

2.1 Day 2 on Quadratic Functions

I. Write the equation of the parabola in Standard Form given the vertex and a point on the graph.

Ex 1) vertex: $(-1, 4)$ and point $(-3, 0)$

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

$$0 = a(-3 + 1)^2 + 4$$

$$0 = a(-2)^2 + 4$$

$$0 = 4a + 4$$

$$-4 = 4a$$

$$-1 = a$$

Ex 2) vertex: $(1, 2)$ and point $(3, -6)$

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

$$-6 = a(3-1)^2 + 2$$

$$-6 = a(2)^2 + 2$$

$$-6 = 4a + 2$$

$$-8 = 4a$$

$$-2 = a$$

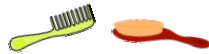
$$y = -1(x+1)^2 + 4$$

$$y = -2(x-1)^2 + 2$$

II. Minimum/Maximum: $f(x) = ax^2 + bx + c$

1. If $a > 0$, f has a minimum at $x = -b/(2a)$
2. If $a < 0$, f has a maximum at $x = -b/(2a)$

This is also the x-coordinate of the vertex!!



Ex 3) The number h (in thousands) of Hairdressers and Cosmetologists in the United States in the U.S. from 1994-2001 can be approximated by $h = 4.17t^2 - 48.1t + 881$, $4 \leq t \leq 11$ where t = year, $t=4$ is 1994. Determine the year in which the Hairdressers and Cosmetologists was the least.

min.

Algebraic

Graphic

$$t = \frac{-b}{2a}$$

$$b = -48.1$$

$$a = 4.17$$

$$t = \frac{-(-48.1)}{2(4.17)} \approx 5.8$$

Sometime in 1995

