2.3 HW

1. Decide whether each of the following pairs of expressions are equivalent for all values of x (or a and b). If they are equivalent, show how you can be sure. If they are not, justify your reasoning completely. Homework Help ✎

a. $(x + 3)^2$ and $x^2 + 9$
b. $(x + 4)^2$ and $x^2 + 8x + 16$
c. $(x + 1)(2x - 3)$ and $2x^2 - x - 3$
d. $3(x - 4)^2 + 2$ and $3x^2 - 24x + 50$
e. $(x^3)^4$ and x^7
f. ab^2 and a^2b^2

2. Jenna wants to solve the equation $2000x - 4000 = 8000$. Homework Help ✎

a. What easier equation could she solve instead that would give her the same solution? (In other words, what equivalent equation has easier numbers to work with?)

b. Justify that your equation in part (a) is equivalent to $2000x - 4000 = 8000$ by showing that they have the same solution.

c. Now Jenna wants to solve $\frac{3}{50} - \frac{x}{50} = \frac{7}{50}$. Write and solve an equivalent equation with easier numbers that would give her the same answer.

3. Find an equation for each sequence below. Then describe its graph.

HW eTool (Desmos). Homework Help ✎

a.

n	$t(n)$
3	8
5	2
7	−4

b.

n	$t(n)$
1	40
2	32
3	25.6

4. Find the x-intercepts for the graph of $y - x^2 = 6x$. Homework Help ✎

5. Multiply each pair of polynomial functions below to find an expression for $f(x) \cdot g(x)$.

HW eTool (Desmos). Homework Help ✎

a. $f(x) = 2x$, $g(x) = (x + 3)$
b. $f(x) = (x + 3)$, $g(x) = (x + 3)$

6. Describe how the graph of $y = -2(x + 1)^2 - 3$ is different from $y = x^2$. Homework Help ✎

7. Given the parabola $f(x) = x^2 - 2x - 3$, complete parts (a) through (c) below. Homework Help ✎

a. Find the vertex by averaging the x-intercepts.

b. Find the vertex by completing the square.

c. Find the vertex of $f(x) = x^2 + 5x + 2$ using your method of choice.

d. What are the domain and range for $f(x) = x^2 + 5x + 2$?

8. Simplify each of the following expressions, leaving only positive exponents in your answer. Homework Help ✎

a. $(x^3y^{-2})^{-4}$

b. $-3x^2(6xy - 2x^3y^2z)$

Answer Key

1. See below:

a. not equivalent
b. equivalent
c. equivalent
d. equivalent
e. not equivalent
f. not equivalent

2. See below:

a. Possibilities include: $x - 2 = 4$ or $2x - 4 = 8$

b. They have the solution $x = 6$

c. $3 - x = 7$, $x = -4$

3. See below:

a. $t(n) = -3n + 17$, points along a line with y-intercept (0, 17) and slope –3

b. $t(n) = 50(0.8)^n$, points along a decreasing exponential curve with y-intercept (0, 50)

4. (0, 0) and (–6, 0)

5. See below:

a. $2x^2 + 6x$

b. $x^2 + 6x + 9$

6. The first graph opens downward, is stretched, and has its vertex at (–1, –3). The second is the parent graph.

7. See below:

a. (1, –4)

b. (1, –4)

c. (–2.5, –4.25)

d. Domain: $-\infty < x < \infty$, Range: $y \geq -4.25$

8. See below:

a. $\frac{y^8}{x^{12}}$

b. $-18x^3y + 6x^5y^2z$