Pg. 71 #3-5 and pg. 109 #11,14-19, 29, 33-41 odd, 42-45

Pg. 71 #3-5

Graph each piecewise function.

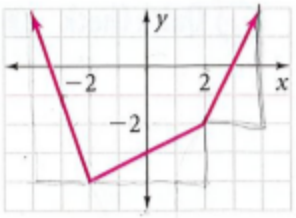
1. $y = [x] + 2$

2. $f(x) = 3[x]$

3. $y = \begin{cases} x + 4, \text{ if } x \leq -2 \\ -x, \text{ if } x > -2 \end{cases}$

4. $f(x) = \begin{cases} -2x + 1, \text{ if } x < 3 \\ x - 8, \text{ if } x \geq 3 \end{cases}$

5. Write a piecewise function to represent the graph at the right.



Pg. 109 #11,14-19, 29, 33-41 odd, 42-45

A **relation** is a set of ordered pairs that can be represented by points in the coordinate plane or by a **mapping diagram.** The **domain** of a relation is the set of x-coordinates. The **range** is the set of y-coordinates.

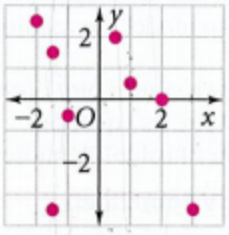
When each element of the domain of a relation is paired with exactly one element of the range, the relation is a **function.** You can write a function using the notation $f(x)$, called **function notation.**

Determine whether each relation is a function. Find the domain and range.

6. $\{(5, 0), (8, 1), (1, 3), (5, 2), (3, 8)\}$

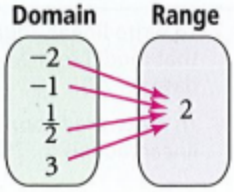
7. $\{(10, 2), (-10, 2), (6, 4), (5, 3), (-6, 7)\}$

8.



9.

10.



For each function, find $f(-2)$, $f(-0.5)$, and $f(3)$.

11. $f(x) = -x + 4$

12. $f(x) = \frac{3}{8}x - 3$

13. $f(x) = -\frac{5}{12}x + 2$

The graph of a **linear function** is a line. You can represent a linear function with a **linear equation.** In a function, the value of y depends on the value of x, so y is the **dependent variable** and x is the **independent variable.**

Given two points on a line, the **slope** of the line is the ratio of the difference of the y-coordinates to the corresponding difference of the x-coordinates. The slope equals the coefficient of x when you write a linear equation in **slope-intercept form.** You can also write a linear equation in **point-slope form** or **standard form.** You can use the slopes of lines to determine whether or not they are parallel, perpendicular, or horizontal. A vertical line has no slope.

Write in standard form an equation for each line.

14. slope $= -3$, through $(4, 0)$

15. through $(2, 3)$ and $(3, 5)$

Find the slope, x-intercept, and y-intercept of each line.

16. $4x - 2y = 3$

17. $Mx = Ny + P$

18. $5 - x = y$

19. a. Write an equation of the line parallel to $x + 2y = 6$ through $(8, 3)$.
b. Write an equation of the line perpendicular to $x + 2y = 6$ through $(8, 3)$.
c. Graph the three lines on the same coordinate plane.

The **absolute value function** $y = |x|$ has a graph in the shape of a V. It is the **parent function** for the family of functions of the form $y = a|x - h| + k$. The maximum or minimum point of the V is the **vertex** of the graph.

The value of h represents a horizontal translation of the parent graph by h units left (h is positive) or right (h is negative). The k represents a vertical translation of the graph by k units up (k is positive) or down (k is negative). The a represents a vertical stretch for $a > 1$; a vertical shrink for $0 < a < 1$. $y = -a|x|$ is a reflection of $y = a|x|$ in the x-axis.

Graph each equation by writing two linear equations.

29. $y = |x - 7|$

30. $y = -|x + 10|$

31. $y = \frac{1}{3}|2x + 6| + 2$

Write an equation for each translation of the graph of $y = |x|$.

32. 4 units up, 2 units right

33. vertex $(-3, 0)$

34. vertex $(5, 2)$

35. vertex $(4, 1)$

Graph each function.

36. $f(x) = |x| - 8$

37. $f(x) = 2|x - 5|$

38. $f(x) = \frac{1}{2}|x - 3| + 3$

39. $y = 3|x + 4|$

40. $y = -\frac{1}{4}|x - 2| + \frac{1}{2}$

41. $y = -2|x + 1| - 1$

A **linear inequality** describes a region of the coordinate plane that has a boundary. To graph an inequality involving two variables, first graph the boundary. Then decide which side of the boundary contains solutions. Points on a dashed boundary are not solutions. Points on a solid boundary are solutions.

Graph each inequality.

42. $y \geq -2$ **43.** $y < 3x + 1$ **44.** $y \leq -|x - 5|$ **45.** $y > |2x + 1|$