Math 27, HW #10

Pg. 96, #30 $f(x) = 2x^2 - x + 1$

A parabola opening upward.

Vertex: $x = \dfrac{-b}{2a} = \dfrac{-(-1)}{2 \cdot 2} = \dfrac{1}{4}$; $y = f\left(\dfrac{1}{4}\right) = \dfrac{7}{8}$

$$V: \left(\tfrac{1}{4}, \tfrac{7}{8}\right)$$

Pg. 96, #36 $f(x) = -4x^2 + 24x - 41$

A parabola opening downward.

Vertex: $x = \dfrac{-b}{2a} = \dfrac{-24}{-8} = 3$; $y = f(3) = -5$

$$V: (3, -5)$$

x-intercepts $(y=0)$ Solve: $-4x^2 + 24x - 41 = 0$

By the QF: $x = \dfrac{-24 \pm \sqrt{24^2 - 4 \cdot 164}}{-8} = \dfrac{-24 \pm \sqrt{-80}}{-8}$ $\Rightarrow$ No x-inter.

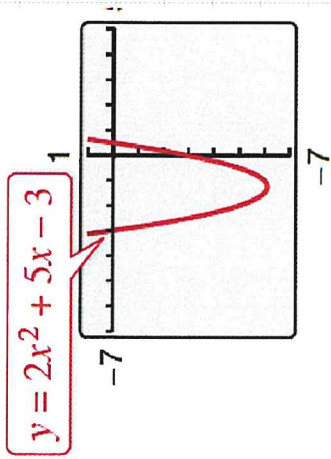Pg. 97, #41   Vertex: $\underset{h \ \ k}{(1, -2)}$ Point: $(-1, 14)$

$f(x) = a(x-h)^2 + k = a(x-1)^2 - 2$; $f(-1) = 14 = a(-1-1)^2 - 2 = 4a - 2$

So $14 = 4a - 2$ $\Rightarrow$ $16 = 4a$ $\Rightarrow$ $a = 4$

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

Pg. 97, #46

46.

$y = 2x^2 + 5x - 3$ (in red box)

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From the graph, we have x-intercepts

at $x = -3, \frac{1}{2}$

And $2x^2 + 5x - 3 = 0$

$\Rightarrow$ $(2x - 1)(x + 3) = 0$

$\quad\quad\quad\quad\quad\quad -x$
$\quad\quad\quad\quad\quad\quad +6x$
$\quad\quad\quad\quad\quad\quad +5x$

$2x - 1 = 0$ oR $x + 3 = 0$

$x = \frac{1}{2}$ $x = -3$