NAME _____ DATE _____ PERIOD _____

4-5 Study Guide and Intervention

Graphing Linear Equations

Identify Linear Equations A **linear equation** is an equation that can be written in the form $Ax + By = C$. This is called the **standard form** of a linear equation.

Standard Form of a Linear Equation	$Ax + By = C$, where $A \geq 0$, A and B are not both zero, and A, B, and C are integers whose GCF is 1.

Example 1 **Determine whether $y = 6 - 3x$ is a linear equation. If so, write the equation in standard form.**

First rewrite the equation so both variables are on the same side of the equation.

$y = 6 - 3x$	Original equation
$y + 3x = 6 - 3x + 3x$	Add $3x$ to each side.
$3x + y = 6$	Simplify.

The equation is now in standard form, with $A = 3$, $B = 1$ and $C = 6$. This is a linear equation.

Example 2 **Determine whether $3xy + y = 4 + 2x$ is a linear equation. If so, write the equation in standard form.**

Since the term $3xy$ has two variables, the equation cannot be written in the form $Ax + By = C$. Therefore, this is not a linear equation.

Exercises

* THE "NOT LINEARS" CAN BE SHOWN ON THIS PAGE. ALL OTHERS MUST BE ON LOOSELEAF.

* **Determine whether each equation is a linear equation. If so, write the equation in standard form.**

1. $2x = 4y$

2. $6 + y = 8$

3. $4x - 2y = -1$

4. $3xy + 8 = 4y$

5. $3x - 4 = 12$

6. $y = x^2 + 7$

7. $y - 4x = 9$

8. $x + 8 = 0$

9. $-2x + 3 = 4y$

10. $2 + \frac{1}{2}x = y$

11. $\frac{1}{4}y = 12 - 4x$

12. $3xy - y = 8$

13. $6x + 4y - 3 = 0$

14. $yx - 2 = 8$

15. $6a - 2b = 8 + b$

16. $\frac{1}{4}x - 12y = 1$

17. $3 + x + x^2 = 0$

18. $x^2 = 2xy$

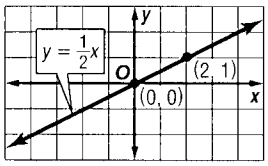
NAME _____ DATE _____ PERIOD _____

5-2 Study Guide and Intervention

Slope and Direct Variation

Direct Variation A **direct variation** is described by an equation of the form $y = kx$, where $k \neq 0$. We say that y *varies directly as* x. In the equation $y = kx$, k is the **constant of variation**.

Example 1 **Name the constant of variation for the equation. Then find the slope of the line that passes through the pair of points.**



For $y = \frac{1}{2}x$, the constant of variation is $\frac{1}{2}$.

$m = \frac{y_2 - y_1}{x_2 - x_1}$ Slope formula

$= \frac{1 - 0}{2 - 0}$ $(x_1, y_1) = (0, 0), (x_2, y_2) = (2, 1)$

$= \frac{1}{2}$ Simplify.

The slope is $\frac{1}{2}$.

Example 2 **Suppose y varies directly as x, and $y = 30$ when $x = 5$.**

(a.) Write a direct variation equation that relates x and y.

Find the value of k.

$y = kx$ Direct variation equation

$30 = k(5)$ Replace y with 30 and x with 5.

$6 = k$ Divide each side by 5.

Therefore, the equation is $y = 6x$.

(b.) Use the direct variation equation to find x when $y = 18$.

$y = 6x$ Direct variation equation

$18 = 6x$ Replace y with 18.

$3 = x$ Divide each side by 6.

Therefore, $x = 3$ when $y = 18$.

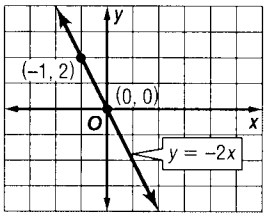
Lesson 5-2

Exercises

LOOK ALL WORK ON LOOSELEAF

Name the constant of variation for each equation. Then determine the slope of the line that passes through each pair of points.

1.



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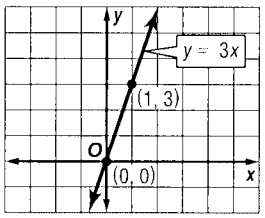

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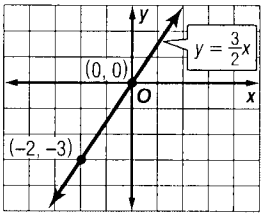

ANSWER BOTH PARTS! (a) (b)

Write a direct variation equation that relates x to y. Assume that y varies directly as x. Then solve.

4. If $y = 4$ when $x = 2$, find y when $x = 16$.

5. If $y = 9$ when $x = -3$, find x when $y = 6$.

6. If $y = -4.8$ when $x = -1.6$, find x when $y = -24$.

7. If $y = \frac{1}{4}$ when $x = \frac{1}{8}$, find x when $y = \frac{3}{16}$.

PAGE 2 of 2