

Name _____

Date _____ Pd. _____

Notes: Graphing Quadratic Functions

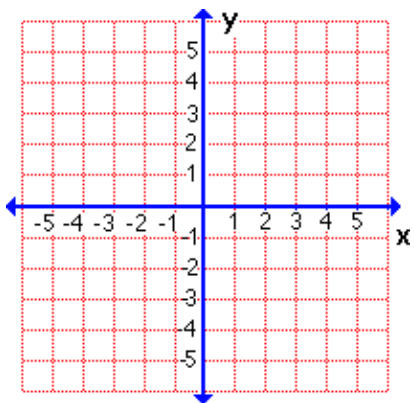
Quadratic Function		Example:
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The degree of a quadratic function is 2, and the exponents are positive. Graphs of quadratic functions have a general shape called a _____. A parabola opens upward and has a _____ when the value of a is positive, and a parabola opens downward and has a _____ when the value of a is negative.

Example 1

Use a table of values to graph $y = x^2 - 4x + 1$.

x	y
-1	
0	
1	
2	
3	
4	

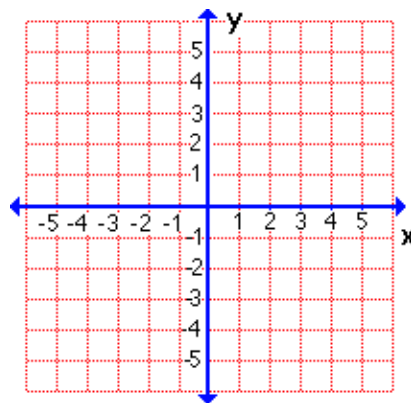


Graph the ordered pairs in the table and connect them with a smooth curve.

Example 2

Use a table of values to graph $y = -x^2 - 6x - 7$.

x	y
-6	
-5	
-4	
-3	
-2	
-1	
0	



Graph the ordered pairs in the table and connect them with a smooth curve.

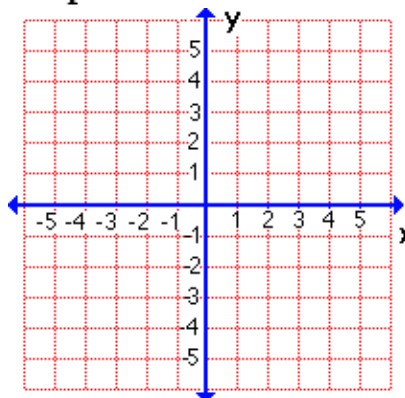
Axis of Symmetry		Example:
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The axis of symmetry contains the minimum or maximum point of the parabola, the _____

Example

Consider the graph of $y = 2x^2 + 4x + 1$.

- Write the equation of the axis of symmetry.
- Find the coordinates of the vertex.
- Identify the vertex as a maximum or a minimum.
- Graph the function.

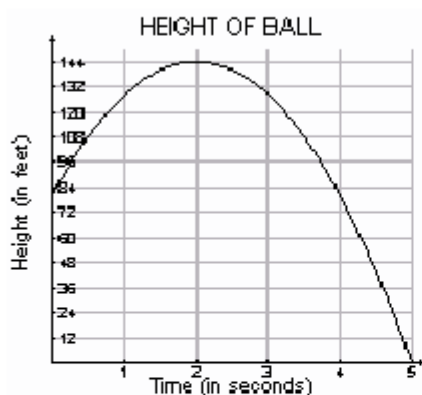


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Exit Card: Graphing Quadratic Functions

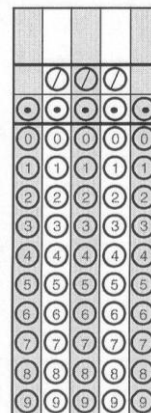
Jill throws a ball into the air. The function $h(t) = -16t^2 + 64t + 80$ models the height of the function. The graph of this function is shown below.



What does the *y-coordinate* of the ordered pair (2, 144) represent in the context of this problem?

- A. The time it takes for the ball to hit the ground.
- B. The time it takes for the ball to start falling to the ground.
- C. The minimum height of the ball.
- D. The maximum height of the ball.

A carnival game involves striking a board with a hammer that forces a ball up a tube. The function $h(t) = -16t^2 + 32t + 3$ gives the height of the ball after t seconds. Find the maximum height of the ball.



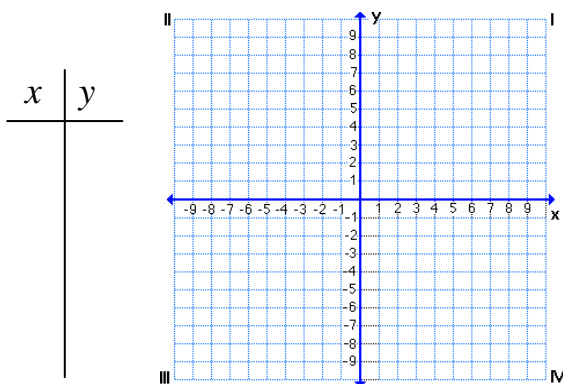
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Homework: Pages 528 – 530 (11, 16, 19, 21, 36, 38, 44 – 46, 55, 59)

11. Use a table of values to graph

$$y = -x^2 + 7$$



16. What is the axis of symmetry of the graph of $y = -3x^2 + 2x - 5$?

Find the axis of symmetry, the vertex, and whether the vertex is a maximum or a minimum, then graph.

