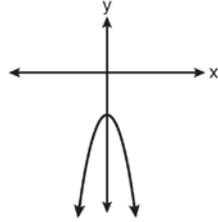
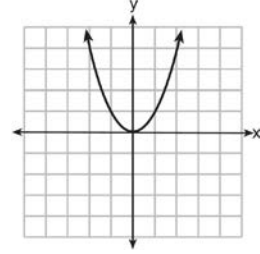


F.BF.B.3: Graphing Polynomial Functions

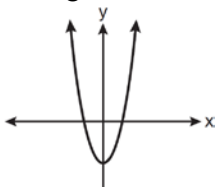
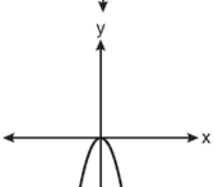
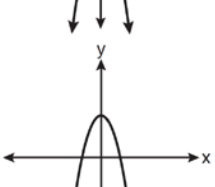
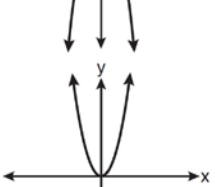
1 The diagram below shows the graph of $y = -x^2 - c$.



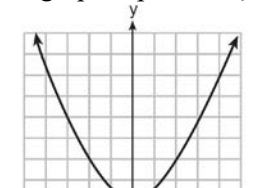
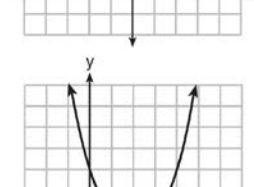
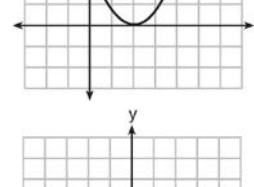
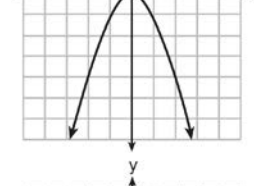
2 The graph of $y = x^2$ is shown below.



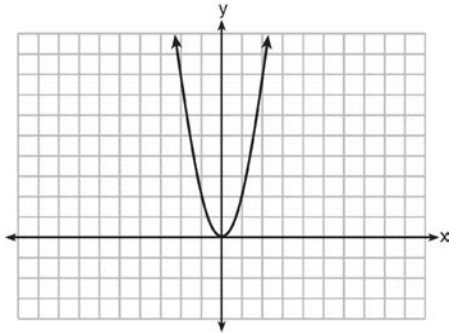
Which diagram shows the graph of $y = x^2 - c$?

- 1) 
- 2) 
- 3) 
- 4) 

Which graph represents $y = 2x^2$?

- 1) 
- 2) 
- 3) 
- 4) 

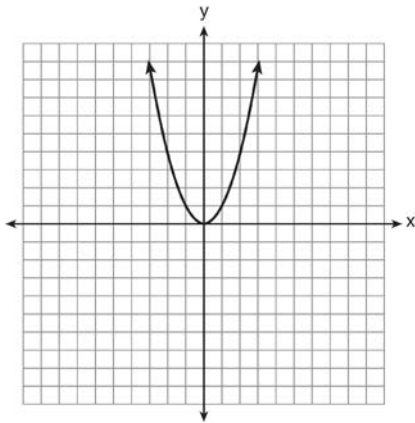
3 The graph of the equation $y = ax^2$ is shown below.



If a is multiplied by $-\frac{1}{2}$, 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 The graph of the equation $y = x^2$ is shown below.



Which statement best describes the change in this graph when the coefficient of x^2 is multiplied by 4?

- 1) The parabola becomes wider.
- 2) The parabola becomes narrower.
- 3) The parabola will shift up four units.
- 4) The parabola will shift right four units.

5 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

6 How is the graph of $y = x^2 + 4x + 3$ affected when the coefficient of x^2 is changed to a smaller positive number?

- 1) The graph becomes wider, and the y -intercept changes.
- 2) The graph becomes wider, and the y -intercept stays the same.
- 3) The graph becomes narrower, and the y -intercept changes.
- 4) The graph becomes narrower, and the y -intercept stays the same.

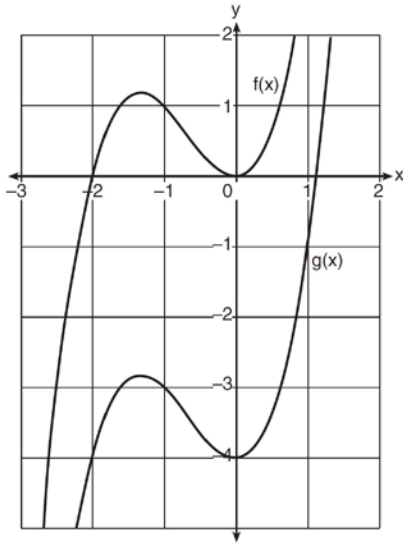
7 Melissa graphed the equation $y = x^2$ and Dave graphed the equation $y = -3x^2$ on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?

