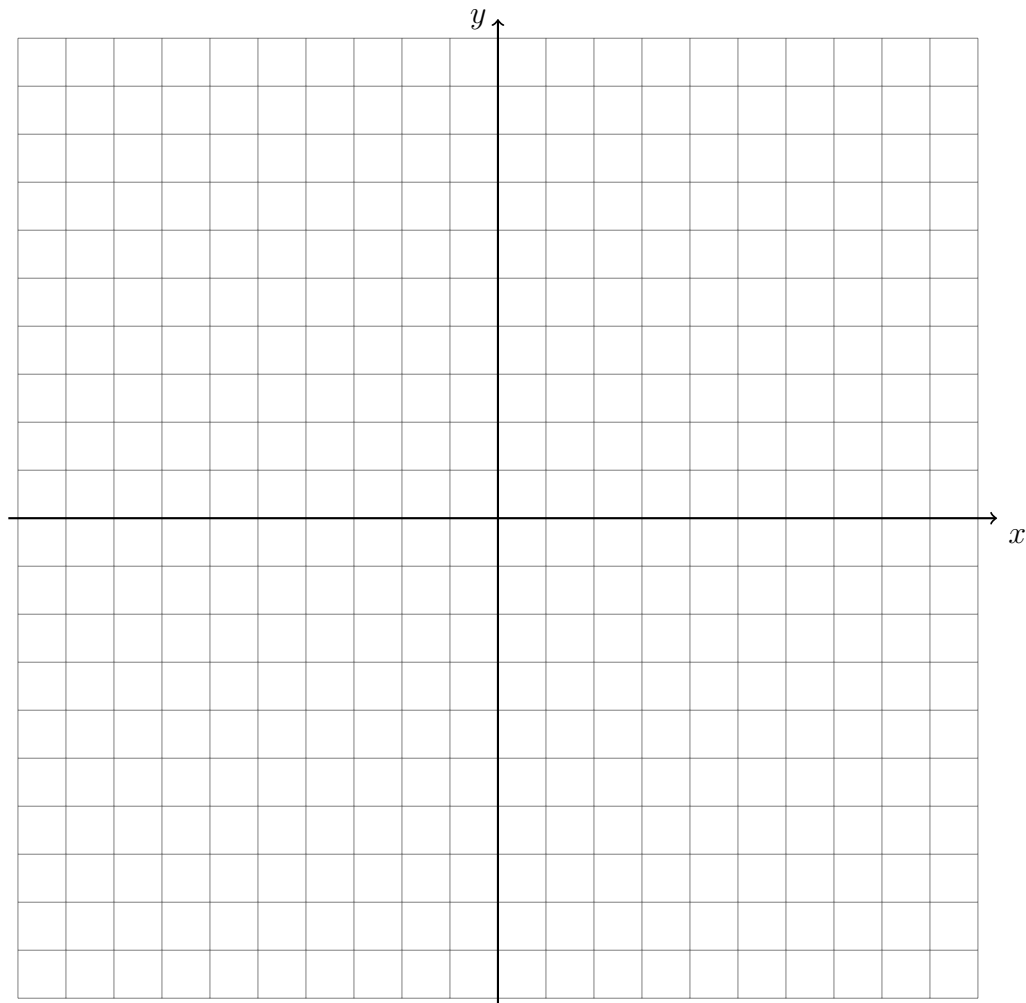
(c) Write down the value of the vertex of the graph of f as a coordinate pair.

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

$$y = \frac{3}{4}x + 2$$

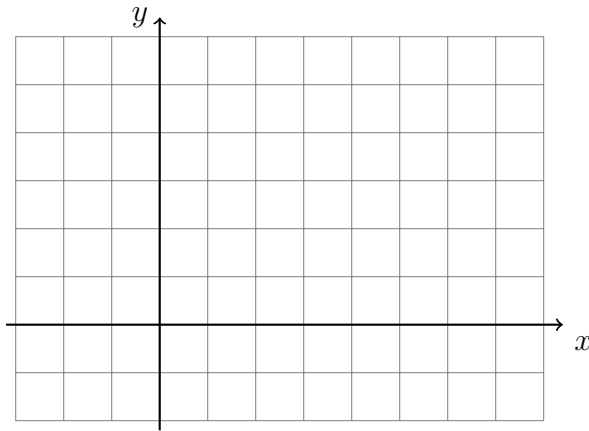
$$3x + 3y = -15$$



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

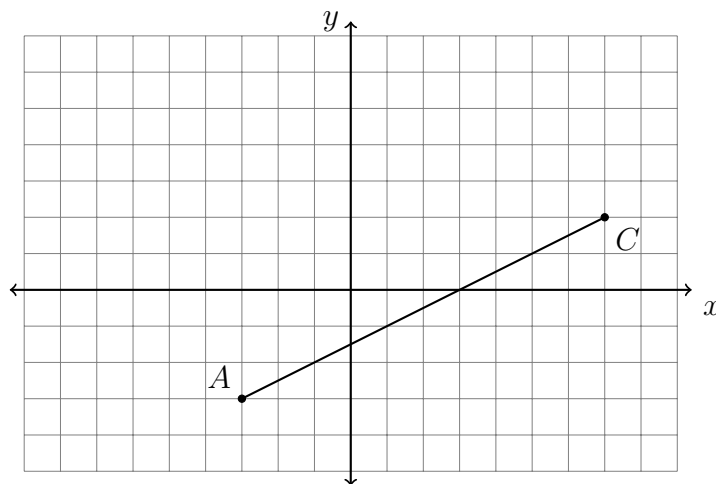
9. Given $J(-2, 7)$ and $K(1, 4)$, find the length of \overline{JK} . Leave the result in simplified radical form (not a decimal).

