Algebra 2 – SBA Prep #2

Name _____

Pd _____ Date _____

Quadratic Review:

1. Below are three equivalent forms of the same quadratic function.

   A. $f(x) = -3x^2 + 12x - 9$ **B.** $f(x) = -3(x-2)^2 + 3$ **C.** $f(x) = -3(x-1)(x-3)$

   i. Which form reveals the y-intercept without changing its form and what is the y-intercept?

   ii. Which form reveals the x-intercept(s) without changing its form and what is/are they?

   iii. Which form reveals the maximum value for f(x) without changing its form, and what is its value?

2. Rewrite the function f defined by $f(x) = x^2 + 3x - 9$ in the form $f(x) = a(x-h)^2 + k$, where a, h, and k are constants.

3. Rewrite the function f defined by $f(x) = 16x^2 - 20x + 64$ in the form $f(x) = a(x-h)^2 + k$, where a, h, and k are constants.

4. Determine whether each function in the table represents the graph of the quadratic function shown. Select Yes or No for each function.
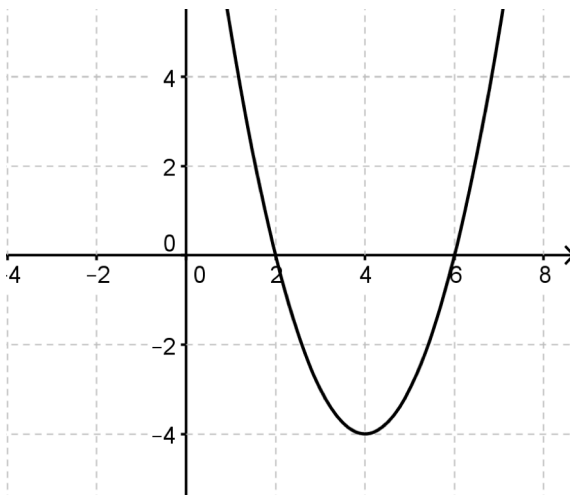
Function	Yes	No
$f(x) = (x-4)^2 - 4$		
$f(x) = (x-6)(x-2)$		
$f(x) = (x+6)(x+2)$		
$f(x) = (x-4)(x+4)$		
$f(x) = (x-2)^2 - 8$		

5. Given the graph of the quadratic function f below and $g(x) = (x-1)(x-4)$, select whether each statement is **True** or **False**.
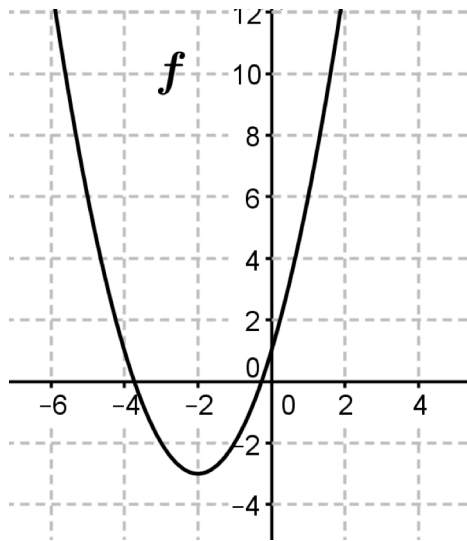
Statement	True	False
The minimum value for $f(x)$ is greater than the minimum value for $g(x)$.		
The value of x when $f(x)$ is at its minimum is greater than the value of x when $g(x)$ is at its minimum.		
Both x-intercepts of $g(x)$ occur when x is less than zero.		
The line of symmetry of $f(x)$ is x = -2.		

Integer Exponent Equivalencies

6. Rewrite an equivalent expression to $\dfrac{a^8}{a^2}$ in the form a^n.

7. Rewrite an equivalent expression to a^{12} in the form $\left(a^n\right)^m$.

8. Rewrite an equivalent expression to a^{-18} in the form $\left(a^n\right)^m$.

9. Rewrite an equivalent expression to $\dfrac{1}{\left(a^3\right)^5}$ in the form a^n.

10. Rewrite an equivalent expression to $\left(a^2 a^3 b^3\right)^6$ in the form $a^n b^m$.

Rational Exponent Equivalencies

11. Determine whether each expression is equivalent to $x^{\frac{7}{3}}$. Select Yes or No for each.

	Yes	No
$\sqrt[7]{x^3}$		
$\sqrt[3]{x^7}$		
$\sqrt{x^{\frac{7}{3}}}$		
$x^2\sqrt[3]{x}$		
$\dfrac{x^7}{x^3}$		

12. Determine whether each expression is equivalent to $(2x^2)^{\frac{3}{5}}$. Select Yes or No for each.

	Yes	No
$8x^{10}$		
$x\sqrt[5]{8x}$		
$\sqrt[5]{2x^6}$		
$\sqrt[5]{8x^6}$		
$\sqrt[5]{8x^2}$		

