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)

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

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

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

$0 = 4a + 4$

$-4 \quad -4$

$-4 = 4a$

$-1 = a$

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

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

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

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

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

$-6 = 4a + 2$

$-2 \quad -2$

$-8 = 4a$

$\frac{-8}{4} = \frac{4a}{4}$

$-2 = a$

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

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.

Alegebraic

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

$b = -48.1$

$a = 4.17$

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

Sometime in 1995

Graphic