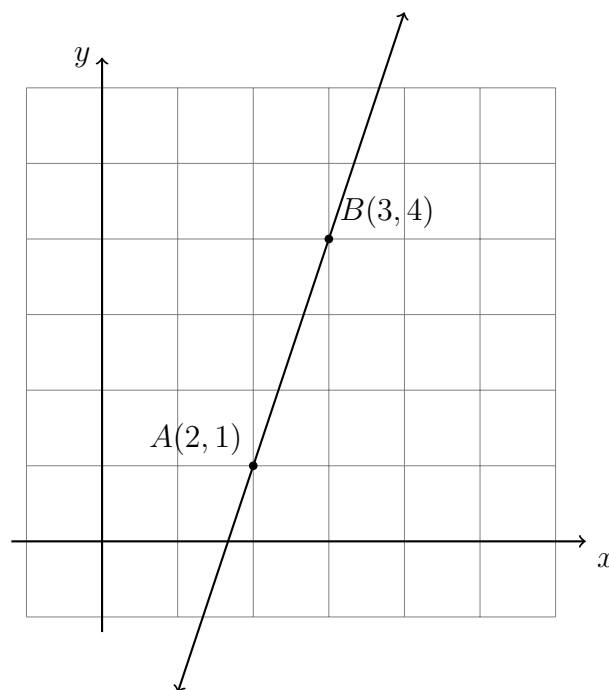**6.5 Homework: Slope**   **CCSS.HSG.SRT.C.8**
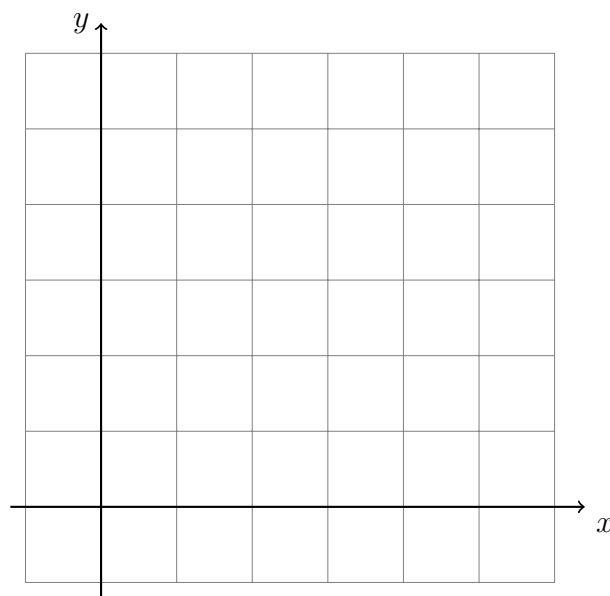
1. Find the slope of the line $\overleftrightarrow{AB}$, $A(2,1)$, $B(3,4)$. Use the formula and show the substitution step.

   $$m = \frac{y_B - y_A}{x_B - x_A}$$

2. Plot the points and find the slope of the line $\overleftrightarrow{RS}$, $R(1,3)$, $S(3,4)$. Use the formula and show the substitution step. As a check, draw the line and count the rise and run.

   $$m = \frac{y_S - y_R}{x_S - x_R}$$

3. Find the equation of the given line $\overleftrightarrow{AB}$, $A(0,4)$, $B(4,2)$.
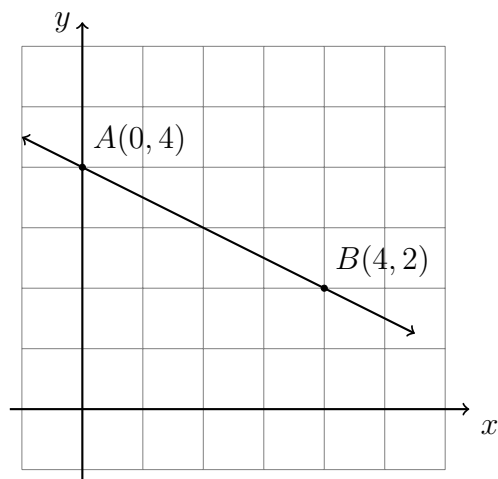
(a) Find the slope, m, showing the substitution step in the slope formula:

$$m = \frac{y_B - y_A}{x_B - x_A}$$

$y = mx + b$

$A(0,4)$

$B(4,2)$

(b) Write down the y-intercept.

(c) Write the equation of the line in the slope-intercept form

4. Complete each statement about linear equations.

(a) What is the slope of a horizontal line?

(b) What is the y-intercept of the line $y = 2x + 3$?

(c) What is the slope of the line $y = x - 5$?

(d) Which has an undefined slope, a vertical or horizontal line?

(e) What is the y-intercept of the line $y = -2x$?

5. Two parallel lines are shown in the graph, p and q.

(a) Find the slope, m, by counting squares across and up on the line.
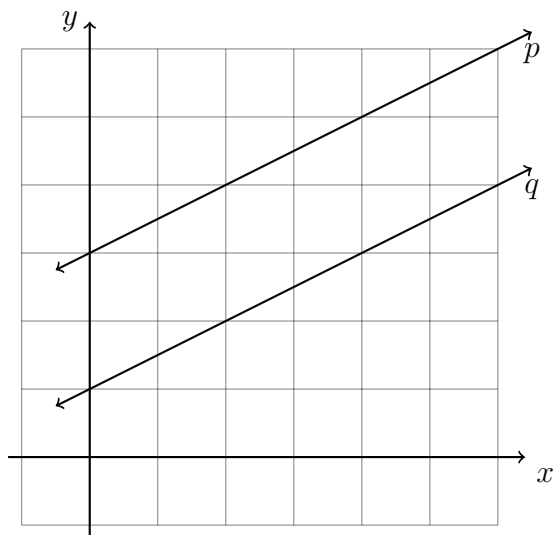
$$m = \frac{rise}{run}$$

to p (the negative reciprocal).

$$m_\perp =$$

(b) True or false: parallel lines have equal slopes.

