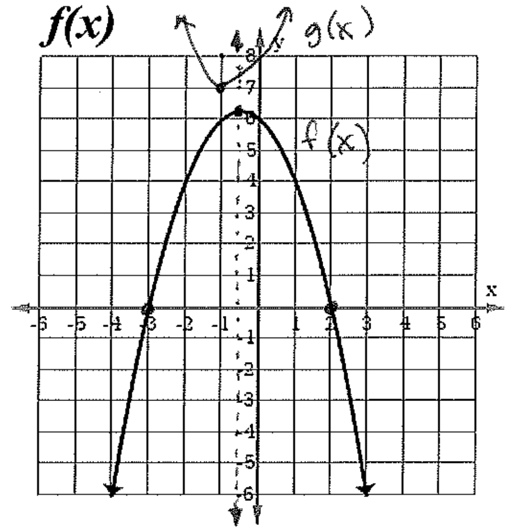
Alg 1 U6 SBAC Practice Name Key Date _____ Period ___

Part A: Graphing Quadratics and Finding Key Features [F-IF.4]

1. **Select** true or false for each statement.



A) The line of symmetry for *f(x)* is $x=-1$.

True False

line of symmetry is $x = -\frac{1}{2}$

B) The maximum y-value of *f(x)* is less than the minimum y-value of the function $g(x)=(x+1)^2+7$. ✓

True False

C) *f(x)* has two x-intercepts.

True False

(2,0) (-3,0)

2. **Find** the domain and range for the function. **Explain** your reasoning.

$h(x)=-2(x-3)^2$

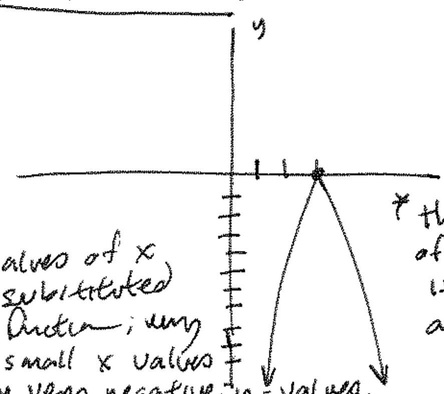
$h(x) = -2(x - 6x + 9)$

$h(x) = -2x + 12x - 18$

domain: all reals

$-\infty < x < \infty$ *any values of x can be substituted into the function; very large or small x values will result in very negative y-values.

range: $-\infty < y \leq 0$



* the max (vertex) of the function is (3,0) - there are no positive y-values

3. **Select** the value of *d* that would result in the function $g(x)=x^2+dx+4$ having only one x-intercept. **Explain** your reasoning.

A) 0 B) 1

C) 4 D) 16

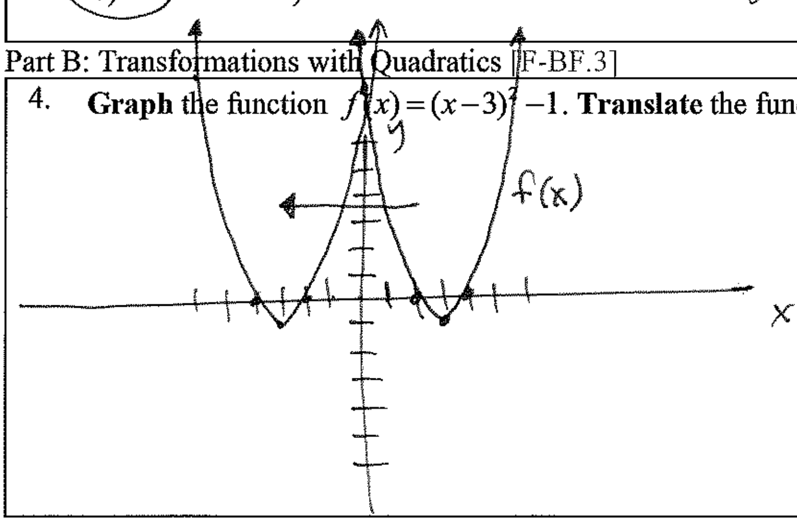
I need a d value that makes this a perfect square

$g(x) = x^2 + 4x + 4 = (x+2)^2$ ✓

x-intercept = vertex = (-2, 0)

Part B: Transformations with Quadratics [F-BF.3]

4. **Graph** the function $f(x)=(x-3)^2-1$. **Translate** the function 6 units left.



vertex: (3, -1)

y-int: (0, 8)

x-ints: (2,0)(4,0)

$f(x) = x^2 - 6x + 9 - 1$

$f(x) = x^2 - 6x + 8$

$f(x) = (x-2)(x-4)$

Part C: Solving Quadratics & The Quadratic Formula [A-REI.4b]

5. **Solve** the equation, showing your work.

A) $2x^2 - 50 = 0$

$+50 \quad +50$

$2x^2 = 50$

$\div 2 \quad \div 2$

$\sqrt{x^2} = \pm\sqrt{25}$

$x = \pm 5$

B) $13x^2 - 49 = 0$

$+49 \quad +49$

$13x^2 = 49$

$\div 13 \quad \div 13$

$\sqrt{x^2} = \pm\sqrt{\frac{49}{13}}$

$x = \pm\sqrt{\frac{49}{13}}$

* see power point vertex and intercepts in resources.

C) $x^2 - 12x + 20 = 0$

factor: $(x-2)(x-10) = 0$

$(2,0)\ (10,0)$

D) $x^2 + 6x + 10 = 0$

quadratic formula:

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-6 \pm \sqrt{36 - 4(1)(10)}}{2(1)}$

$x = \frac{-6 \pm \sqrt{-4}}{2}$

$x = \frac{-6 \pm 2i}{2} = -3 \pm i$

short cut:

$\frac{-b}{2a} = -3$

$r = -3 - u \quad s = -3 + u$

$(-3-u)(-3+u) = 10$

$9 - u^2 = 10$

$-1 = u^2$

$\sqrt{-1} = u$

$i = u$

$r = -3 + i \quad s = -3 - i$ ✓

6. **Select** any equations with no real solutions. **Justify** your reasoning.

A) $x^2 + 4x + 4 = 0$

$(x+2)^2 = 0$

1 real solution

B) $x^2 + 5x + 1 = 0$

$\frac{-5 \pm \sqrt{25 - 4(1)(1)}}{2(1)}$

$\frac{-5 \pm \sqrt{21}}{2}$

2 real solutions

C) $x^2 + 2x + 7$

$\frac{-2 \pm \sqrt{4 - 4(1)(7)}}{2(1)}$

$\frac{-2 \pm \sqrt{-24}}{2}$ imaginary!!

0 real solutions ☺

Part D: Modeling with Quadratics [A-SSE.3a, A-SSE.3b]

7. **Sketch** a graph that represents the height of a stone above the ground in meters, y, with respect to time in seconds, x, after it has been thrown straight up into the air. **Explain** the key features of the graph.