

## 2019-2020 Algebra 2 Ch. 4 Free Response Test

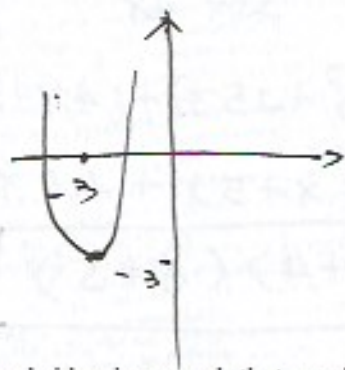
1. Identify the maximum or minimum value and the domain and range of the graph of the function

$$y = 2(x+3)^2 - 3.$$

$$\text{min: } -3$$

domain: all real numbers

range: all real numbers  $\geq -3$



2. You live near a bridge that goes over a river. The underneath side of the bridge is an arch that can be modeled with the function  $y = -0.000486x^2 + 0.776x$  where  $x$  and  $y$  are in feet. How high above the river is the bridge (the top of the arch)? How long is the section of bridge above the arch?

$$y = -0.000486x^2 + 0.776x$$

$$x = h = -\frac{b}{2a} = \frac{-0.776}{2 \cdot (-0.000486)} = 798.35$$

$$\text{Long: } 798.35 \times 2 = \boxed{1596.7}$$

$$y = -0.000486(798.35)^2 + 0.776(798.35) = \boxed{309.76} \text{ (High)}$$

What is the equation, in standard form, of a parabola that contains the following points?

- 3.
- $(-2, 15), (0, 3), (4, 27)$

$$\begin{cases} 15 = 4a - 2b + c \\ c = 3 \\ 27 = 4^2a + 4b + c \end{cases} \rightarrow \begin{cases} 4a - 2b + 3 = 15 \\ 16a + 4b + 3 = 27 \end{cases} \rightarrow$$

$$\begin{cases} 4a - 2b = 12 \\ 16a + 4b = 24 \end{cases} \rightarrow \left[ \begin{array}{cc|c} 4 & -2 & 12 \\ 16 & 4 & 24 \end{array} \right] = \left[ \begin{array}{cc|c} 1 & 0 & 3 \\ 0 & 1 & -2 \end{array} \right]$$

$$a = 2 \quad b = -2 \quad c = 3$$

$$\boxed{y = 2x^2 - 2x + 3}$$