Name ______________________ Date ______________

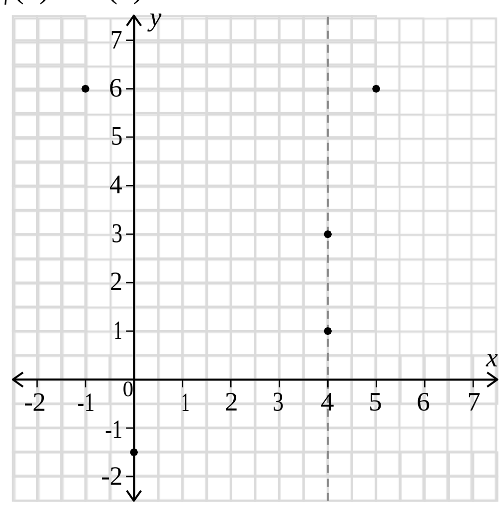
REVIEW OF TERMS AND CONNECTIONS

WORDS You Need To Communicate Effectively

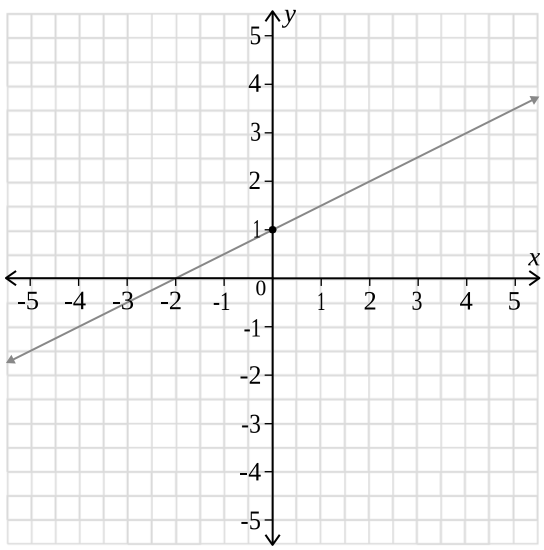
1. Match each term with an image or example.

a) evaluating a function
b) reflection symmetry
c) factored polynomial expression
d) vertical-line test
e) y-intercept
f) linear relation

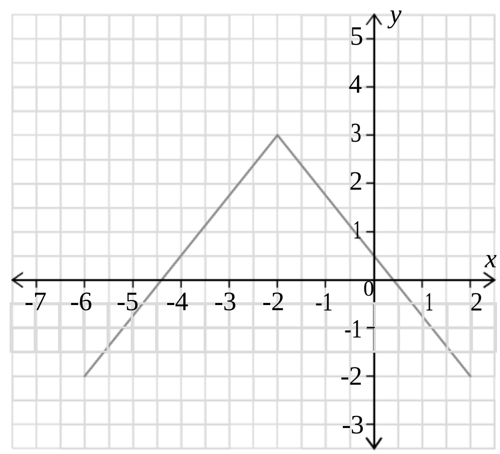
i) $2x + 3y = 7$
ii) $3(x - 3)(x + 4)$
iii) $f(3) = 2(3) + 7$ or 13
iv)



v)



vi)

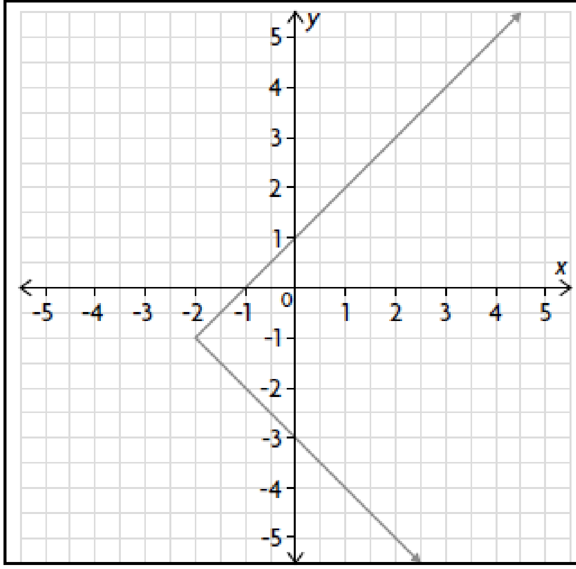


Name ______________________________ Date ____________________

CONNECTIONS You Need for Success

Identifying Functions

A relation can be described by a set of points, an equation, or a graph. The domain of a relation is the set of all its *x*-values, and its range is the set of all its *y*-values.

