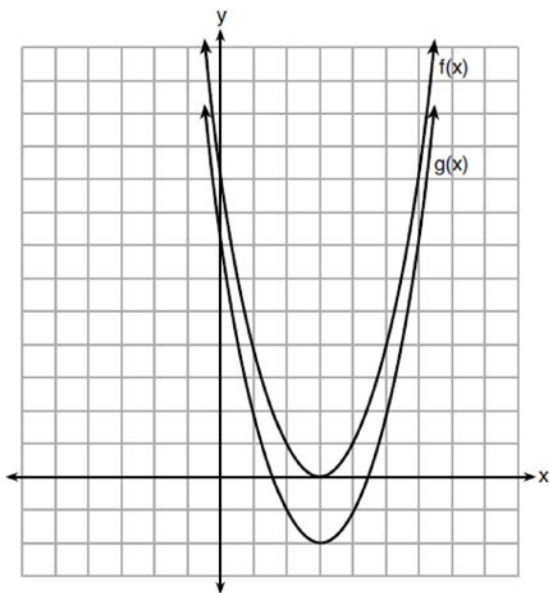## F.BF.B.3: Graphing Polynomial Functions 1

1 Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units
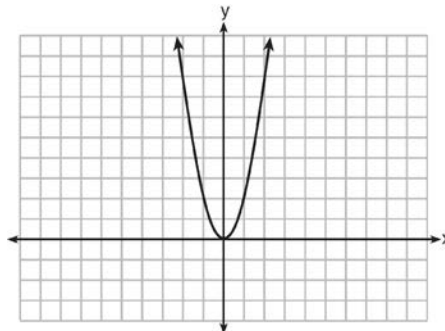1) right
2) up
3) left
4) down

2 The functions $f(x) = x^2 - 6x + 9$ and $g(x) = f(x) + k$ are graphed below.

Which value of k would result in the graph of $g(x)$?
1) 0
2) 2
3) −3
4) −2

3 The graph of the equation $y = ax^2$ is shown below.

If a is multiplied by $-\dfrac{1}{2}$, the graph of the new equation is
1) wider and opens downward
2) wider and opens upward
3) narrower and opens downward
4) narrower and opens upward

4 What would be the order of these quadratic functions when they are arranged from the narrowest graph to the widest graph?
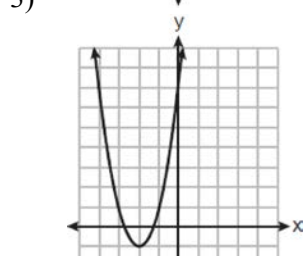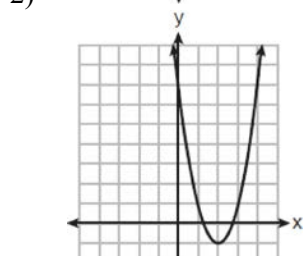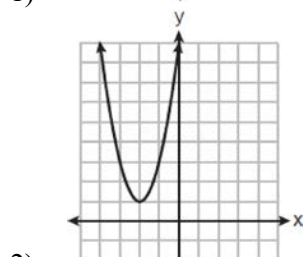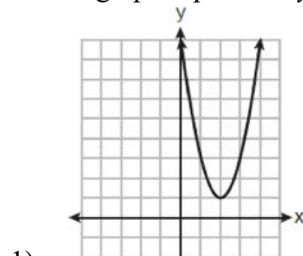$$f(x) = -5x^2 \quad g(x) = 0.5x^2 \quad h(x) = 3x^2$$
1) $f(x), g(x), h(x)$
2) $g(x), h(x), f(x)$
3) $h(x), f(x), g(x)$
4) $f(x), h(x), g(x)$

5 The graph of $y = f(x)$ is shown below.
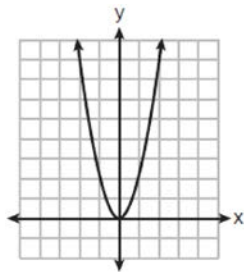
Which graph represents $y = f(x - 2) + 1$?

1)

2)

3)

4)

6 Compared to the graph of $f(x) = x^2$, the graph of $g(x) = (x - 2)^2 + 3$ is the result of translating $f(x)$
   1) 2 units up and 3 units right
   2) 2 units down and 3 units up
   3) 2 units right and 3 units up
   4) 2 units left and 3 units right

7 If $f(x) = x^2$, which function is the result of shifting $f(x)$ 3 units left and 2 units down?
   1) $g(x) = (x + 2)^2 - 3$
   2) $g(x) = (x - 2)^2 + 3$
   3) $g(x) = (x + 3)^2 - 2$
   4) $g(x) = (x - 3)^2 + 2$

8 If the original function $f(x) = 2x^2 - 1$ is shifted to the left 3 units to make the function $g(x)$, which expression would represent $g(x)$?
   1) $2(x - 3)^2 - 1$
   2) $2(x + 3)^2 - 1$
   3) $2x^2 + 2$
   4) $2x^2 - 4$