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



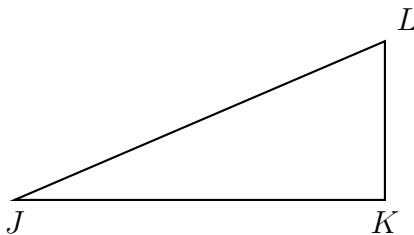
- (a) Determine and state the coordinates of the midpoint M of \overline{AB} . Mark M and label it on the graph.
- (b) Find the slope of \overline{AB} .
- (c) Find the length of \overline{AB} . Leave the result as a simplified radical.

11. In the diagram below, \overline{AC} has endpoints with coordinates $A(-3, -3)$ and $C(7, 2)$.



- If B is a point on \overline{AC} and $AB:BC = 2:3$, what are the coordinates of B ?
12. $A(2, 4)$ is one endpoint of \overline{AB} . The segment's midpoint is $M(7, 3)$. Find the other endpoint, B .
13. A translation maps $A(-1, 12) \rightarrow A'(5, 6)$. What is the image of $B(10, -1)$ under the same translation?

14. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 9.8$, $m\angle J = 28^\circ$. Find the length KL , rounded to the nearest hundredth.



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

15. $\frac{1}{3}(2x + 11) = 7$

16. $\frac{1}{4}(28 - 4x) = -9$

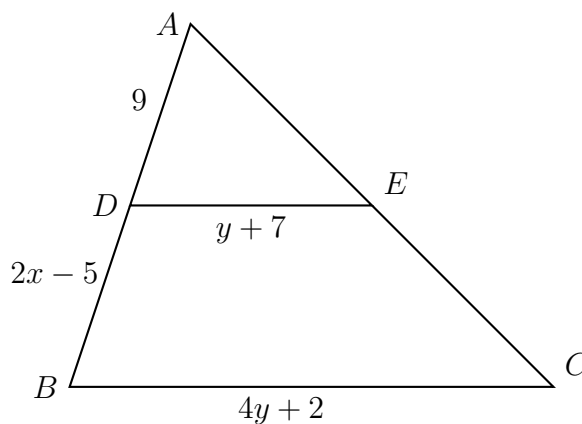
17. Given $f(x) = \frac{3}{4}x + 5$. Solve for x such that for $f(x) = 11$.

18. Given $g(x) = -2x^2 - 9x + 4$. Simplify $g(0)$.

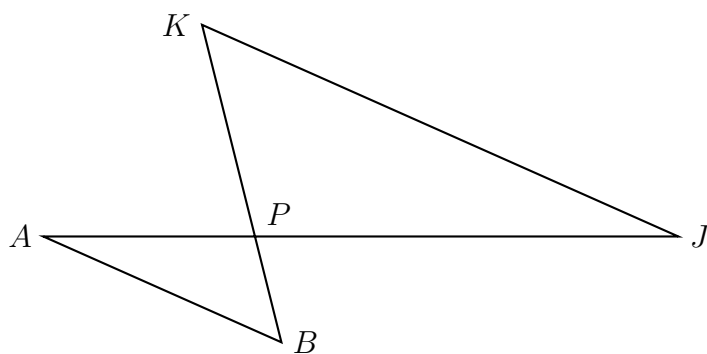
19. Given $h(x) = x^2 + 8x + 7$. Solve $h(x) = 0$.

20. Given triangle ABC with D the midpoint of \overline{AB} and E the midpoint of \overline{AC} , as shown. Given $AD = 9$, $BD = 2x - 5$, $DE = y + 7$, and $BC = 4y + 2$.

Find x and y .



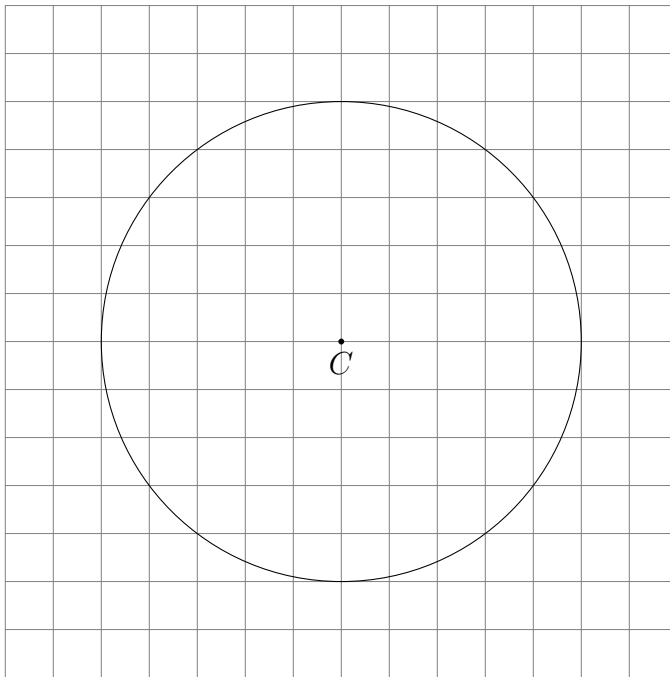
21. Given $\triangle ABP$ and $\triangle JKP$ as shown below. $\overline{AB} \parallel \overline{JK}$. $AP = 4.8$, $JP = 9.6$, and $AB = 7.1$. Find JK .



22. Given the circle C with circumference 10π .

(a) Write down the formula for the circumference of a circle and solve for the radius yielding a circumference of 10π .

(b) Find the area of the circle. Give an exact result in terms of π .



23. Given a circle O with radius 7.3.

(a) Find the circumference of O , rounded *to the nearest hundredth*.

(b) Find the area of O , rounded *to the nearest hundredth*.