13. Select an expression that is equivalent to $\left(\dfrac{1}{2}\right)x^{\frac{1}{6}} \cdot \left(\dfrac{1}{2}\right)x^{\frac{2}{3}}$

a) $\sqrt{x}$

b) $\dfrac{1}{2}\sqrt[3]{x}$

c) $\dfrac{1}{4}\sqrt[3]{x}$

d) $\dfrac{1}{4}\sqrt[6]{x^5}$

Solving:

14. A student solved $\sqrt{x^2 - 3} - 1 = 0$ in five steps as shown.

Step 1: $\sqrt{x^2 - 3} = 1$

Step 2: $\left(\sqrt{x^2 - 3}\right)^2 = (1)^2$

Step 3: $x^2 - 3 = 1$

Step 4: $x^2 = 4$

Step 5: $x = 2, x = -2$

Which statement is an accurate interpretation of the student's work?
- a) The student solved the equation correctly.
- b) The student made an error in Step 2.
- c) Only x = 2 is a solution to the original equation.
- d) Only x = -2 is a solution to the original equation.

15. Select the appropriate box to indicate the match of each table to its equation.

Table A

x	f(x)
0	0.00
1	1.41
2	2.83
3	4.24
6	8.49
8	11.31

Table B

x	f(x)
0	0.00
1	1.41
2	2.00
3	2.45
6	3.46
8	4.00

Table C

x	f(x)
0	0.00
1	2.00
2	2.83
3	3.46
6	4.90
8	5.66

Equation	Table A	Table B	Table C
$f(x) = 2\sqrt{x}$			
$f(x) = \sqrt{2x}$			
$f(x) = x\sqrt{2}$			

1. A student solved $\sqrt{x+2} - x = 0$ in six steps as shown.   **g(x)**

    Step 1: $\sqrt{x+2} = x$

    Step 2: $\left(\sqrt{x+2}\right)^2 = (x)^2$

    Step 3: $x + 2 = x^2$
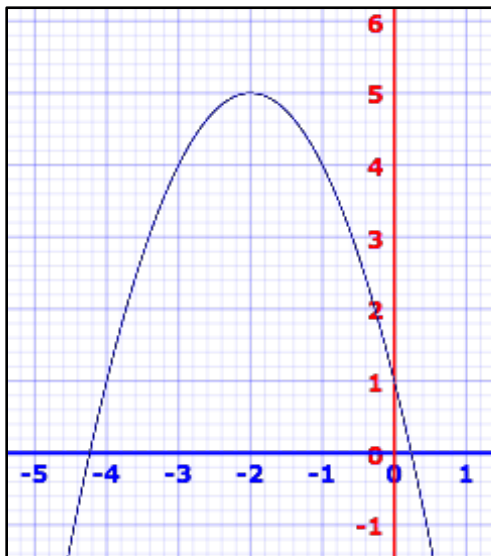
    Step 4: $x^2 - x - 2 = 0$

    Step 5: $(x-2)(x+1) = 0$

    Step 6: $x = 2, x = -1$

    Which statement is an accurate interpretation of the student's work?
    a. The student solved the equation correctly.
    b. The student made an error in Step 4.
    c. Only $x = 2$ is a solution to the original equation.
    d. Only $x = -1$ is a solution to the original equation.

2. The equation $f(x) = -\dfrac{1}{2}(x+3)(x-5)$ represents *f(x)* and the graph represents **g(x)**.

    Select whether each statement is **true** or **false** about the given functions.

Statement	True	False
a. The line of symmetry of g(x) is $x = 2$		
b. The maximum of g(x) is less than the maximum of f(x).		
c. The value of x when f(x) is at the maximum is less than the value of x when g(x) is at the maximum.		

3. Write an equivalent expression to $\left(-2x^2 y\right)\left(3x^4 y^3\right)$

4. Select an expression that is equivalent to $x^{\frac{1}{4}} \cdot \sqrt[6]{x^3}$

    A. $x^{\frac{3}{4}}$ C. $x^{\frac{4}{10}}$

    B. $x^{\frac{3}{24}}$ D. $x^{\frac{3}{24}}$

5. The equation $f(x) = -(x-4)^2 + 5$ represents $f(x)$ and the graph below represents $g(x)$.

Select whether each statement is **true** or **false** about the given functions.

Statement	True	False
A) The line of symmetry of $g(x)$ is $x = -5$		
B) The maximum of $g(x)$ is less than the maximum of $f(x)$.		
C) The value of x when $f(x)$ is at the maximum is less than the value of x when $g(x)$ is at the maximum.		
D) The y-intercept of $g(x)$ is greater than the y-intercept of $f(x)$.		

