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Thank You! Cassidy and Chloe - Inspired By Math

Inspired By Math

Name:_____

Shamrock Slope Challenge

Objective: I will practice graphing linear equations, calculating slope, and finding intersections of lines while engaging with a St. Patrick's Day theme.

Materials:

- Rulers
- Colored pencils or markers
- Calculators (optional)

Activity Setup:

Leprechaun Liam has hidden his pot of gold at the intersection of three magical lines on a coordinate plane. Each line represents a different rainbow, and where they meet is the location of the treasure. Help find Liam's gold by solving the following problems!

Part 1: Graphing the Rainbows

Graph the following equations using the coordinate plane on the next page. Use a different color for each line:

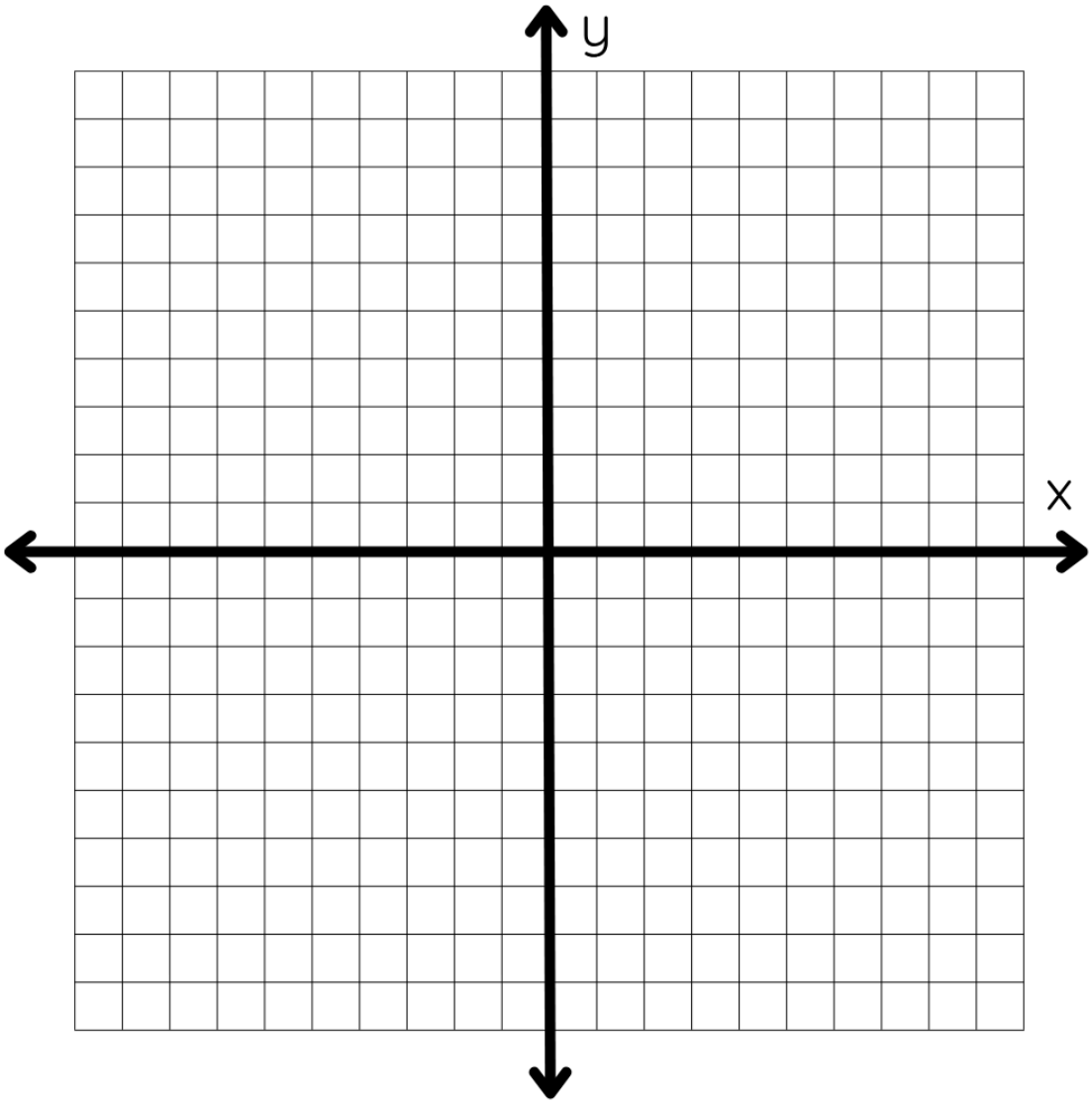
1. **Red Rainbow**: $y = 3x - 8$
2. **Green Rainbow**: $y = -\frac{1}{2}x + 6$
3. **Blue Rainbow**: $2x + 2y = 16$

Questions:

1. What is the slope of the Red Rainbow?

2. What is the y-intercept of the Green Rainbow?

3. Rewrite the equation of the Blue Rainbow in slope-intercept form.



Part 2: Finding the Pot of Gold

4. Confirm algebraically the coordinates of the point where all three rainbows intersect. This is where the pot of gold is hidden!

Part 3: Leprechaun's Lucky Charm

Liam wants to add a fourth line that passes through his pot of gold and has a slope of 4.

7. Write an equation for this new "Lucky Charm" line in point-slope form.

8. Convert your equation from question 7 into slope-intercept form.

Extension:

Can you find another line that passes through the pot of gold and is perpendicular to the Lucky Charm line?