(c) Write the slope of a line perpendicular

6. Write down the slope perpendicular to each slope (its negative reciprocal).
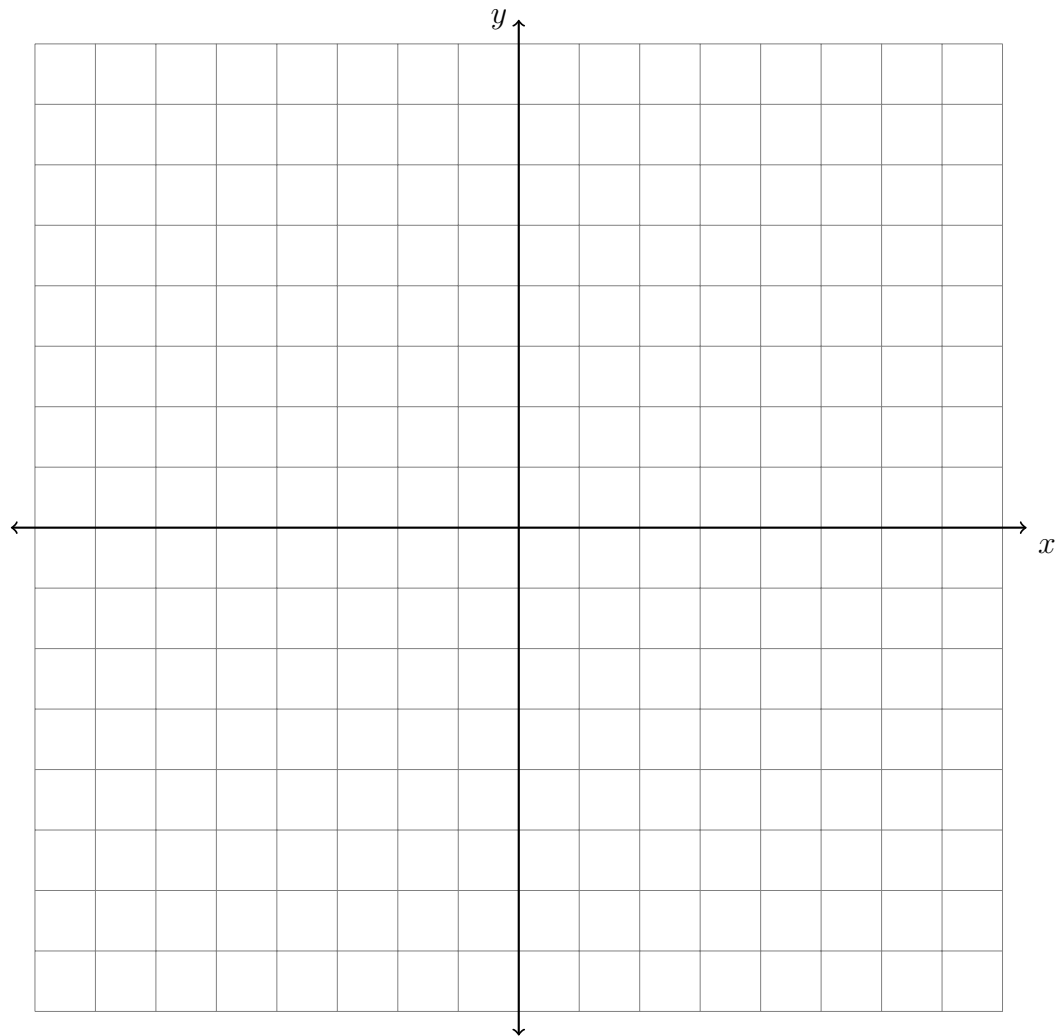
   (a) If $m = 2$ then $m_\perp =$

   (b) If $m = -3$ then $m_\perp =$

   (c) If $m = \dfrac{2}{3}$ then $m_\perp =$

   (d) If $m = -\dfrac{3}{4}$ then $m_\perp =$

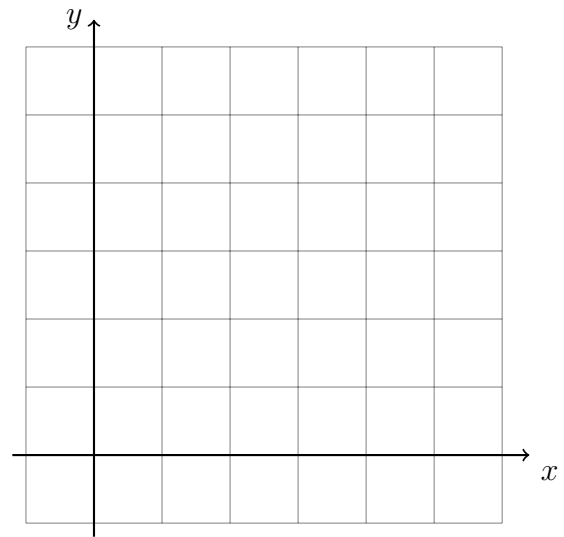7. Plot the $\triangle ABC$ with vertices $A(2, 2)$, $B(5, 1)$, and $C(6, 4)$.

   Find the slopes of $\overleftrightarrow{AB}$ and $\overleftrightarrow{AC}$. Is the triangle a right triangle?

y

x

8. Is the point $C(4, 2)$ on the line $l : y = \frac{1}{2}x + 1$?

Support your answer with *both* algebra (substitute C's coordinates into the equation) and geometry by graphing the line and point C.

9. Plot the same triangle as problem 7 using Geogebra/classic. Paste an image of your work in this Classkick slide from the clipboard or by using the "camera" tool.

   Spicy: measure the slopes of the relevant triangle sides and the measure of $\angle B$
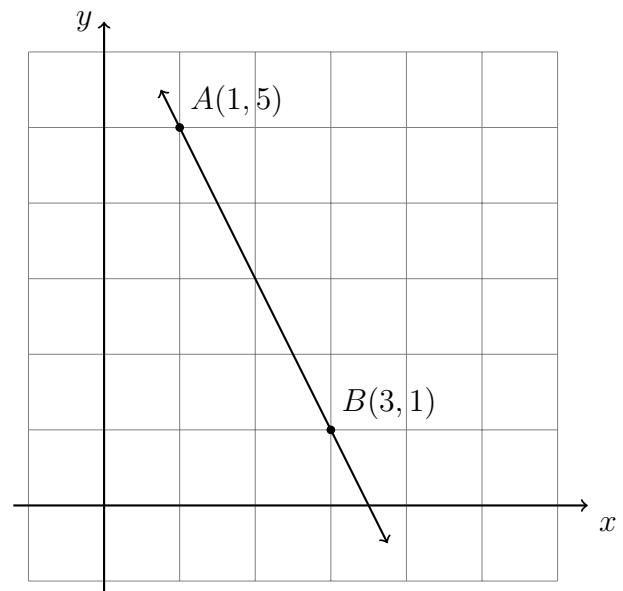
10. Do Now: Use the Graspable Math algebra calculator to substitute and simplify. Show your work in this slide by