$g(x)$
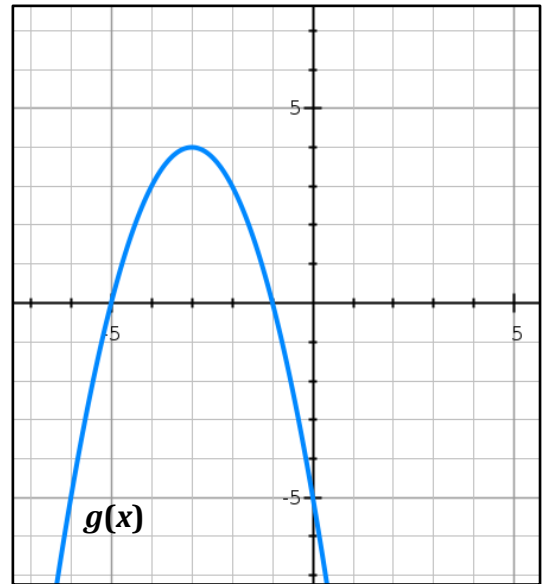
6. Determine whether each expression is equivalent to $\sqrt[3]{3^2} \cdot \sqrt[3]{3^5}$. Select Yes or No for each in the table at the right.

	Yes	No
$3^{\frac{7}{3}}$		
$9\sqrt[3]{3}$		
$3^{\frac{10}{3}}$		
3^{21}		
$3^{\frac{21}{10}}$		
$3^{\frac{3}{7}}$		

7. Mr. TakiGUCCI solved the following equation $3(x+4) = 4(x+7)+1$, his steps are shown below:

STEP 1: $3(x+4) = 4(x+7)+1$

STEP 2: $3x+12 = 4x+28+1$

STEP 3: $3x+12 = 4x+27$

STEP 4: $12 = x+27$

STEP 5: $-15 = x$

Part A Identify Mr. T.'s mistake: STEP 1   STEP 2   STEP 3   STEP 4   STEP 5
(circle the step where the mistake was made)

Part B: Identify the actual solution

8. Mike solved the problem $\left(3m^2 - 2m + 4\right) \div \left(m - 3\right)$.

His work is shown in the steps below:

$$
\begin{array}{r}
3m + 7 \\
m - 3 \overline{\smash{)}\, 3m^2 - 2m + 4}
\end{array}
$$

Step 1: $\quad \dfrac{3m^2 - 9m}{}$

Step 2: $\qquad\qquad 7m + 4$

Step 3: $\qquad\qquad \dfrac{7m - 21}{}$

Step 4: $\qquad\qquad\qquad 25$

Step 5: The remainder is 25.

Step 6: The answer is $3m + 7 + \dfrac{25}{3m^2 - 2m + 4}$

Part A: Select/Circle the first step that contains a mistake.

Part B: Find the correct solution(s) by selecting from the possible solutions shown below:
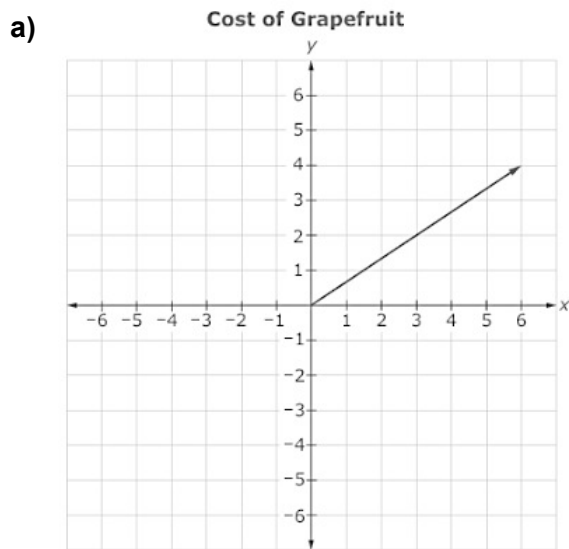
No Solution All Real Numbers $3m + 7 + \dfrac{25}{m - 3}$

$3m + 7$ $3m + 32$ $m - 3 + \dfrac{25}{3m + 7}$

9. Of the following tables select which are functions and not functions:

	FUNCTION	NOT FUNCTION
x: -1, 5, 2, -1, 2 / $f(x)$: 6, 1, 3, 4, 2		
x: 0, 1, 2, 3, 4 / $g(x)$: -5, -2, 0, -2, -5		
x: 0, 3, 4, 4, 7 / $t(x)$: 5, 4, 3, 2, 1		

10. Which graph represents the cost, y, in dollars, to buy a grapefruit that costs $1.50?

a)

Cost of Grapefruit

b)

Cost of Grapefruit

c)

