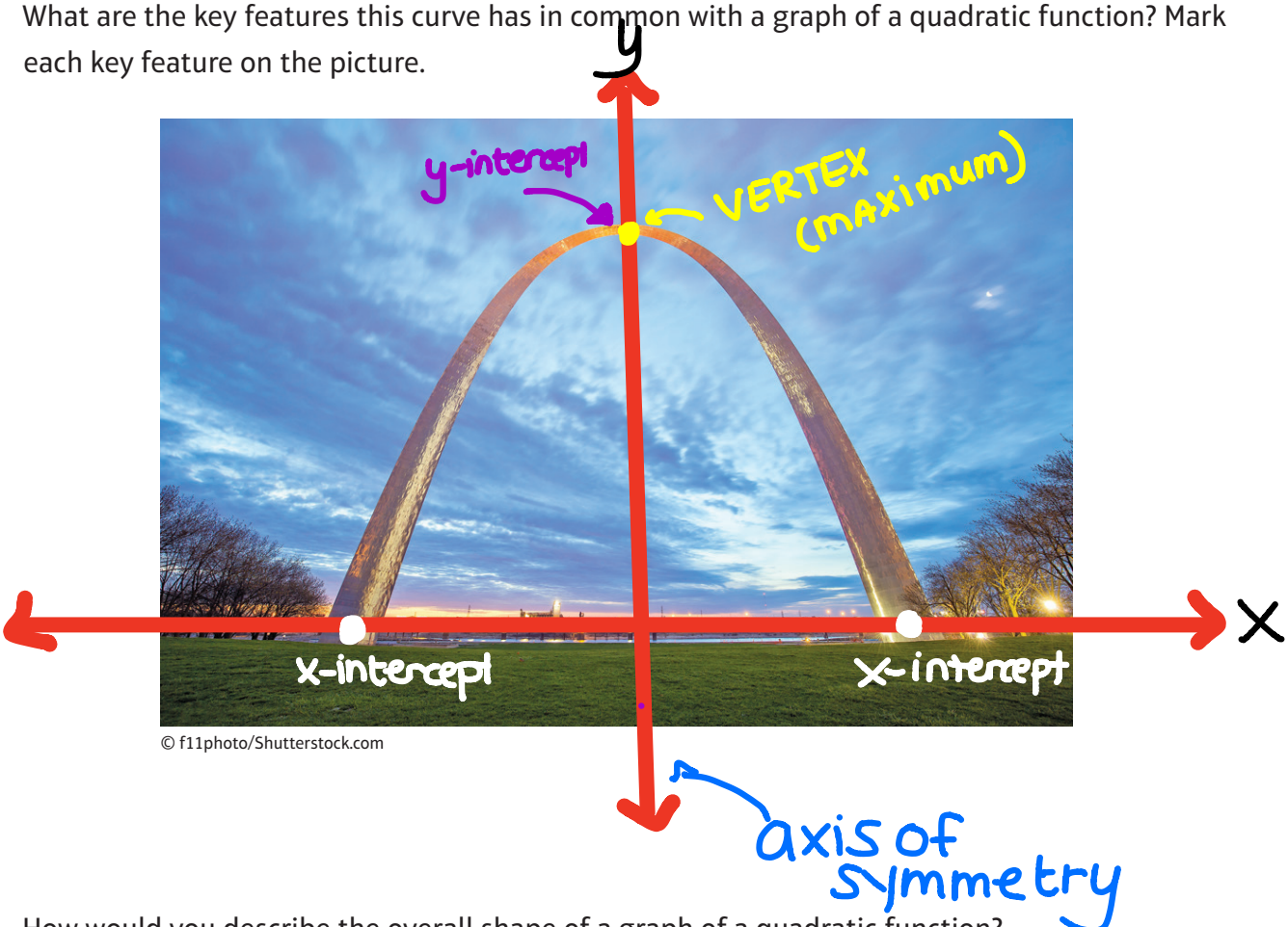
NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

Below is an example of a curve found in architecture. The St. Louis Arch can be represented by a graph of a quadratic function.

1. What are the key features this curve has in common with a graph of a quadratic function? Mark each key feature on the picture.



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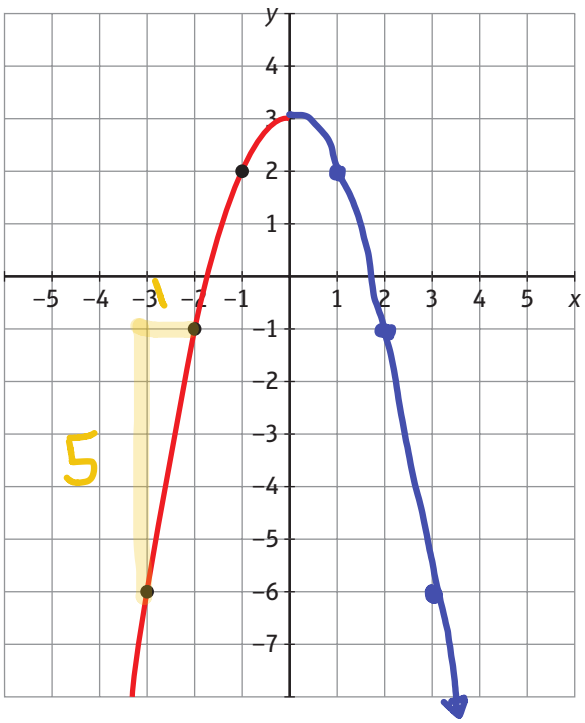
2. How would you describe the overall shape of a graph of a quadratic function?

- ∪ shaped
- parabola
- Symmetrical

3. Below you see only one side of the graph of a quadratic function.

   A. Complete the graph by plotting three additional points of the quadratic function. Explain how you found these points, and then fill in the table on the right.



x	f(x)
-3	-6
-2	-1
-1	2
0	3
1	2
2	-1
3	-6

   B. What are the coordinates of the x-intercepts?

≈ (-1.7, 0) and (1.7, 0)

   C. What are the coordinates of the y-intercept?

(0, 3)

   D. What are the coordinates of the vertex? Is it a minimum or a maximum?

(0, 3) ⟶ maximum

   E. If we knew the equation for this curve, what would the sign of the leading coefficient be?

negative (upside down parabola)

4. Use your completed graph from Problem 3A to verify that the average rate of change for the interval $-3 \le x \le -2$, or $[-3, -2]$, is 5. Show your steps.

f(-3) = -6
f(-2) = -1

$$\frac{-1-(-6)}{-2-(-3)} = \frac{-1+6}{-2+3} = \frac{5}{1} = 5$$

See graph

5. Based on your work in Problem 4, what interval would have an average rate of change of -5? Explain your thinking.

[2, 3]