NAME

Module 8 Writing Linear Equations of Two Variables

Lesson 4 Solving Linear Equations in Two Variables When Parameters Are Changed

Given each equation, determine the resulting equation when the parameters are changed as indicated. Write the new equation in slope-intercept form.

1. $y = \frac{1}{3}x - 3$
increase slope by 1
$y = \frac{4}{3}x - 3$

2. $y = -\frac{5}{2}x + 6$
decrease *y*-intercept by 4
$y = -\frac{5}{2}x + 2$

3. $y = -2x + 1$
increase *y*-intercept by 3
$y = -2x + 4$

4. $y = x - 3$
decrease slope by $\frac{2}{3}$
$y = \frac{1}{3}x - 3$

5. $y = -\frac{3}{4}x + 2$
decrease *y*-intercept by 2
$y = -\frac{3}{4}x + 0$

6. $y = \frac{2}{3}x - \frac{1}{4}$
multiply slope by 2
$y = \frac{4}{3}x - \frac{1}{4}$

7. $y = -x + \frac{5}{4}$
increase slope by –6
$y = -7x + \frac{5}{4}$

8. $y = -\frac{1}{4}x - 5$
decrease *y*-intercept by $\frac{1}{2}$
$y = -\frac{1}{4}x - 5\frac{1}{2}$

9. $y = \frac{6}{5}x + \frac{1}{5}$
decrease *y*-intercept by $\frac{2}{5}$
$y = \frac{6}{5}x - \frac{1}{5}$

10. $y = -\frac{4}{3}x - 3$
increase slope by $\frac{5}{3}$
$y = \frac{1}{3}x - 3$

11. $y = \frac{7}{3}x - 1$
increase slope by 2
$y = \frac{13}{3}x - 1$

12. $y = -3x - 8$
multiply slope by $\frac{1}{4}$
$y = -\frac{3}{4}x - 8$

13. $y = -\frac{6}{7}x - 2$
decrease *y*-intercept by 2
$y = -\frac{6}{7}x - 4$

14. $y = -\frac{2}{7}x + 9$
decrease *y*-intercept by 5
$y = -\frac{2}{7}x + 4$

15. $y = x + \frac{2}{5}$
decrease slope by 2
$y = -x + \frac{2}{5}$

16. $y = -\frac{5}{2}x - 1$
multiply the slope by $\frac{3}{2}$
$y = -\frac{15}{4}x - 1$

In slope-intercept form, write the equation of the line described:

17. The line with the same *y*-intercept and the opposite slope as the line $3x - y = 5$.

$y = -3x - 5$

18. The line with the same slope and the opposite *y*-intercept as the line $4y - 2x = 8$.

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

19. The line with the same slope and the opposite *y*-intercept as the line $5y + 3x = 2$.

$y = -\frac{3}{5}x - \frac{2}{5}$

20. The line with the same *y*-intercept and the opposite slope as the line $9x - 2y + 4 = 7$.

$y = -\frac{9}{2}x - \frac{3}{2}$

Journal

1. Compare the graphs of two lines that have the same slope but opposite *y*-intercepts.
2. Explain how the graph of an equation with a negative value for the *b* parameter differs from the graph of an equation with a positive value for the *b* parameter.
3. Explain how a line with a negative slope differs from a line with a positive slope.
4. Explain how increasing the *b* parameter by 4 changes the graph of an equation.
5. Explain how decreasing a negative slope by 10 affects a line.

Cumulative Review

Identify the Property of Equality illustrated.

1. $5x + 2 = 5x + 2$

Reflexive Property

2. If $3y = 4x$, then $4x = 3y$

Symmetric Property

3. If $x = y$ and $y = z$, then $x = z$

Transitive Property

4. If $8x = 10y$, then $\frac{8}{2}x = \frac{10}{2}y$

Division Property or Multiplication Property

5. If $3x = 4y + 1$, then $6(3x) = 6(4y + 1)$

Multiplication Property

6. If $x + 4 = y$, then $x = y - 4$

Subtraction Property or Addition Property

7. If $y - 2 = x$, then $y = x + 2$

Addition Property

8. $4(2a + 3b) = 8a + 12b$

Distributive Property

9. If $4x = 8y$ and $2y = x$, then $4x + 2y = 8y + x$

Addition Property

10. $(3m + 2n) + 4p = 3m + (2n + 4p)$

Associative Property

Possible Journal Response

1. Since the lines have the same slope, they are parallel. The lines intersect the *y*-axis at points that are equidistant from the origin because their *y*-intercepts are opposites.
2. The line with a negative *b* parameter has a negative *y*-intercept, meaning it intersects the *y*-axis below the origin. The line with a positive *b* parameter has a positive *y*-intercept, so it intersects the *y*-axis above the origin.
3. A line with a negative slope rises right to left. A line with a positive slope rises left to right.
4. Since the slope does not change, the line would be parallel to the original line. The new line would be 4 units higher than the original line.
5. A decrease of 10 to a negative slope would make the new line steeper than the original line and rise right to left as the original line does.