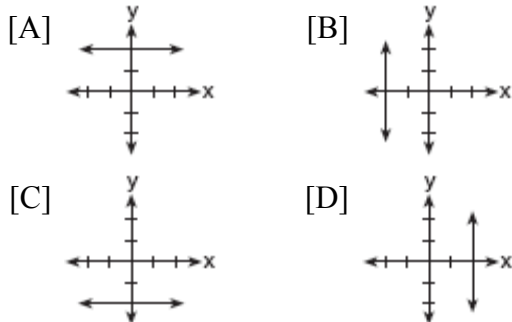


A.G.4: Identify and graph linear, quadratic (parabolic), absolute value, and exponential functions.

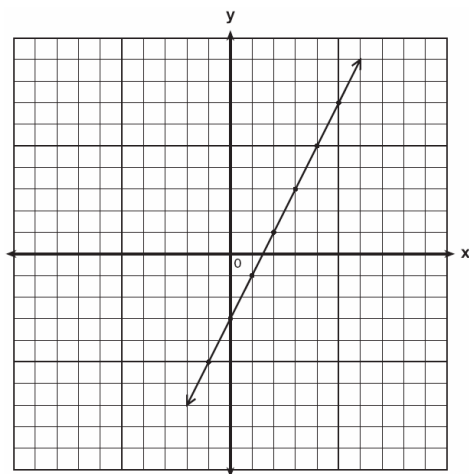
1. 060523a, P.I. A.G.4

Which graph represents the equation $x = 2$?



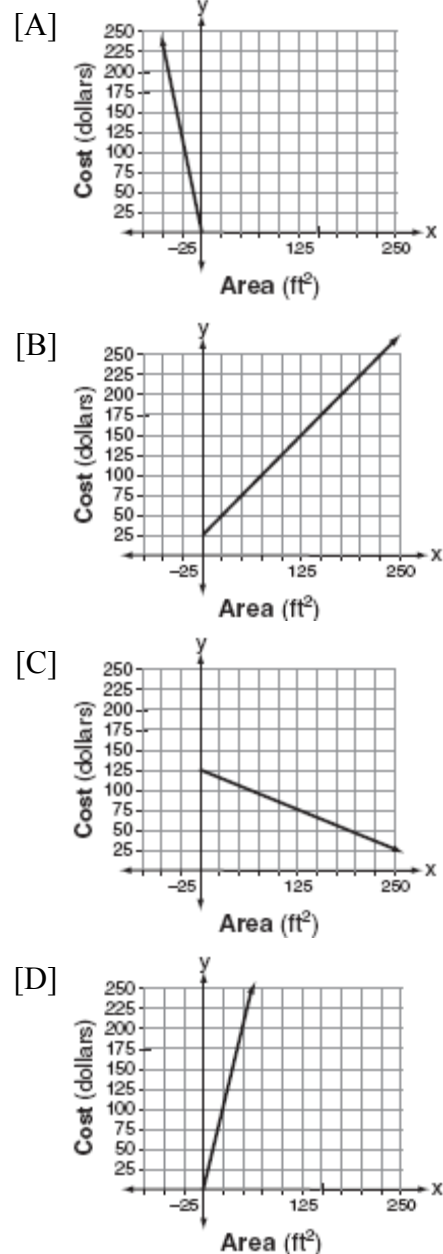
2. 060225a, P.I. A.G.4

Write the equation for the line shown in the accompanying graph. Explain your answer.



3. 080703a, P.I. A.G.4

Super Painters charges \$1.00 per square foot plus an additional fee of \$25.00 to paint a living room. If x represents the area of the walls of Francesca's living room, in square feet, and y represents the cost, in dollars, which graph best represents the cost of painting her living room?