9 Given: $f(x) = (x - 2)^2 + 4$
           $g(x) = (x - 5)^2 + 4$
   When compared to the graph of $f(x)$, the graph of $g(x)$ is
   1) shifted 3 units to the left
   2) shifted 3 units to the right
   3) shifted 5 units to the left
   4) shifted 5 units to the right

10 Josh graphed the function $f(x) = -3(x - 1)^2 + 2$. He then graphed the function $g(x) = -3(x - 1)^2 - 5$ on the same coordinate plane. The vertex of $g(x)$ is
   1) 7 units below the vertex of $f(x)$
   2) 7 units above the vertex of $f(x)$
   3) 7 units to the right of the vertex of $f(x)$
   4) 7 units to the left of the vertex of $f(x)$

11 If the parent function of $f(x)$ is $p(x) = x^2$, then the graph of the function $f(x) = (x - k)^2 + 5$, where $k > 0$, would be a shift of
1) k units to the left and a move of 5 units up
2) k units to the left and a move of 5 units down
3) k units to the right and a move of 5 units up
4) k units to the right and a move of 5 units down

12 When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$
1) opens upward and is wider
2) opens upward and is narrower
3) opens downward and is wider
4) opens downward and is narrower

13 Caitlin graphs the function $f(x) = ax^2$, where a is a positive integer. If Caitlin multiplies a by -2, when compared to $f(x)$, the new graph will become
1) narrower and open downward
2) narrower and open upward
3) wider and open downward
4) wider and open upward

14 How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?
1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

15 In the functions $f(x) = kx^2$ and $g(x) = |kx|$, k is a positive integer. If k is replaced by $\frac{1}{2}$, which statement about these new functions is true?
1) The graphs of both $f(x)$ and $g(x)$ become wider.
2) The graph of $f(x)$ becomes narrower and the graph of $g(x)$ shifts left.
3) The graphs of both $f(x)$ and $g(x)$ shift vertically.
4) The graph of $f(x)$ shifts left and the graph of $g(x)$ becomes wider.

16 Describe the transformations performed on the graph of $f(x) = x^2$ to obtain the graph of $g(x)$ when $g(x) = (x - 3)^2 - 4$.

17 A student is given the functions $f(x) = (x + 1)^2$ and $g(x) = (x + 3)^2$. Describe the transformation that maps $f(x)$ onto $g(x)$.

18 The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2, -1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$. Explain how you arrived at your answer. [The use of the set of axes below is optional.]
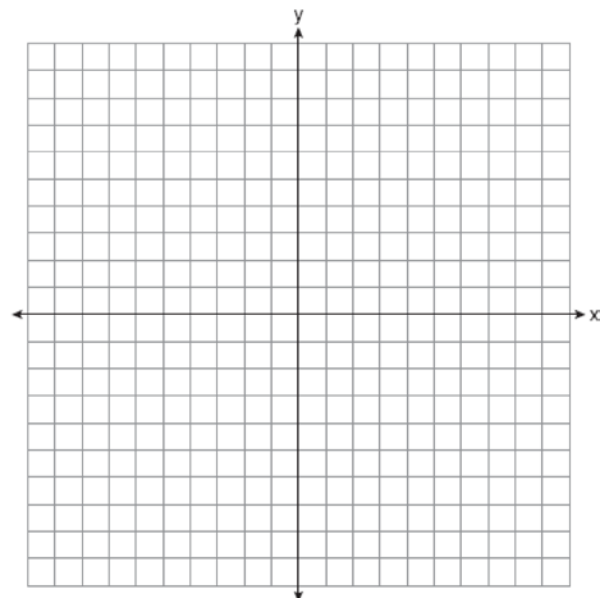
F.BF.B.3: Graphing Polynomial Functions 1
Answer Section

1 ANS: 2   REF: 081501ai
2 ANS: 4   REF: 012007ai
3 ANS: 1   REF: 081417ai
4 ANS: 4   REF: 082211ai
5 ANS: 1   REF: 082305ai
6 ANS: 3   REF: 081808ai
7 ANS: 3   REF: 012407ai
8 ANS: 2   REF: 011819ai
9 ANS: 2   REF: 061904ai
10 ANS: 1
$-5 - 2 = -7$

REF: 081905ai
11 ANS: 3   REF: 062113ai
12 ANS: 2   REF: 011717ai
13 ANS: 1   REF: 012310ai
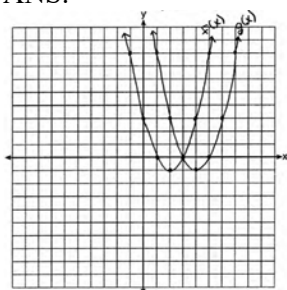14 ANS: 2   REF: 011512ai
15 ANS: 1   REF: 081706ai
16 ANS:
3 right and 4 down.

REF: 062226ai
17 ANS:
translate 2 left

REF: 082230ai
18 ANS:

$(4, -1)$. $f(x - 2)$ is a horizontal shift two units to the right.

REF: 061428ai