    (a) Copy / paste an image (on a Mac, Command-Control-Shift 4 to copy to the clipboard), or

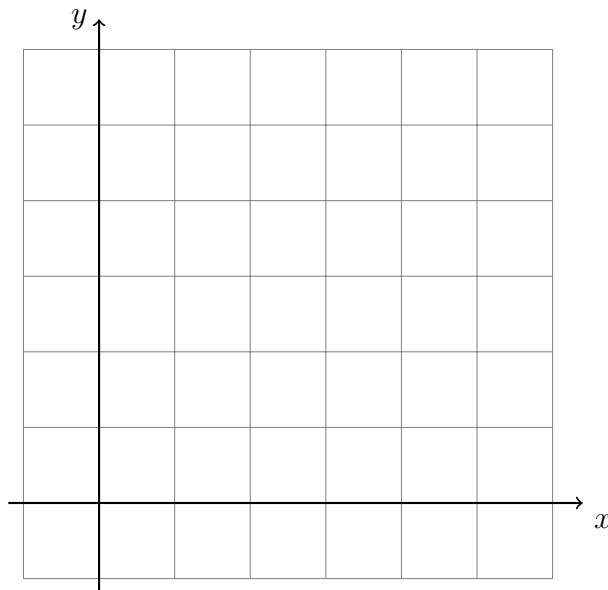   (b) Use the camera tool to upload from your Desktop (Command-Shift 4 on a Mac)

11. Find the slope of the line $\overleftrightarrow{AB}$, $A(1,5)$, $B(3,1)$. Use the formula and show the substitution step.

$$m = \frac{y_B - y_A}{x_B - x_A}$$

12. Plot the points and find the slope of the line $\overleftrightarrow{RS}$, $R(1, 2)$, $S(4, 5)$. Use the formula and show the substitution step. As a check, draw the line and count the rise and run.
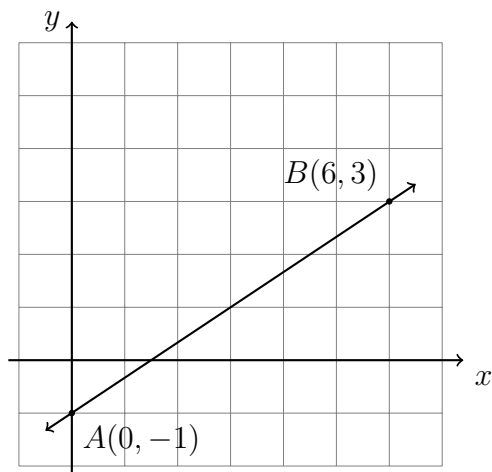
$$m = \frac{y_S - y_R}{x_S - x_R}$$

13. Find the equation of the given line $\overleftrightarrow{AB}$, $A(0, -1)$, $B(6, 3)$.

   (a) Find the slope, m, showing the substitution step in the slope formula:

   $$m = (y_B - y_A)/(x_B - x_A)$$

   (b) Write down the y-intercept.

   (c) Write the equation of the line.

14. Complete each statement about linear equations.

   (a) What is the slope of the line $y = 2x + 3$?

   (b) Which has an zero slope, a vertical or horizontal line?

   (c) What is the y-intercept of the line $y = \frac{1}{2}x$?

   (d) What is the slope of a vertical line?

(e) What is the slope of the line $y = -x + 3$?

15. Is the point $C(3, 1)$ on the line $l : y = -\frac{3}{2}x + 5$?

    Support your answer with *both* algebra (substitute C's coordinates into the equation) and geometry by graphing the line and point C.
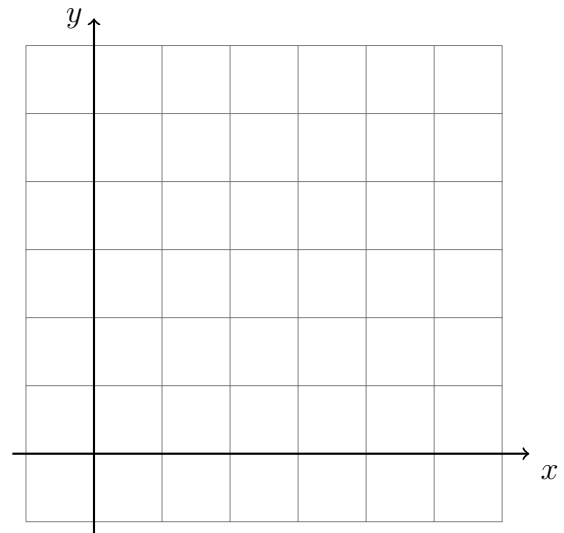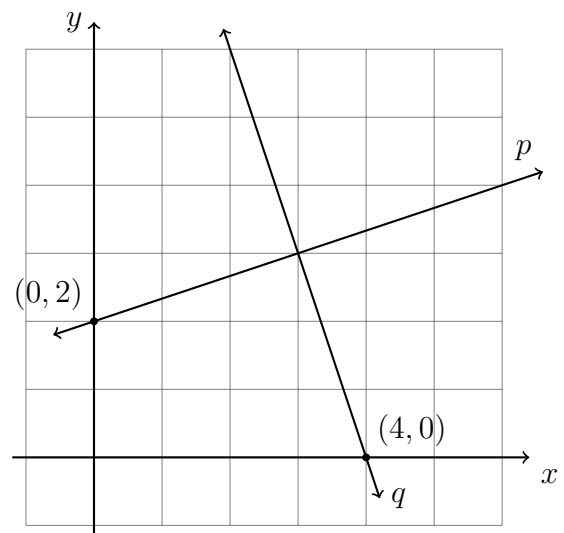
16. Two perpendicular lines are shown in the graph, p and q. Line p has a slope of $m = \dfrac{1}{3}$ and a y-intercept $b = 2$.

    (a) Write down the equation of line p.

    (b) What is the slope of line q, $m_\perp$?

    (c) Spicy: Line q crosses the x-axis at $(4, 0)$. What is its y-intercept?