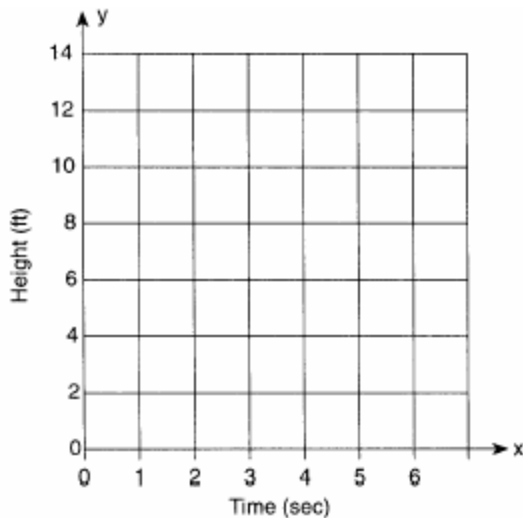


NAME: _____

4. 010031a, P.I. A.G.4

Amy tossed a ball in the air in such a way that the path of the ball was modeled by the equation $y = -x^2 + 6x$. In the equation, y represents the height of the ball in feet and x is the time in seconds.

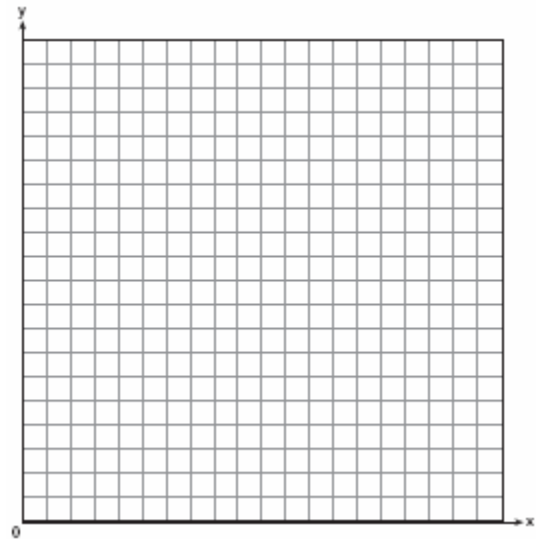
a Graph $y = -x^2 + 6x$ for $0 \leq x \leq 6$ on the grid provided below.



b At what time, x , is the ball at its highest point?

5. 060333a, P.I. A.G.4

An architect is designing a museum entranceway in the shape of a parabolic arch represented by the equation $y = -x^2 + 20x$, where $0 \leq x \leq 20$ and all dimensions are expressed in feet. On the accompanying set of axes, sketch a graph of the arch and determine its maximum height, in feet.

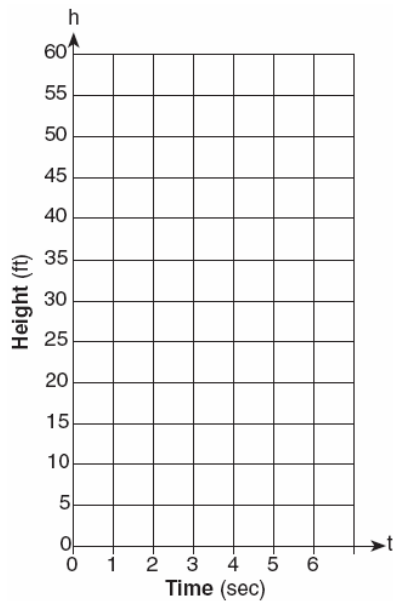


NAME: _____

6. 010439a, P.I. A.G.4

Tom throws a ball into the air. The ball travels on a parabolic path represented by the equation $h = -8t^2 + 40t$, where h is the height, in feet, and t is the time, in seconds.

a On the accompanying set of axes, graph the equation from $t = 0$ to $t = 5$ seconds, including all integral values of t from 0 to 5.

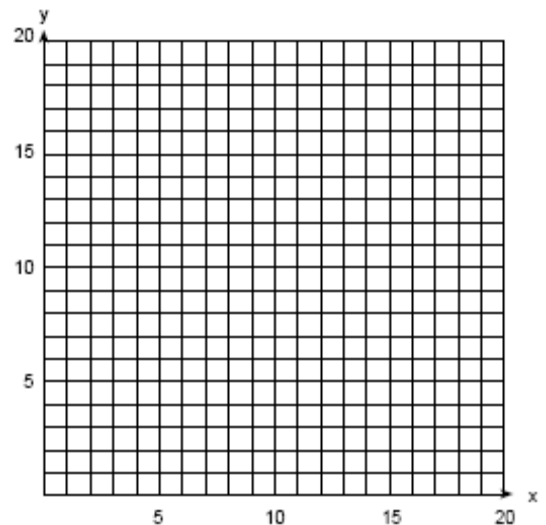


b What is the value of t at which h has its greatest value?

