

SBA Prep #2: Algebra 2

Quadratics & Exponents

HW #4: #1-11

Algebra 2 – SBA Prep #2

Name _____
Pd _____ Date _____

Quadratic Review:

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

Standard

Vertex

Factored

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?

A, (0, -9)

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

C, (1, 0) & (3, 0)

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

B, (2, 3)

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.

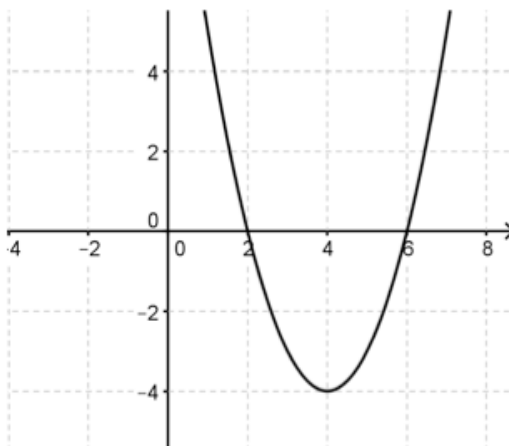
$a = 1$ $h = -1.5$ $k = -11.25$

$\frac{-b}{2a} = \frac{-(3)}{2(1)} = \frac{-3}{2} = -1.5$ $= (-1.5)^2 + 3(-1.5) - 9$
 $= 2.25 - 4.5 - 9$
 $= -11.25$

$f(x) = 1(x + 1.5)^2 - 11.25$

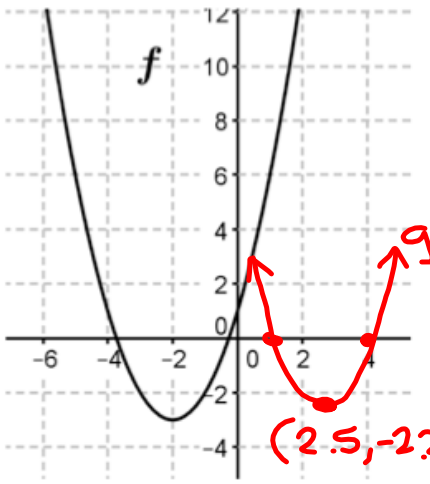
3. Rewrite the function f defined by $f(x) = 16x^2 - 20x + 64$ in the form $f(x) = a(x-h)^2 + k$, where a , h , and k are constants.

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**. (1.5)(-1.5) → -2.25



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 $\frac{a^8}{a^2}$ in the form a^n .

~~$a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a$~~
 $a \cdot a$
 a^6

$\frac{a^m}{a^n} = a^{m-n}$
 $(a^n)^m = a^{n \cdot m}$

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

$(a^2)^6, (a^6)^2, (a^3)^4, (a^4)^3$

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

$(a^{-2})^9, (a^{-6})^3, (a^{-1})^{18}$

9. Rewrite an equivalent expression to $\frac{1}{a^{15}}$ in the form a^n .

$\frac{1}{a^{15}} \rightarrow a^{-15}$

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

$a^{12} \cdot a^{18} \cdot b^{18}$
 $a^{30} b^{18}$

Rational Exponent Equivalencies

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

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

Handwritten notes for problem 11:

- $x^{\frac{7}{3}}$
- $x^{\frac{3}{3}} \cdot x^{\frac{3}{3}} \cdot x^{\frac{1}{3}}$
- $x \cdot x \cdot \sqrt[3]{x}$

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

	Yes	No
$8x^{10}$		✓
$x^5\sqrt[3]{8x}$	✓	
$\sqrt[5]{2x^6}$		✓
$\sqrt[5]{8x^6}$	✓	
$\sqrt[5]{8x^2}$		✓

Handwritten notes for problem 12:

- $2^{\frac{5}{3}} \cdot x^{\frac{10}{3}}$

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

- ~~a) \sqrt{x}~~
- ~~b) $\frac{1}{2}\sqrt[3]{x}$~~
- c) $\frac{1}{4}\sqrt[3]{x}$

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

Handwritten calculations for problem 13:

- $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$
- $\frac{1}{6} + \frac{2}{3} \cdot 2 = \frac{1}{6} + \frac{4}{6} = \frac{5}{6}$

Handwritten result for problem 13: $\frac{1}{4}x^{\frac{5}{6}}$

Solving:

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

✓ Step 1: $\sqrt{x^2 - 3} = 1$

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

✓ Step 3: $x^2 - 3 = 1$

✓ Step 4: $x^2 = 4$

✓ Step 5: $x = 2, x = -2$

Check

$$\sqrt{(2)^2 - 3} = 1$$

$$\sqrt{4 - 3} = 1$$

$$\sqrt{1} = 1$$

$$1 = 1 \checkmark$$

$$\sqrt{(-2)^2 - 3} = 1$$

$$\sqrt{4 - 3} = 1$$

$$\sqrt{1} = 1$$

$$1 = 1 \checkmark$$

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
$f(x) = 2\sqrt{x}$			✓
$f(x) = \sqrt{2x}$		✓	
$f(x) = x\sqrt{2}$	✓		

$f(1) = 2\sqrt{1}$
 $= 2(1)$
 $= 2$
 $f(1) = 2$

$f(2) = \sqrt{2(2)}$
 $= \sqrt{4}$
 $= 2$
 $f(2) = 2$

$f(2) = 2\sqrt{2}$
 $= 2.83$
 $f(2) = 2.83$