17. Write down the slope perpendicular to each slope (its negative reciprocal).
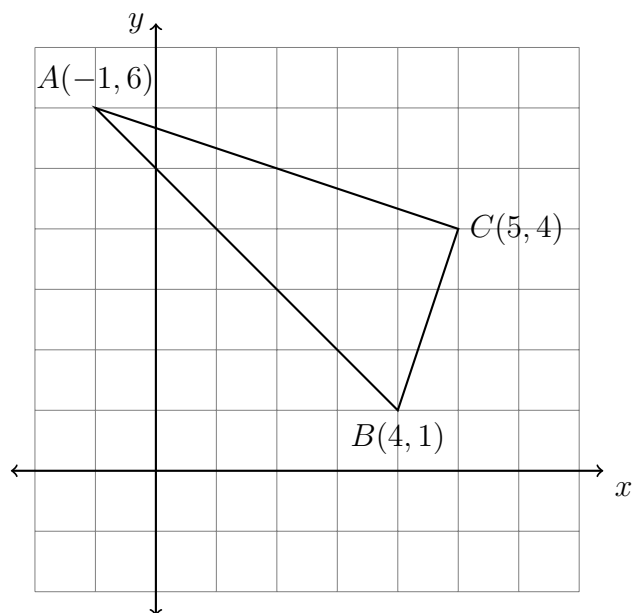
    (a) If $m = -2$ then $m_\perp =$

(b) If $m = -\dfrac{5}{4}$ then $m_\perp =$

(c) If $m = 1$ then $m_\perp =$

(d) If $m = \dfrac{3}{1}$ then $m_\perp =$

18. $\triangle ABC$ with vertices $A(-1, 6)$, $B(4, 1)$, and $C(5, 4)$ is shown.

   Find the slopes of $\overleftrightarrow{AC}$ and $\overleftrightarrow{BC}$. Is the triangle a right triangle? Justify your answer.
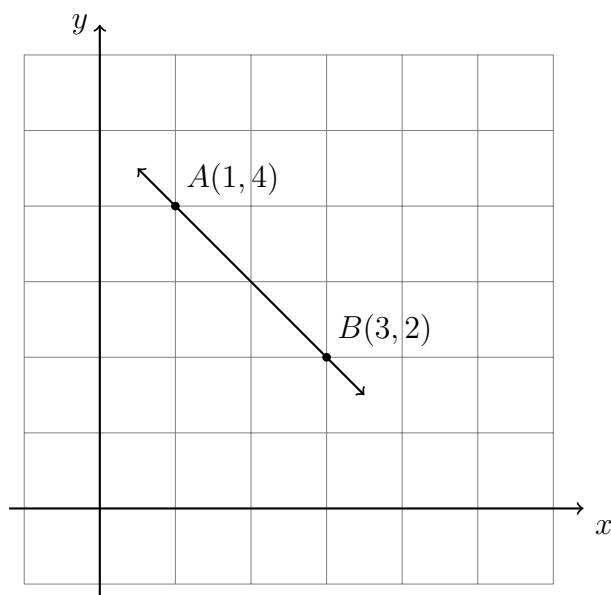

19. Plot a right triangle using Geogebra/classic (use the grid). Paste an image of your work in this Classkick slide from the clipboard or by using the "camera" tool.

   Spicy: Show the measures the slopes of the triangle legs and the measure of the right angle.

20. Find the slope of the line $\overleftrightarrow{AB}$, $A(1, 4)$, $B(3, 2)$. Use the formula and show the substitution step.
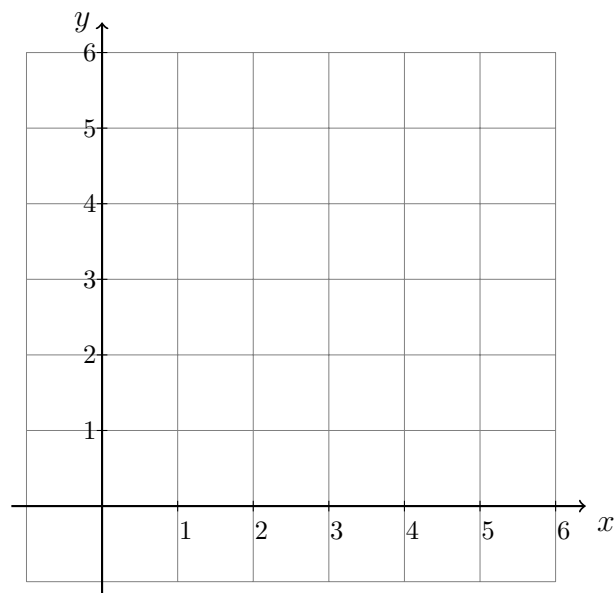
$$m = \frac{y_B - y_A}{x_B - x_A}$$

21. Plot the points and find the slope of the line $\overleftrightarrow{RS}$, $R(3,1)$, $S(5,5)$. Use the formula and show the substitution step. As a check, draw the line and count the rise and run.
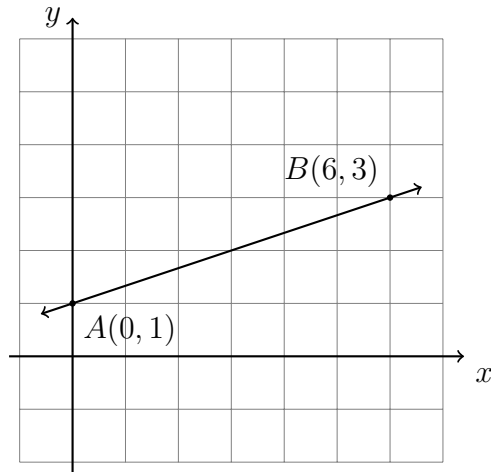
$$m = \frac{y_S - y_R}{x_S - x_R}$$

22. Find the equation of the given line $\overleftrightarrow{AB}$, $A(0,1)$, $B(6,3)$.

(a) Find the slope, m, showing the substitution step in the slope formula:

$$m = (y_B - y_A)/(x_B - x_A)$$

(b) Write down the y-intercept.

(c) Write the equation of the line.

23. Complete each statement about linear equations.

    (a) What is the y-intercept of the line $y = 3x - 1$?

    (b) What is the slope of the line $y = x + 13$?

    (c) Which has an undefined slope, a vertical or horizontal line?

    (d) What is the y-intercept of the line $y = \frac{5}{2}x$?

    (e) What is the slope of a horizontal line?

