Name: _____ Date: _____

A2H: Vertex Form Ms. Loughran

Do Now:

Put the following quadratics in vertex form, and then find all of the following for it:

(a) the vertex
(b) the axis of symmetry
(c) the x-intercepts, if any
(d) the y-intercepts
(e) the domain
(f) the range

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

1. $y = -2x^2 - 4x + 11$

$y = -2(x^2 + 2x + 1 - 1 - \frac{11}{2})$ $\quad -\frac{13}{2}$

$y = -2(x+1)^2 - 2(-\frac{13}{2})$

$y = -2(x+1)^2 + 13$

Vertex: $(-1, 13)$

axis of symmetry: $x = -1$

D: $(-\infty, \infty)$

R: $(-\infty, 13]$

x-int: (let $y=0$)

$0 = -2(x+1)^2 + 13$

$-13 = -2(x+1)^2$

$\frac{13}{2} = (x+1)^2$

$\pm\sqrt{\frac{13}{2}} = x+1$

$-1 \pm \sqrt{\frac{13}{2}} = x$

$(-1 \pm \sqrt{\frac{13}{2}}, 0)$

y-int (let $x=0$)

$y = -2(0+1)^2 + 13$

$y = -2 + 13$

$y = 11$

$(0, 11)$

2. $y = 3x^2 - 5x + 1$ $\quad \frac{12}{36}$

$y = 3(x^2 - \frac{5}{3}x + \frac{25}{36} - \frac{25}{36} + \frac{1}{3})$

$y = 3(x - \frac{5}{6})^2 + 3(\frac{-13}{36})$ $\quad \frac{12}{12}$

$y = 3(x - \frac{5}{6})^2 - \frac{13}{12}$

Vertex: $(\frac{5}{6}, -\frac{13}{12})$

axis of symmetry: $x = \frac{5}{6}$

D: $(-\infty, \infty)$

R: $[-\frac{13}{12}, \infty)$

x-int: (let $y=0$)

$0 = 3(x - \frac{5}{6})^2 - \frac{13}{12}$

$\frac{13}{12} = 3(x - \frac{5}{6})^2$

$\frac{13}{36} = (x - \frac{5}{6})^2$

$\pm\sqrt{\frac{13}{36}} = x - \frac{5}{6}$

$\frac{5}{6} \pm \frac{\sqrt{13}}{6} = x$

$(\frac{5}{6} \pm \frac{\sqrt{13}}{6}, 0)$

y-int (let $x=0$)

$y = 3(0 - \frac{5}{6})^2 - \frac{13}{12}$

$y = 3(\frac{25}{36}) - \frac{13}{12}$ $\quad \frac{12}{12}$

$y = \frac{25}{12} - \frac{13}{12}$

$y = 1$

$(0, 1)$