

Algebra 1
Perpendicular Lines Investigation

Name: _____ Date: _____ Mod: _____

Directions: Graph the points and use a ruler to draw the line that passes through them. Use the designated color to draw each line.

BLUE: (0, 2) (2, -1)

PURPLE: (-3, 6) (-6, 5)

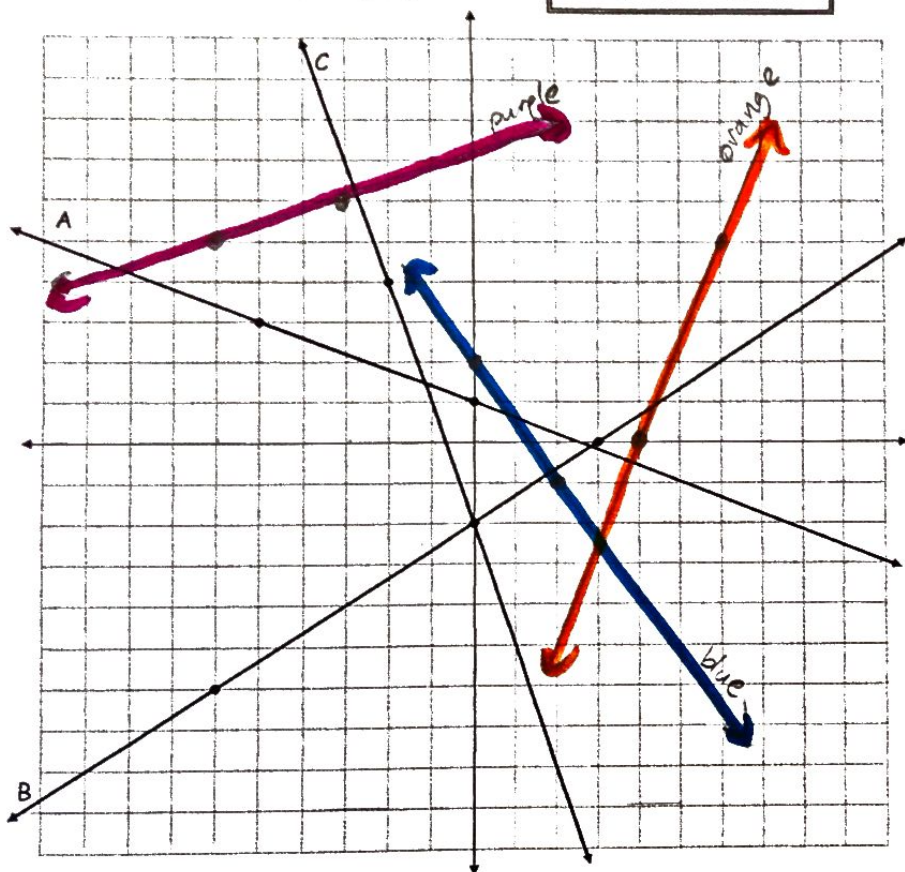
ORANGE: (4, 0) (6, 5)

Given Lines and Their Points

A: (0, 1) (-5, 3)

B: (3, 0) (-6, -6)

C: (-2, 4) (0, -2)



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The equation of Line A is $y = -\frac{2}{5}x + 1$.

The equation of Line B is $y = \frac{2}{3}x - 2$.

The equation of line C is $y = -3x - 2$.

Directions: Use the points given to write the equation of each line in slope-intercept form.

| BLUE LINE | PURPLE LINE | ORANGE LINE |
|---------------------------------------|--|-------------------------------------|
| $m = \frac{-1-2}{2-0} = \frac{-3}{2}$ | $m = \frac{5-6}{-6+3} = \frac{-1}{-3} = \frac{1}{3}$ | $m = \frac{5-0}{6-4} = \frac{5}{2}$ |
| $y-2 = -\frac{3}{2}(x-0)$ | $y-6 = \frac{1}{3}(x+3)$ | $y-0 = \frac{5}{2}(x-4)$ |
| $y-2 = -\frac{3}{2}x$ | $y-6 = \frac{1}{3}x + 1$ | $y = \frac{5}{2}x - 10$ |
| $y = -\frac{3}{2}x + 2$ | $y = \frac{1}{3}x + 7$ | |

Directions: Use your graph to help answer the following questions.

1. Which colored line is perpendicular to line A? orange
What are the equations of these 2 lines?

2. Which colored line is perpendicular to line B? blue
What are the equations of these 2 lines?

3. Which colored line is perpendicular to line C? purple
What are the equations of these 2 lines?

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Directions: Use the equations of each pair of perpendicular lines to answer the following questions.

4. What do you notice about the slopes in each pair of equations?

opposite reciprocals

5. What do you notice about the y-intercepts of in each pair of equations?

different

6. What general statement can you make about the equations of perpendicular lines in relation to $y = mx + b$?

opposite reciprocal slope (m)
different y-int (b)

Directions: Answer the following the questions using the knowledge you gained from your investigation.

1. Are $y = 3x + 7$ and $y = 3x - 8$ perpendicular to each other? YES or **NO**
2. Are $y = \frac{2}{3}x - 2$ and $y = -\frac{3}{2}x + 1$ perpendicular to each other? **YES** or NO
3. Name 3 lines that are perpendicular to $y = 2x - 3$.

$y = -\frac{1}{2}x$ $y = -\frac{1}{2}x + 1$ $y = -\frac{1}{2}x + 2$...

4. Name 3 lines that are not perpendicular to $y = 5x - 2$.

$y = 5x - 0$ $y = 5x + 1$ $y = 5x - 3$