7. 089933a, P.I. A.G.4

An arch is built so that it is 6 feet wide at the base. Its shape can be represented by a parabola with the equation $y = -2x^2 + 12x$, where y is the height of the arch.

a Graph the parabola from $x = 0$ to $x = 6$ on the grid below.

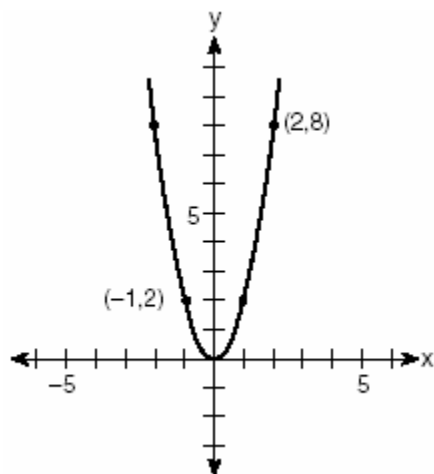


b Determine the maximum height, y , of the arch.

NAME: _____

8. 060404b, P.I. A.G.4

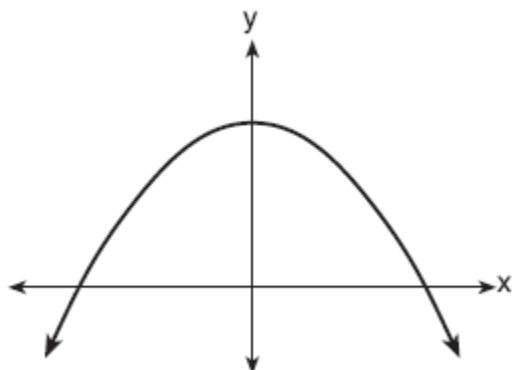
Which quadratic function is shown in the accompanying graph?



- [A] $y = -2x^2$ [B] $y = -\frac{1}{2}x^2$
[C] $y = \frac{1}{2}x^2$ [D] $y = 2x^2$

9. 060703b, P.I. A.G.4

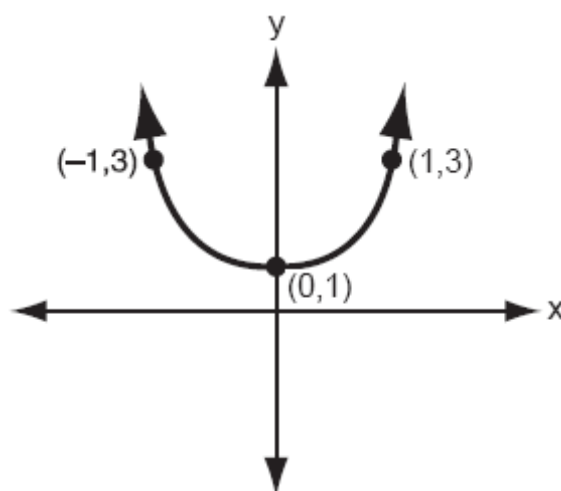
Which equation is best represented by the accompanying graph?



- [A] $y = -x^2 + 1$ [B] $y = 6x^2$
[C] $y = 6x + 1$ [D] $y = 6^x$

10. 010801b, P.I. A.G.4

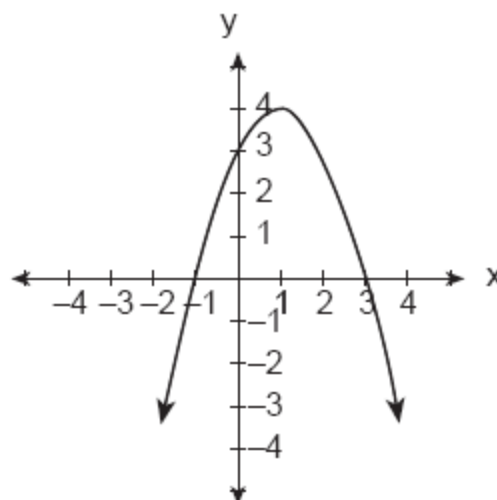
Which equation is represented by the accompanying graph?