Relation	Domain	Range
{(−1, 2), (3, −4), (0, 2), (3, 1)}	{−1, 0, 3}	{−4, 1, 2}
$3x + 7y = 0$	$\{x \in R\}$	$\{y \in R\}$
	$\{x \geq -2, x \in R\}$	$\{y \in R\}$

Since a function is a relation that assigns exactly one *y*-value to each *x*-value, a relation is not a function if the same *x*-value has two or more *y*-values. This is the basis for the vertical-line test.

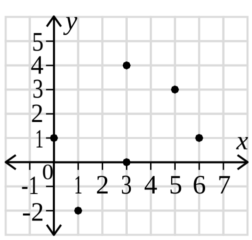
Another way to identify whether a relation is a function is to look at its equation. Linear relations are always functions, *except* when they are of the form $x =$ constant. (A vertical line has infinitely many *y*-values with the same *x*-value.)

2. Determine whether each relation is a function, and explain why or why not.

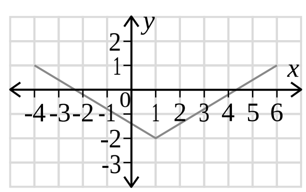
a) {(1, 3), (0, − 1), (3, 2), (1, 2)} **b)** $x - 2y = 5$ **c)** $x = -2$

3. Use the vertical-line test to determine whether each relation is a function.

a)



b)



Name ______________________________ Date ____________________

Solving Algebraic Equations

Algebraic equations are solved to determine the value of an unknown. Solving an algebraic equation requires a systematic approach. How to manipulate algebraic expressions, the knowledge of inverse operations, and the order of operations are all useful when solving equations.

Solve for x:

$2(3x + 5) = x$

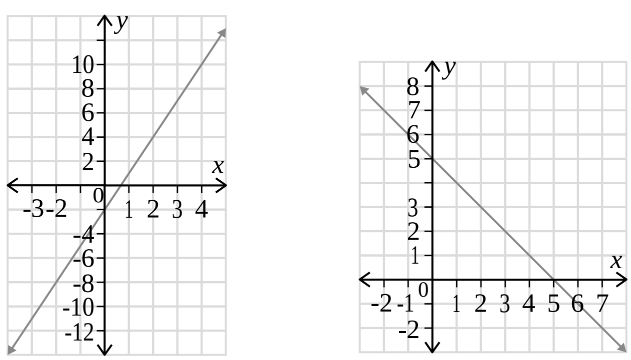
$6x + 10 = x$	Expand the left side of the equation.
$6x + 10 - x = x - x$ $5x + 10 = 0$	Subtract x from each side to begin isolating the variable x on one side of the equation.
$5x + 10 - 10 = 0 - 10$ $5x = -10$	Subtract 10 from each side.
$\frac{5x}{5} = \frac{(-10)}{5}$ $x = -2$	Divide each side by 5 to isolate x.

4. Solve each equation.

a) $3x + 7 = 13$ **b)** $3 - 4x = 5$ **c)** $4x^2 = 100$

Graphing Linear Relations

The method you choose to graph a linear relation depends on the form in which it is given. The slope-intercept form of a linear relation is $y = mx + b$, where m is the slope of the relation and b is its y-intercept. For example,



A linear relation in point-slope form uses a given point with the slope. For example,

$y - 2 = -3(x - 1)$ contains the point (1, 2) and has slope -3

$y - 3 = \frac{1}{2}(x + 6)$ contains the point $(-6, 3)$ and has slope $\frac{1}{2}$.

