

Chapter 1: Functions
Study Guide

Answer
Key

The following topics are a summary of the skills and concepts on which you will be tested.

Understand and correctly interpret function notation

a. If $f(x) = \sqrt{x-2}$ then $f(11) = ?$ $\sqrt{11-2} = \sqrt{9} = 3$

b. If $g(x) = 3 - x^2$ then $g(5) = ?$ $3 - (5)^2 = 3 - 25 = -22$

c. If $f(x) = \frac{x+3}{2x-5}$ then $f(2) = ?$ $\frac{2+3}{2(2)-5} = \frac{5}{4-5} = \frac{5}{-1} = -5$

Find inputs and outputs of functions

Determine the outputs for the given inputs of the following functions.

1. $x=2$

$f(x) = -2x + 4$
 $-4 + 4$
 $f(x) = ?$
 $f(2) = 0$

2. $x = -6$

$f(x) = |x - 2|$
 $|-6 - 2|$
 $|-8|$
 $f(x) = ?$
 $f(-6) = 8$

$x = 9$

$f(x) = \sqrt{x + 1}$
 $\sqrt{3 + 1}$
 $f(x) = ?$
 $f(9) = 2$

Solve linear equations

7. $1 + 3x - x = x - 4 + 2x$ $x = 5$

8. $5x - 3 + 2x = x + 7 + 6x$ No Sol

9. $4y - 8 - 2y = 4$ $y = 6$

10. $-x + 3 = 6$ $x = -3$

11. $3y + 7 - y = 5 + 2y + 2$
 \mathbb{R}

12. $4y + 7 = 2y + 7$ $y = 0$

Simplifying Algebraic Expressions

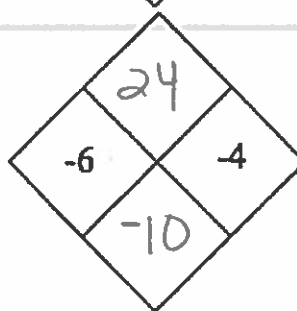
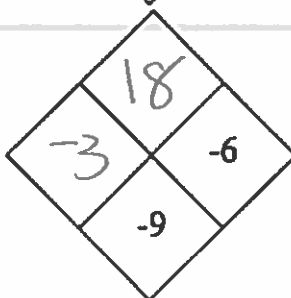
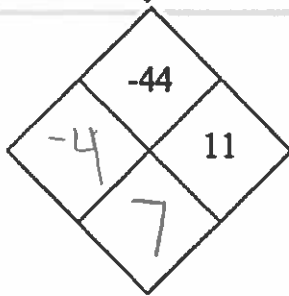
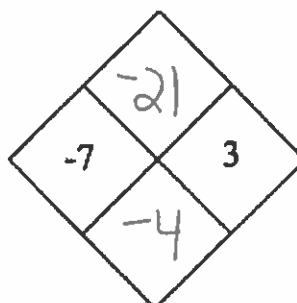
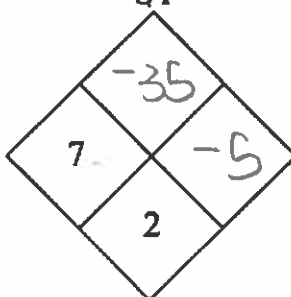
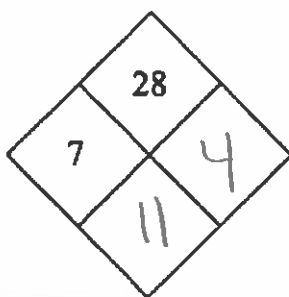
1. $3(2x - 5) + 2(3x - 3)$
 $= 6x - 15 + 6x - 6$
 $= 12x - 21$

2. $-7(3 - x) - 3(5x - 9)$
 $= -21 + 7x - 15x + 27$
 $= 6 - 8x$

3. $4(7x - 3) + 5(4 - 8x)$
 $= 28x - 12 + 20 - 40x$
 $= -12x + 8$

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Diamond problems - fill in the missing parts



Use order of operations and evaluate expressions

Evaluate each of the following expressions. Let $x = 4$, $y = -2$, and $z = -3$.

19. $\frac{2x^2x}{x+2} = \frac{2(-2)^2(4)}{4+2} = \frac{2 \cdot 4 \cdot 4}{6} = \frac{32}{6} = \boxed{\frac{16}{3}}$

21. $z^2 + 8zy - y^2 = (-3)^2 + 8(-3)(-2) - 4^2 = 9 + 48 - 16 = \boxed{41}$

23. $6z - y^2 + \frac{x+2}{-3} = 6(-3) - (-2)^2 + \frac{4+2}{-3} = -18 - 4 + (-2) = \boxed{-24}$

20. $x(3 + zy) - 2x^2 = 4(3 + (-3)(-2)) - 2(4)^2 = 4(3 + 6) - 2(16) = 4(9) - 32 = 36 - 32 = \boxed{4}$

22. $\frac{x^3 - 4y}{4^3 + 8} = \frac{4^3 - 4(-2)}{4^3 + 8} = \frac{64 + 8}{64 + 8} = \frac{72}{72} = \boxed{1}$

24. $\frac{-x^2(x-5y)}{3x-4y} = \frac{-(-2)^2(4(-3) - 5(-2))}{3(4) - 4(-2)} = \frac{-4(-12 + 10)}{12 + 8} = \frac{-4(-2)}{20} = \frac{8}{20} = \boxed{\frac{2}{5}}$

Creating and then describing the characteristics of a graph

Sketch a graph of the equation $y = 4 - x^2$. Then describe it completely. Include at least 6 unique statements.

- Parabola
- Function
- Opens down

- y -int = 4
- x -int = 2, -2
- vertex: (0, 4)
- Domain: \mathbb{R}
- Range: $y \leq 4$

Solve problems involving absolute value, square roots, and cube roots

1-5, 1-34, 1-35, 1-39, 1-48, 1-58, 1-61, and CL 1-89

Increases at a decreasing rate until it reaches the vertex, then decreases at an increasing rate.
• Line of symmetry at $x = 0$

It is recommended that you complete CL 1-1-83 through CL 1-91. The solutions are provided as well as where you can go to review content and practice similar problems.