24. Is the point $C(6, 5)$ on the line $l : y = \frac{1}{2}x + 2$?

    Support your answer with *both* algebra (substitute C's coordinates into the equation) and geometry by graphing the line and point C.
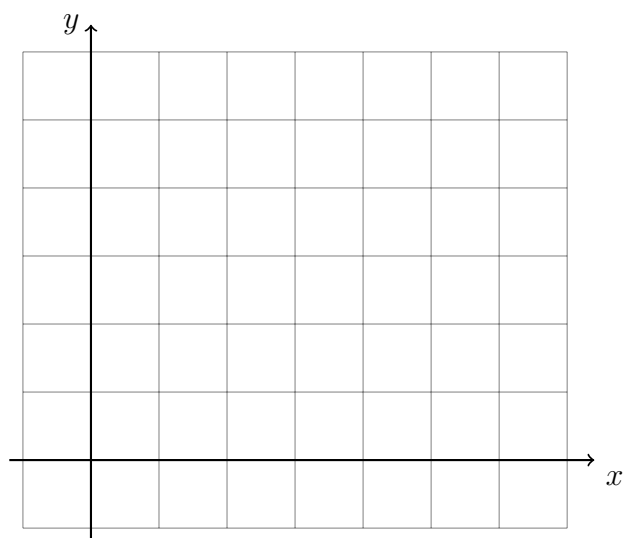
25. Write down the slope perpendicular to each slope (its negative reciprocal).

    (a) If $m = -5$ then $m_\perp =$

    (b) If $m = \dfrac{3}{4}$ then $m_\perp =$
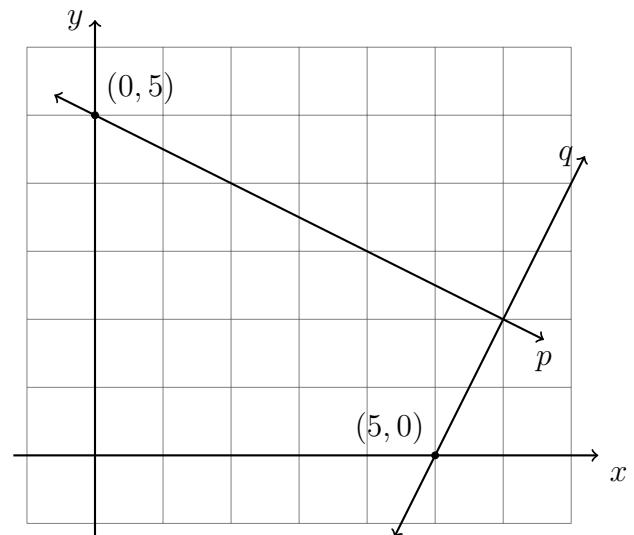
    (c) If $m = -1$ then $m_\perp =$

    (d) If $m = \dfrac{1}{7}$ then $m_\perp =$

26. Two perpendicular lines are shown in the graph, p and q. Line p has a slope of $m = -\dfrac{1}{2}$ and a y-intercept $b = 5$.

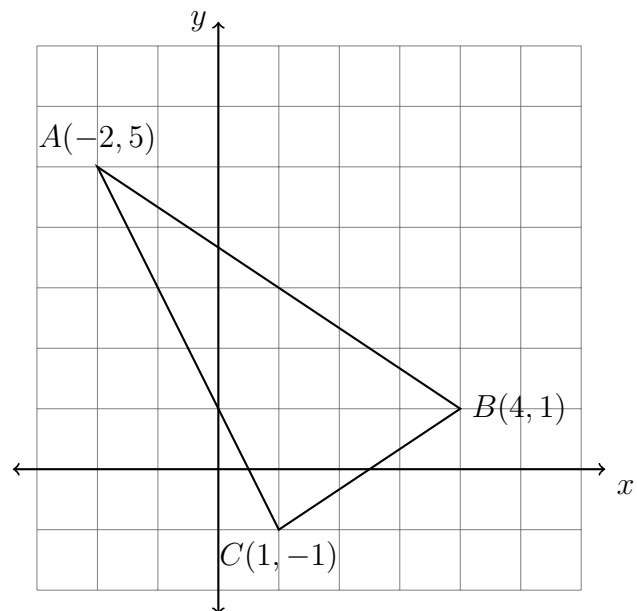   (a) Write down the equation of line p.

    (b) What is the slope of line q, $m_\perp$?

    (c) Spicy: Line q crosses the x-axis at $(5, 0)$. What is its y-intercept?

27. $\triangle ABC$ with vertices $A(2, 5)$, $B(4, 1)$, and $C(1, -1)$ is shown.

    Find the slopes of $\overleftrightarrow{AC}$ and $\overleftrightarrow{BC}$. Is the triangle a right triangle? Justify your answer.

28. Plot a right triangle using Geogebra (use the grid). The legs must not be horizontal or vertical. Paste an image of your work in this Classkick slide from the clipboard or by using the "camera" tool.

    Spicy: Show the measures the slopes of the triangle legs and the measure of the right angle.
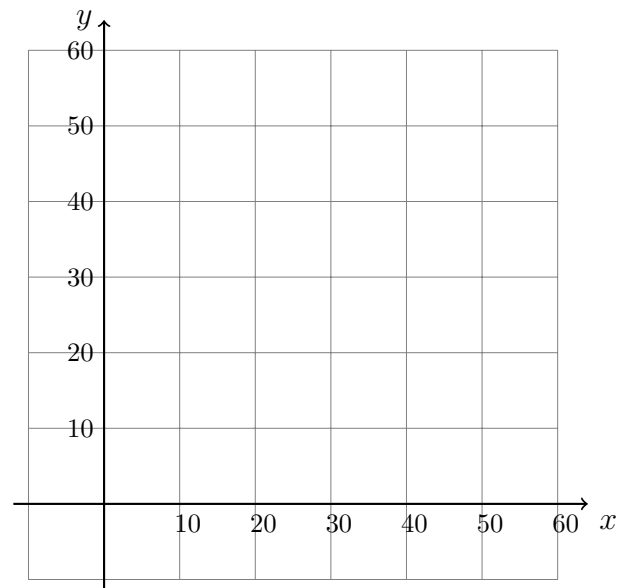
29. Find the slope of the line $\overleftrightarrow{AB}$, $A(10, 30)$, $B(30, 10)$. Use the formula and show the substitution step.