Name: KEY

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Graph the following equations using the coordinate plane on the next page. Use a different color for each line:

Red Rainbow: $y = 3x - 8$

Green Rainbow: $y = -\frac{1}{2}x + 6$

Blue Rainbow: $2x + 2y = 16$

Questions:

1. What is the slope of the Red Rainbow?

   $m = 3$

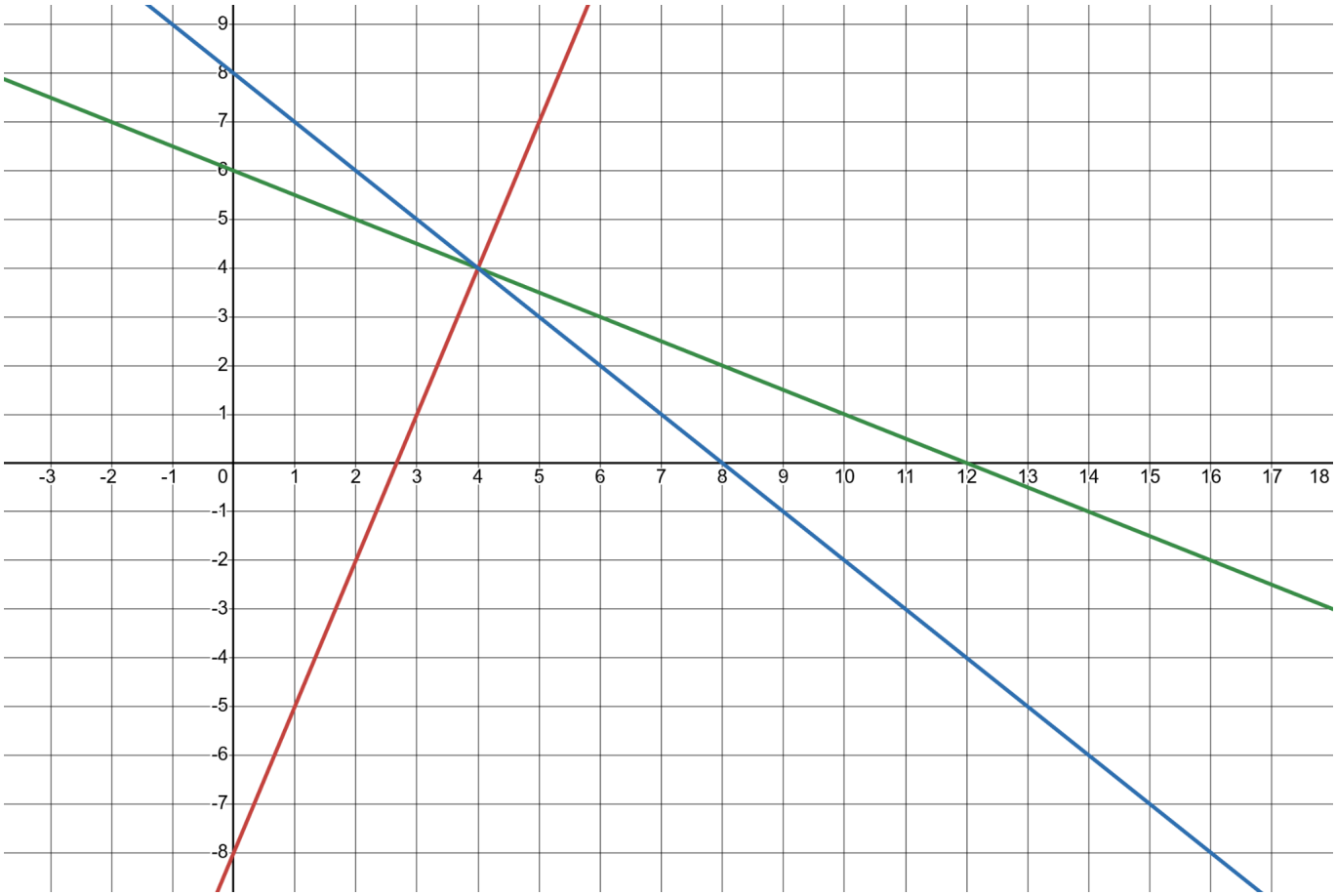
2. What is the y-intercept of the Green Rainbow?

   $b = 6$

3. Rewrite the equation of the Blue Rainbow in slope-intercept form.

   $y = -x + 8$

These functions were graphed using www.desmos.com



Part 2: Finding the Pot of Gold

4. Confirm algebraically the coordinates of the point where all three rainbows intersect. This is where the pot of gold is hidden!

   Red Rainbow = Green Rainbow

   $3x - 8 = -\frac{1}{2}x + 6$

   $\frac{7}{2}x - 8 = 6$

   $\frac{7}{2}x = 14$

   $x = 4$

   $y = 3(4) - 8 = 4$

   Checking Solution with Blue Rainbow:

   $2x + 2y = 16$

   $2(4) + 2(4) = 16$

   $8 + 8 = 16$

Part 3: Leprechaun's Lucky Charm

Liam wants to add a fourth line that passes through his pot of gold and has a slope of 4.

7. Write an equation for this new "Lucky Charm" line in point-slope form.

   $y - y_1 = m(x - x_1)$

   $m = 4$

   $point = (4, 4)$

   $y - 4 = 4(x - 4)$

8. Convert your equation from question 7 into slope-intercept form.

$$y - 4 = 4(x - 4)$$

$$y - 4 = 4x - 16$$

$$y = 4x - 12$$

Extension:

Can you find another line that passes through the pot of gold and is perpendicular to the Lucky Charm line?

$$y - y_1 = m(x - x_1)$$

$$m = -\frac{1}{4}$$

$$point = (4, 4)$$

$$y - 4 = -\frac{1}{4}(x - 4)$$

$$y - 4 = -\frac{1}{4}x + 1$$

$$y = -\frac{1}{4}x + 5$$