- [A] $y = 2x^2 + 1$ [B] $y = x^2$
[C] $y = 2(x^2 + 1)$ [D] $y = 2x^2$

11. 080017a, P.I. A.G.4

Which is an equation of the parabola shown in the accompanying diagram?

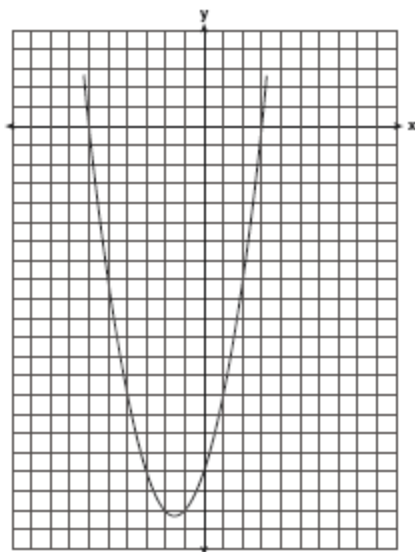


- [A] $y = -x^2 - 2x + 3$ [B] $y = x^2 + 2x + 3$
[C] $y = x^2 - 2x + 3$ [D] $y = -x^2 + 2x + 3$

NAME: _____

12. 010328a, P.I. A.G.4

The graph of a quadratic equation is shown in the accompanying diagram. The scale on the axes is a unit scale. Write an equation of this graph in standard form.



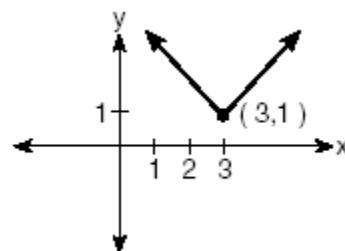
13. 080912b

If the equation of the axis of symmetry of a parabola is $x = 2$, at which pair of points could the parabola intersect the x -axis?

- [A] (3,0) and (2,0) [B] (-3,0) and (-1,0)
[C] (3,0) and (1,0) [D] (3,0) and (5,0)

14. 060314b, P.I. A.G.4

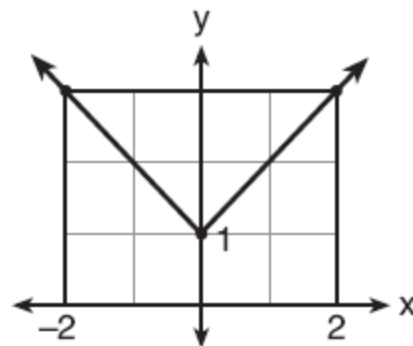
Which equation is represented by the accompanying graph?



- [A] $y = |x + 3| - 1$ [B] $y = (x - 3)^2 + 1$
[C] $y = |x - 3| + 1$ [D] $y = |x| - 3$

15. 080707b, P.I. A.G.4

Which equation represents the function shown in the accompanying graph?



- [A] $f(x) = |x| - 1$ [B] $f(x) = |x - 1|$
[C] $f(x) = |x| + 1$ [D] $f(x) = |x + 1|$

A.G.4: Identify and graph linear, quadratic (parabolic), absolute value, and exponential functions.

[1] D

[2] $y = 2x - 3$ or an equivalent equation, and appropriate work is shown, or an appropriate explanation is given, such as the slope is 2 and the y -intercept is -3.

[1] $y = 2x - 3$, but the slope and intercept are incorrect, or the explanation is not given or is incorrect, such as $m = 2$ and $b = -3$.

or [1] The slope and intercept are explained correctly, but the equation is incorrect.

or [1] $y = 2x - 3$, but no work is shown and no explanation is given.