$$m = \frac{y_B - y_A}{x_B - x_A}$$
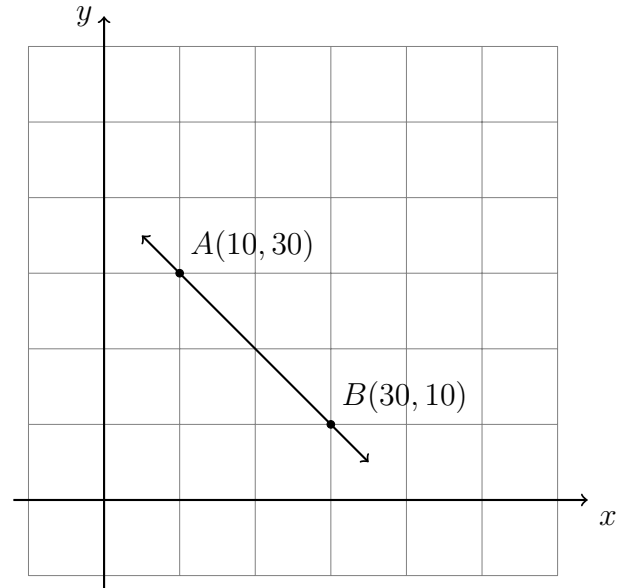
30. Plot the points and find the slope of the line $\overleftrightarrow{RS}$, $R(20, 10)$, $S(50, 20)$. Use the formula and show the substitution step. As a check, draw the line and count the rise and run.

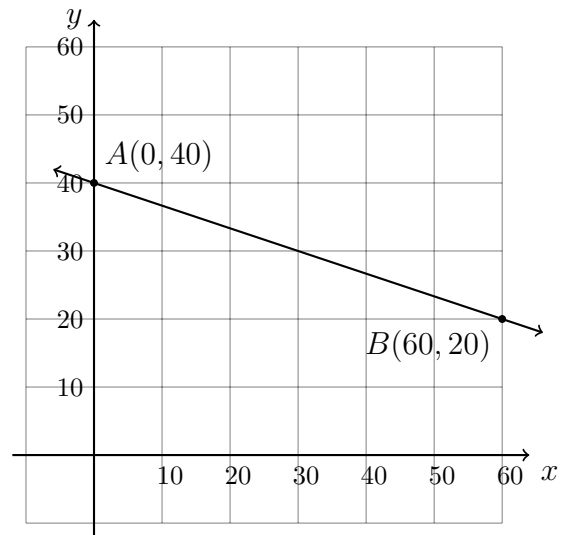$$m = \frac{y_S - y_R}{x_S - x_R}$$

31. Find the equation of the given line $\overleftrightarrow{AB}$, $A(0, 40)$, $B(60, 20)$.

(a) Find the slope, m, showing the substitution step in the slope formula:

$$m = (y_B - y_A)/(x_B - x_A)$$

(b) Write down the y-intercept.

(c) Write the equation of the line.

32. Complete each statement about linear equations.

(a) What is the y-intercept of the line $y = 1.25x - 15.75$?

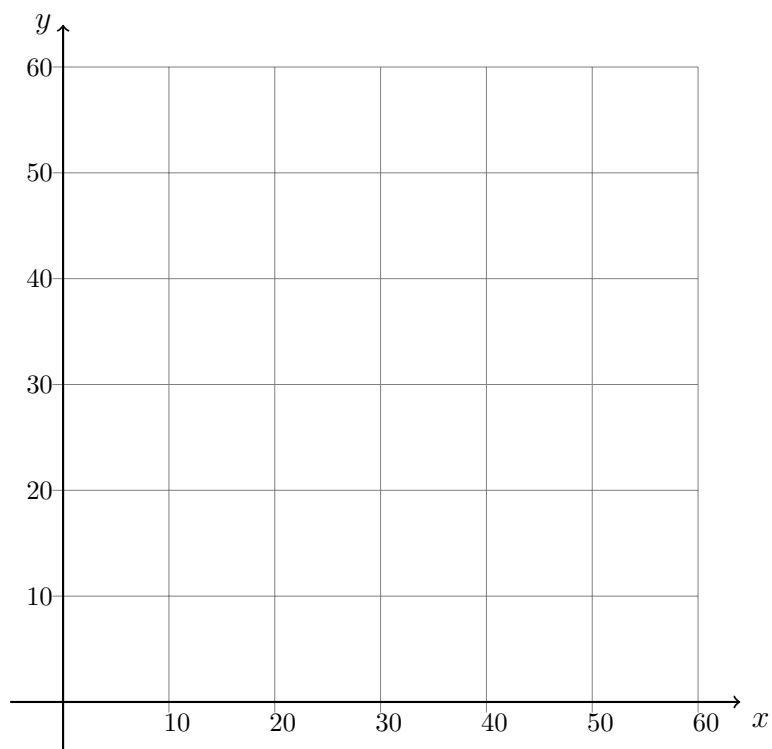(b) What is the slope of the line $y = \dfrac{5}{2}x + 100$?

(c) Which has an zero slope, a vertical or horizontal line?

(d) What is the y-intercept of the line $y = \dfrac{3}{25}x + \dfrac{25}{3}$?

33. Is the point $C(60, 30)$ on the line $l : y = \frac{1}{4}x + 10$?

Support your answer with *both* algebra (substitute C's coordinates into the equation) and geometry by graphing the line and point C.

34. Write down the slope perpendicular to each slope (its negative reciprocal).

   (a) If $m = 3$ then $m_\perp =$

   (b) If $m = -\dfrac{3}{2}$ then $m_\perp =$

   (c) If $m = 4$ then $m_\perp =$

   (d) If $m = -\dfrac{9}{4}$ then $m_\perp =$

35. Quadrilateral $ABCD$ with vertices $A(2,5)$, $B(1,-1)$, $C(4,1)$, and $D(1,7)$ is shown.
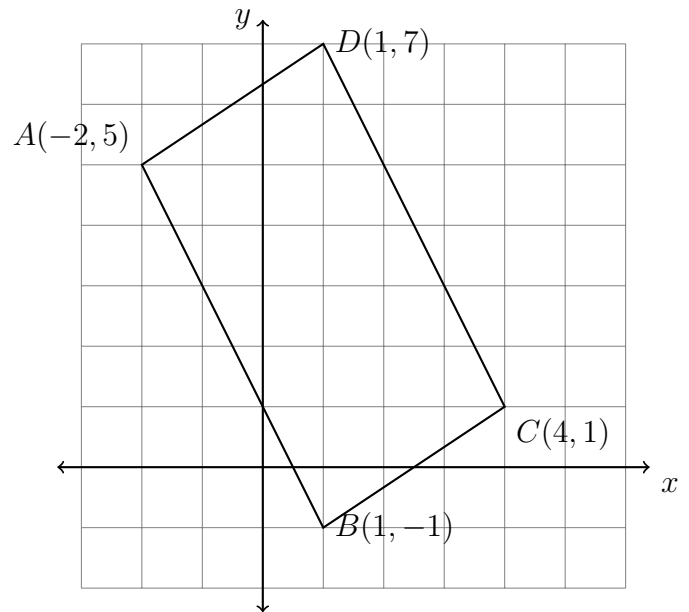
   Find the slopes of each side. Is $ABCD$ a parallelogram? a rectangle? Justify your answer.