5. Identify the form of each linear relation.

a) $y = x + 5$ **b)** $y + 1 = -3(x - 1)$ **c)** $y - 5 = 3x$

6. Graph each linear relation in question 5.

Name ______________________________ Date ____________________

Factoring Polynomial Expressions

Some, but not all, polynomial expressions can be factored.

Factoring a second-degree polynomial expression with one variable can be broken down into steps:

Step 1: If the x^2 term has a coefficient, factor the coefficient out of the whole expression:

$3x^2 - 12x + 9$

$3(x^2 - 4x + 3)$

Step 2: Inside the brackets, look for pairs of integers whose product is the constant term:

$(1)(3) = 3$ or $(-1)(-3) = 3$

Step 3: Check the sum of each pair of integers to match the coefficient of the x term, in this case -4:

$1 + 3 = 4$ ✗ $1 + (-3) = -4$ ✓

Step 4: If there is a pair of integers that meets the criteria, use them to write the factored form:

$3(x - 1)(x - 3)$

7. Factor each quadratic expression, if possible.

a) $x^2 + 2x - 15$ **b)** $-3x^2 + 15x - 12$ **c)** $x^2 - 7x + 3$

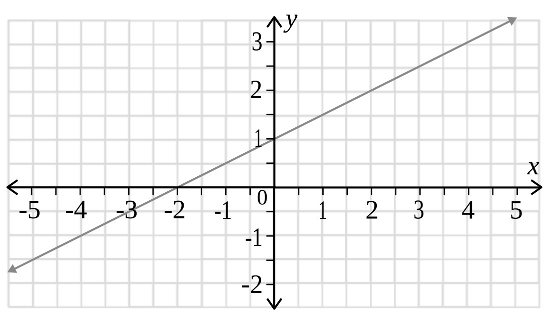
PRACTICING

8. Determine, with reasons, whether each relation is a function.

a) $\{(0, 3), (-1, 2), (2, 3), (5, 0)\}$

b) $x = 2y - 5$

c)



9. Solve each equation.

a) $\frac{1}{2}x^2 - 32 = 0$ **b)** $2(x + 5) = 9$ **c)** $x(x + 3) = (x - 1)^2$

10. Graph each linear relation.

a) $y + 2 = 3(x - 1)$ **b)** $y = \frac{1}{2}x - 1$

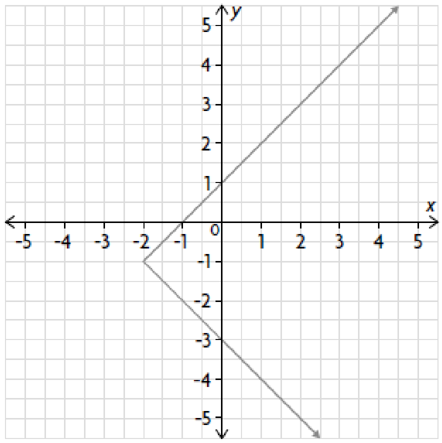
c) line passing through (3, 2) with slope -2

11. Factor each quadratic expression, if possible.

a) $2x^2 - 2x - 24$ **b)** $x^2 + 4x + 7$ **c)** $-x^2 + 2x + 8$

Name ________________________________ Date ____________________

d)



9. Solve each equation.

a) $-\frac{1}{2}x^2 - 32 = 0$ **b)** $2(x + 5) = 9$ **c)** $x(x + 3) = (x - 1)^2$

10. Graph each linear relation.

a) $y + 2 = 3(x - 1)$ **b)** $y = \frac{1}{2}x - 1$

c) line passing through (3, 2) with slope −2

11. Factor each quadratic expression, if possible.

a) $2x^2 - 2x - 24$ **b)** $x^2 + 4x + 7$ **c)** $-x^2 + 2x + 8$