[0] The equation is incorrect, and the explanation of slope and intercept is not given or is incorrect.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[2] obviously incorrect procedure.

[3] B

a [3] A parabola is correctly graphed through (0,0), (1,5), (2,8), (3,9), (4,8), (5,5), and (6,0).

[2] The correct table of values is shown but is not graphed through the entire domain.

or [2] The correct points are graphed but as a broken line graph not a curve.

or [2] At least three values are correctly calculated and graphed.

[1] At least two of the values are correctly calculated, and the student tried to graph all points.

b [1] 3

or [1] The correct time, x , for an incorrect graph in part a is found.

a and *b* [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[4] obviously incorrect procedure.

[4] 100 and a correct parabolic arch is drawn, and appropriate work is shown, such as a table of values for the parabola or correctly labeled points.

[3] 100 and a correct parabolic arch is drawn, but no table of values or labeled points are shown.

or [3] 100 and a correct parabolic arch is drawn, and appropriate work is shown, but no scale or an incorrect scale is shown.

or [3] A correct parabolic arch is drawn, but the maximum height is missing or is incorrect.

[2] An incorrect parabolic arch is drawn, but an appropriate maximum height is found.

or [2] A correct height is determined algebraically, but a parabolic arch is not drawn.

or [2] 100 and an appropriate parabolic arch is drawn, but it is not drawn between $0 \leq x \leq 20$.

[1] A correct parabolic arch is drawn, but no work is shown, such as a table of values or correctly labeled points, and the maximum height is missing or is incorrect.

or [1] 100, but no work is shown and no parabolic arch is drawn.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure.

- a [3] A parabola with points graphed at (0,0), (1,32), (2,48), (3,48), (4,32), and (5,0) is shown. [Points do not have to be labeled on the graph for full credit.]
 [2] Appropriate work is shown, such as a table of values, but one graphing error is made.
 or [2] The correct points are graphed, but the parabola is drawn incorrectly, such as connecting (2,48) and (3,48) as a line segment or not connecting the points at all.
 or [2] At least four correct values are found, and the parabola is graphed appropriately.
 or [2] A correct table of values is shown for all values from 0 to 5, but no graph is drawn.
 [1] Two or three correct values are found, and the parabola is graphed appropriately.
 or [1] A correct table of values is shown for an incorrectly transcribed equation, such as $h = 8t^2 + 40t$, but no graph is drawn.
 b [1] 2.5 is found algebraically or identified from a table or from the graph of the parabola.
 or [1] An appropriate value of t is found, based on an incorrect graph.
 or [1] $2 < t < 3$ is given as the range of values based on the line segment drawn in part a.
 a and b [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-
- [6]

- a [3] A parabola is correctly graphed through (0,0), (1,10), (2,16), (3,18), (4,16), (5,10), and (6,0).
 [2] A correct table of values is shown, but not all the points are graphed correctly.
 or [2] The correct points are graphed but as a broken-line graph, not a curve.
 or [2] At least four values are calculated correctly and graphed.
 [1] The student has at least two of the values calculated correctly and has tried to graph all the points.
 [0] Fewer than two values are calculated correctly.
 b [1] A maximum height of 18 is found.
 or [1] Correct y is found for an incorrect graph in part a.
 a and b [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-
- [7] _____
- [8] D _____
- [9] A _____
- [10] A _____
- [11] D _____
- [3] $y = x^2 + 3x - 18$, and appropriate work leading from the roots to the equation is shown.
 [2] Appropriate work is shown, but one computational error is made.
 or [2] $x^2 + 3x - 18 = 0$, but appropriate work is shown.
 or [2] Only the correct factors $(x + 6)$ and $(x - 3)$ are shown.
 [1] Appropriate work is shown, but more than one computational error is made.
 or [1] Only the roots -6 and 3 are shown, such as $x = -6$, $x = 3$.
 or [1] $y = x^2 + 3x - 18$, but no work is shown.
 [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [12]

[13] C

[14] C

[15] C