   Slope of $\overline{AB} =$ Slope of $\overline{CD} =$

   Slope of $\overline{BC} =$ Slope of $\overline{AD} =$

36. Plot a parallelogram (not a rectangle) using Geogebra (use the grid). The legs must not be horizontal or vertical. Paste an image of your work in this Classkick slide from the clipboard or by using the "camera" tool.
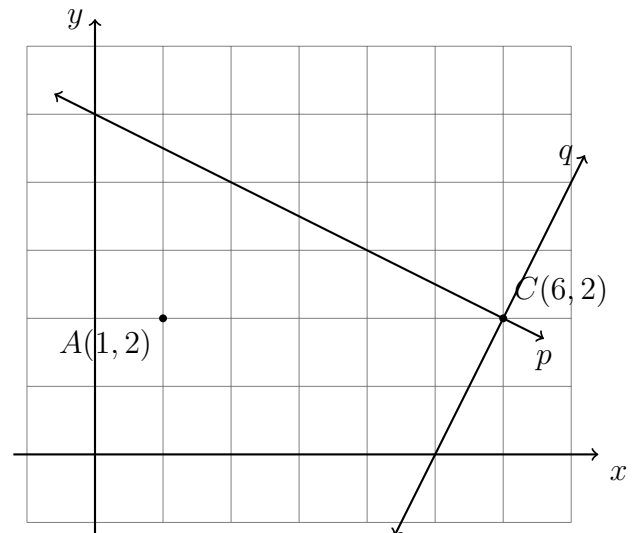
    Spicy: Show the measures the slopes of the quadrilateral sides.

37. Complete the rectangle $ABCD$ on the graph, by adding the two missing sides.

    (a) Mark point B on line p. Write the equation of line $\overleftrightarrow{AB}$.

    (b) Mark point D on line q. Write the equation of line $\overleftrightarrow{AD}$.

    (c) Show that $\overleftrightarrow{AB} \perp \overleftrightarrow{AD}$ by showing that the product of their slopes is -1.

38. Use the online calculator to calculate slope (or "grade") for a six inch rise over a run of 20 feet.

GRADE

| Angle:

Rise: 6   in ⌄
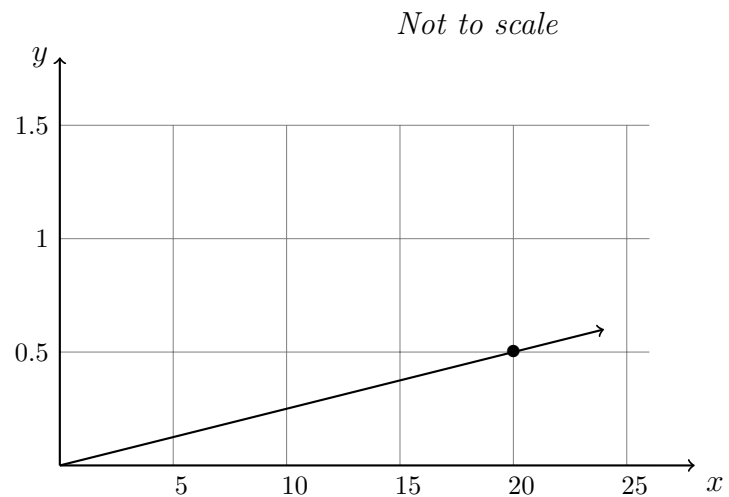
Run: 20   ft ⌄

Not to scale

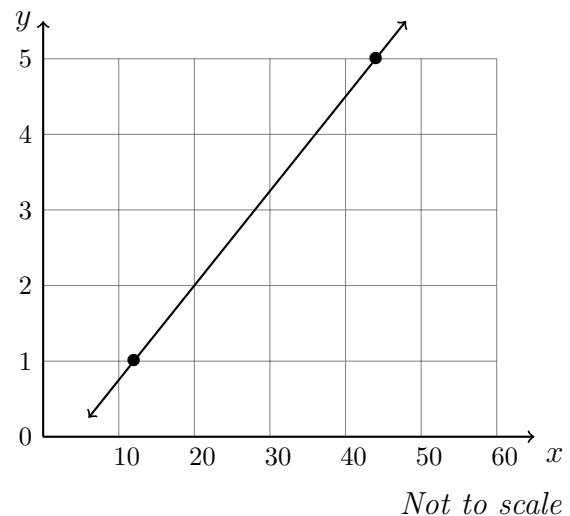CALCULATE

Express your result as follows:

Fraction:

Decimal:

Percentage:

39. Find the slope of the line $\overleftrightarrow{AB}$, $A(12,1)$, $B(44,5)$. Use the formula and show the substitution step. Express your result as a fraction, a decimal, and a percent grade.
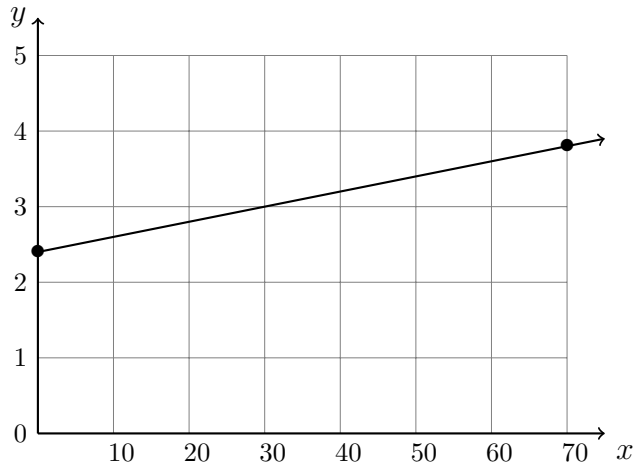
$$m = \frac{y_B - y_A}{x_B - x_A}$$

Not to scale

40. Find the equation of the line through the points $(0, 2.4)$, $(70, 3.8)$. Use the slope formula, then substitute the slope and y-intercept into a linear equation.

$$m = \frac{y_2 - y_1}{x_2 - x_1}, \qquad y = mx + b$$

Not to scale

41. Complete each statement about linear equations.

    (a) What is the y-intercept of the line $y = 1.25x - 13.5$?

