

Chapter 4 Quadratic Functions and Equations

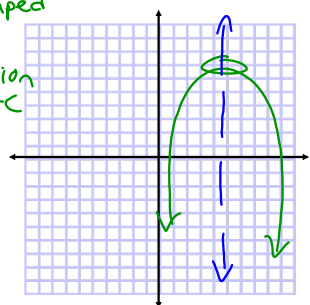


Section 4-1 Quadratic Functions and Transformations

Students will be able to identify and graph quadratic functions.

Define:

parabola - U-shaped graph for a quad. function
 $f(x) = ax^2 + bx + c$
 Picture:



Vertex
 Axis of Symmetry

Graph on the same graph as the parent function. Describe the rule for the effect that the number has on the function.:

- 1. $f(x) = -\frac{1}{3}x^2$
 - 2. $f(x) = (x - 4)^2$
 - 3. $f(x) = x^2 + 3$
 - 4. $f(x) = -(x + 1)^2$
 - 5. $f(x) = 2x^2 - 1$
- Handwritten notes:*
 For 1: $f(x) = x^2$ reflect about x, vert comp by $\frac{1}{3}$
 For 3: $\uparrow 3$

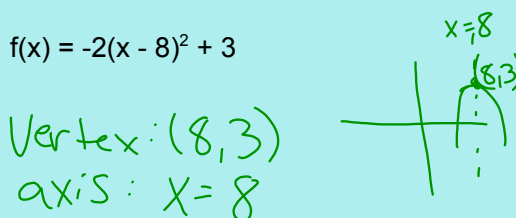
Vertex form:

$f(x) = a(x - h)^2 + k$

vertex: (h, k)
 Axis of Symmetry: $x = h$
 $x = h$

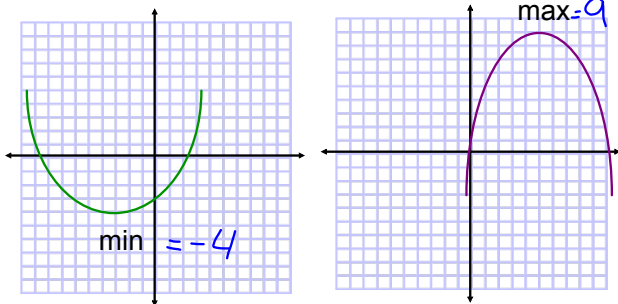
Name the transformations:

$f(x) = -2(x - 8)^2 + 3$



Identify the vertex and axis of symmetry.

If the multiple of x^2 is greater than 1, it is a vertical stretch. If it is between 0 and 1, it is a vertical compression. If it is a negative, then it reflects over the x-axis.



$$f(x) = -2(x + 1)^2 + 4$$

Vertex: $(-1, 4)$

Axis of symmetry: $X = -1$

Min or Max: $\text{max} = 4$

Domain: \mathbb{R}
 Range: $y \leq 4$



Find the equation in vertex form for the following.



The bridge is about 500 meters long and 85 meters high.

#49. Write the equation in vertex form:

vertex $(1, 2)$ point $(2, -5)$

$$\begin{aligned} f(x) &= a(x-h)^2 + k \\ y &= a(x-1)^2 + 2 \\ -5 &= a(2-1)^2 + 2 \\ -5 &= a(1) + 2 \\ -5 &= a + 2 \\ -2 &= a \\ -7 &= a \\ f(x) &= -7(x-1)^2 + 2 \end{aligned}$$

Hwk: pg. 199-200
 #8, 12, 16, 19, 24-36 evens,
 40, 44, 50, 53