19. $y = -2x^2$

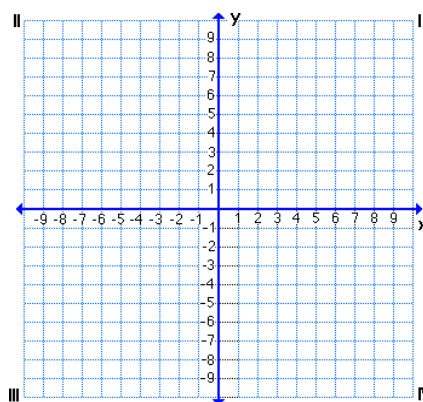
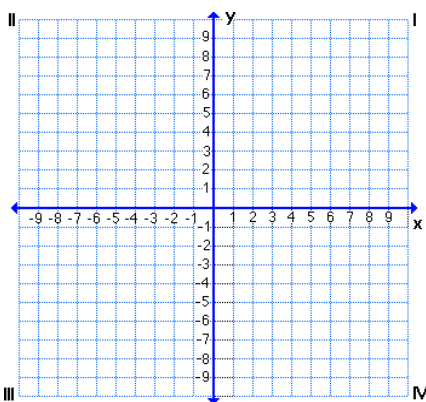
Axis of sym: _____

Max or Min: _____

21. $y = -x^2 + 5$

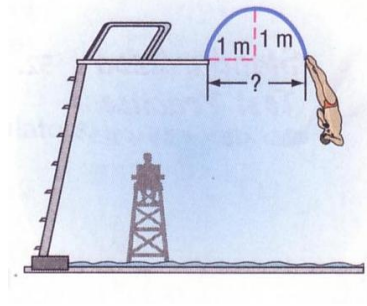
Axis of sym: _____

Max or Min: _____



36. What is the equation of the axis of symmetry of a parabola if its x -intercepts are -6 and 4 ?

38. A diver follows a path that is in the shape of a parabola. Suppose the diver's foot reaches 1 meter above the height of the diving board at the maximum height of the dive. At that time, the diver's foot is also 1 meter from the edge of the diving board. What is the distance of the diver's foot from the diving board at the diver descends past the diving board? Explain.

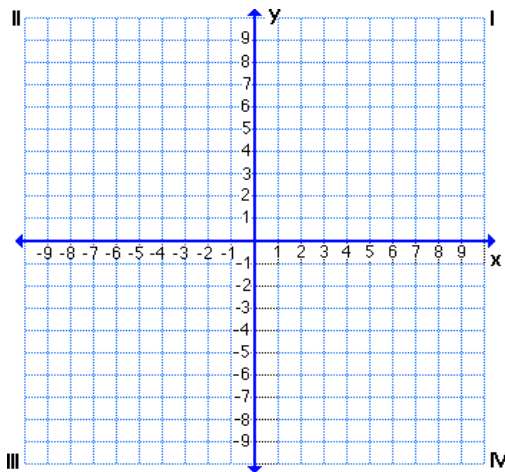


The shape of the Gateway Arch in St. Louis, Missouri, is a *catenary* curve. It resembles a parabola with the equation $h = -0.00635x^2 + 4.0005x - 0.07875$, where h is the height in feet and x is the distance from one base in feet.

44. What is the equation of the axis of symmetry?
45. What is the distance from one end of the arch to the other?
46. What is the maximum height of the arch?

Graph each function. Determine whether the vertex is a maximum or a minimum and give the ordered pair of the vertex.

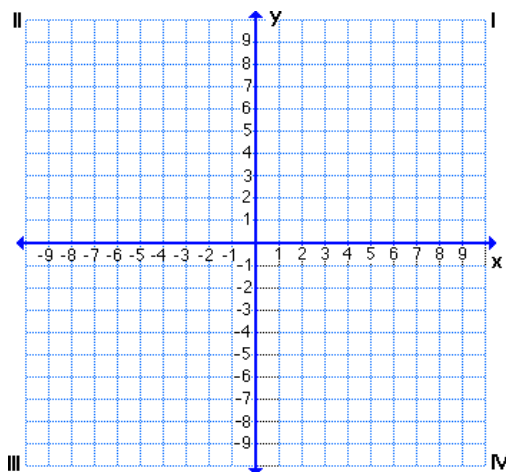
55. $y = -x^2 + 4x + 3$



Maximum or Minimum? _____

Vertex: _____

59. $y = -0.5x^2 - 2x + 3$



Maximum or Minimum? _____

Vertex: _____