    (b) What is the percent grade of the line $y = 0.04x + 12.5$?

    (c) What is the slope of a vertical line?

    (d) What is the slope of the line $x = 7$?
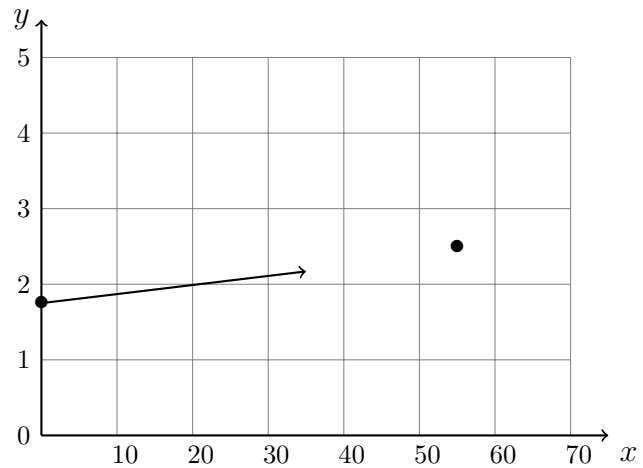
    (e) If $m = 4$ then $m_\perp =$

    (f) Lines p and q have slopes $m_p = -\frac{3}{2}$ then $m_q = +\frac{2}{3}$. Are they parallel, perpendicular, or neither? Justify your answer by showing the product of their slopes.

42. Is the point $P(55, 2.5)$ on the line: $y = 0.012x + 1.75$?

    Support your answer algebraically (substitute P's coordinates into the equation).

    Not to scale

43. Quadrilateral $ABCD$ with vertices $A(-2,5)$, $B(0,-1)$, $C(4,0)$, and $D(2,6)$ is shown.
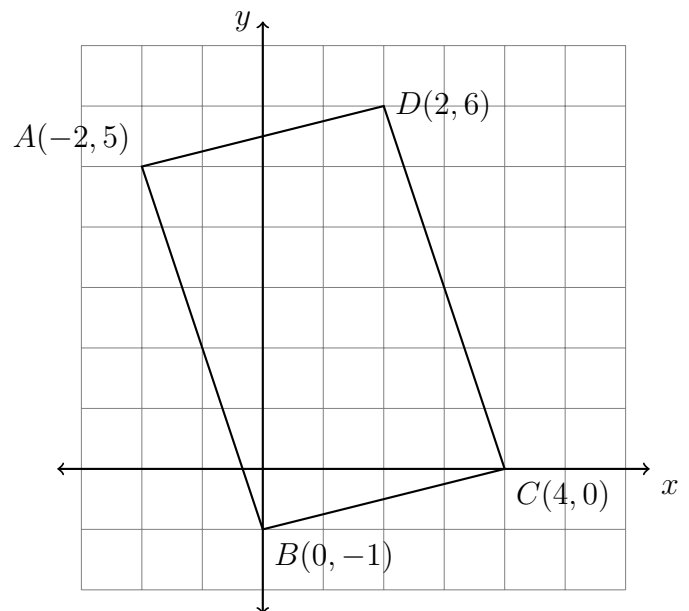
Find the slopes of each side. Is $ABCD$ a parallelogram? a rectangle? Justify your answer.

Slope of $\overline{AB} =$

Slope of $\overline{BC} =$

Slope of $\overline{CD} =$

Slope of $\overline{AD} =$

44. Plot a parallelogram (not a rectangle) using Geogebra (use the grid). The legs must not be horizontal or vertical. Paste an image of your work in this Classkick slide from the clipboard or by using the "camera" tool.
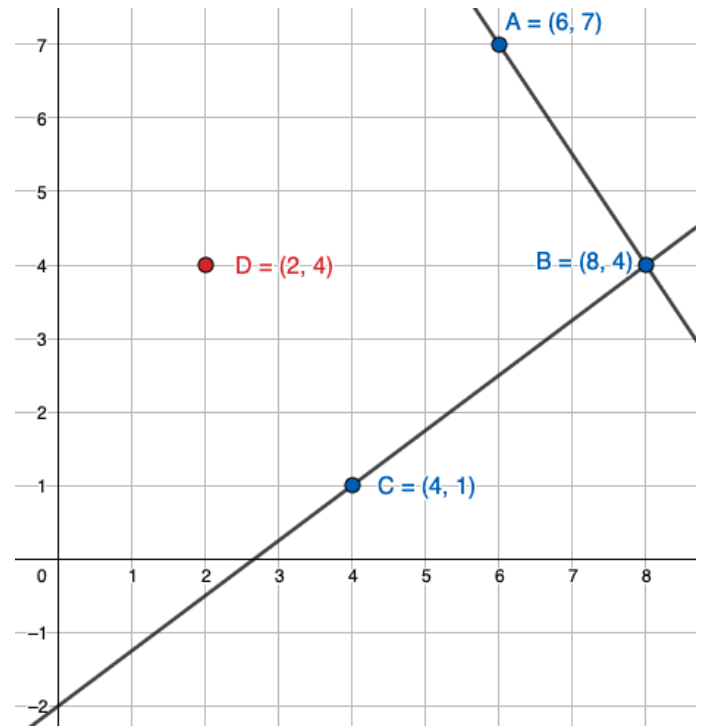
Spicy: Show the measures the slopes of the quadrilateral sides.

45. (a) Draw two sides $\overline{AD}$, $\overline{CD}$ to complete a parallelogram $ABCD$.

(b) Write the slope of line $\overleftrightarrow{CD}$.

(c) Write the equation of line $\overleftrightarrow{BC}$.

(d) Is $\overleftrightarrow{CD} \perp \overleftrightarrow{BC}$? Show the product of their slopes is or is not -1.

Link: https://www.geogebra.org/calculator/j8kx5ykf