Cost of Grapefruit

d)

Cost of Grapefruit
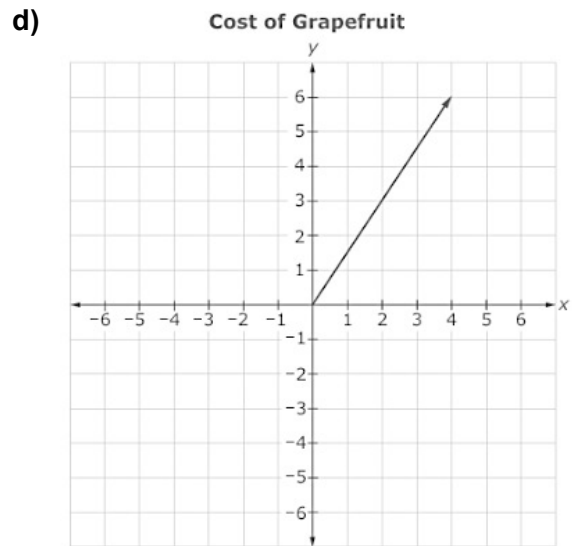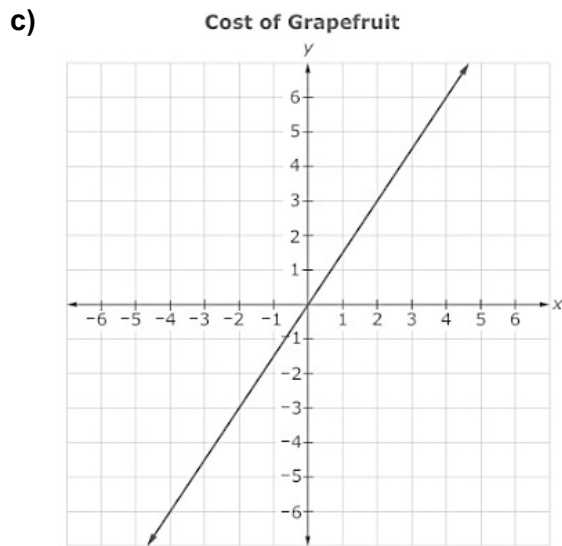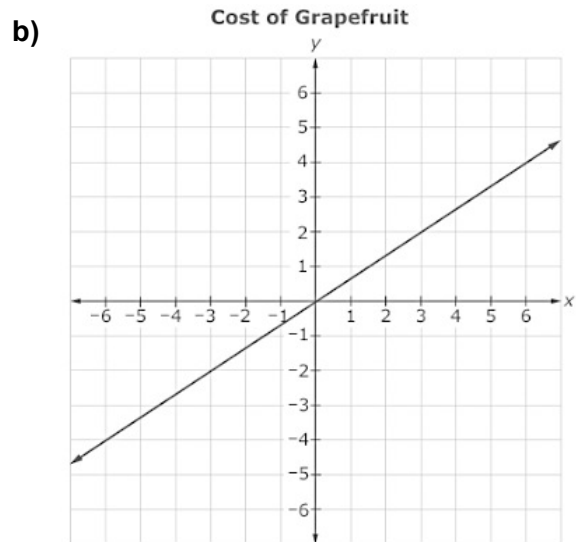
11. This graph shows the amount of gas, in ounces, in a lawn mower gas tank, modeled as a function of time.
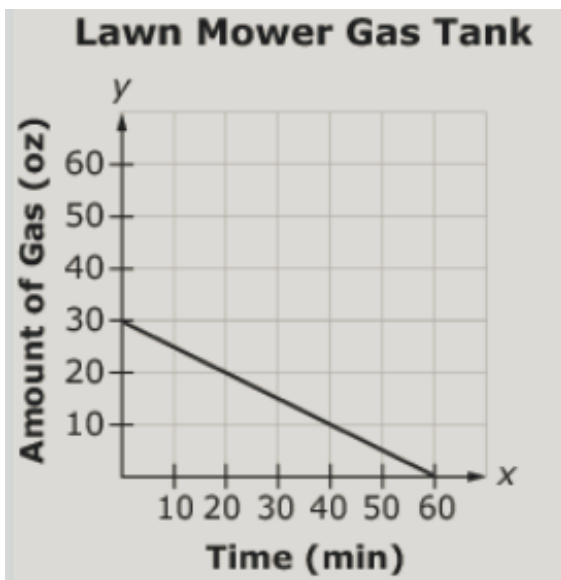
Determine whether each statement is true according to the graph. Select True or False for each statement.

Statements	T	F
The maximum amount of gas in the tank was 60 ounces.		
The amount of gas in the gas tank is at maximum at 0 minutes.		
The gas tank will be empty at 60 minutes.		