- 1) Dave's graph is wider and opens in the opposite direction from Melissa's graph.
- 2) Dave's graph is narrower and opens in the opposite direction from Melissa's graph.
- 3) Dave's graph is wider and is three units below Melissa's graph.
- 4) Dave's graph is narrower and is three units to the left of Melissa's graph.

- 8 Consider the graph of the equation $y = ax^2 + bx + c$, when $a \neq 0$. If a is multiplied by 3, what is true of the graph of the resulting parabola?
- 1) The vertex is 3 units above the vertex of the original parabola.
 - 2) The new parabola is 3 units to the right of the original parabola.
 - 3) The new parabola is wider than the original parabola.
 - 4) The new parabola is narrower than the original parabola.
- 9 The graph of a parabola is represented by the equation $y = ax^2$ where a is a positive integer. If a is multiplied by 2, the new parabola will become
- 1) narrower and open downward
 - 2) narrower and open upward
 - 3) wider and open downward
 - 4) wider and open upward
- 10 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.
- 11 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.
- 12 Which is the equation of a parabola that has the same vertex as the parabola represented by $y = x^2$, but is wider?
- 1) $y = x^2 + 2$
 - 2) $y = x^2 - 2$
 - 3) $y = 2x^2$
 - 4) $y = \frac{1}{2}x^2$
- 13 The graph of $y = (x - 3)^2$ is shifted left 4 units and down 2 units. What is the axis of symmetry of the transformed graph?
- 1) $x = -2$
 - 2) $x = -1$
 - 3) $x = 1$
 - 4) $x = 7$

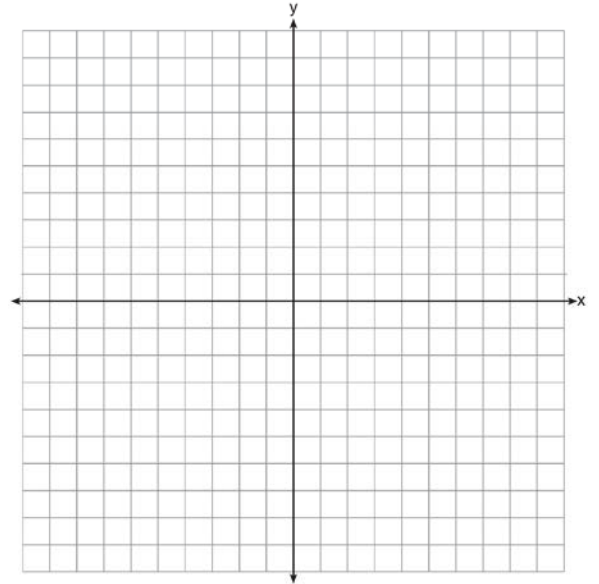
- 14 What is the translation that maps the function $f(x) = x^2 - 1$ onto the function $g(x) = x^2 + 1$?
- 1) $T_{0,2}$
 - 2) $T_{0,1}$
 - 3) $T_{1,-1}$
 - 4) $T_{-1,1}$

- 15 In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.

- 16 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 Answer Section

- 1 ANS: 1 REF: 081015ia
 2 ANS: 4 REF: 061503ia
 3 ANS: 1 REF: 081417ai
 4 ANS: 2 REF: 081414ia
 5 ANS: 2 REF: 011717ai
 6 ANS: 2 REF: 011330ia
 7 ANS: 2 REF: 061113ia
 8 ANS: 4 REF: 060829ia
 9 ANS: 2 REF: 081218ia
 10 ANS: 1 REF: 081706ai
 11 ANS: 2 REF: 011512ai
 12 ANS: 4 REF: 081322ia
 13 ANS: 2

$y = (x - 3)^2$ is in vertex form, so the vertex of this quadratic is $(3, 0)$, and the axis of symmetry is $x = 3$. Shifting the graph left 4 units moves the axis of symmetry to $x = -1$.

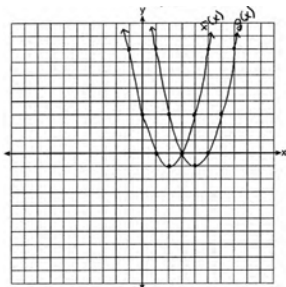
REF: 060611b

- 14 ANS: 1 REF: 010906b
 15 ANS:

$g(x) = x^3 + 2x^2 - 4$, because $g(x)$ is a translation down 4 units.

REF: 061632ai

- 16 ANS:



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

REF: 061428ai