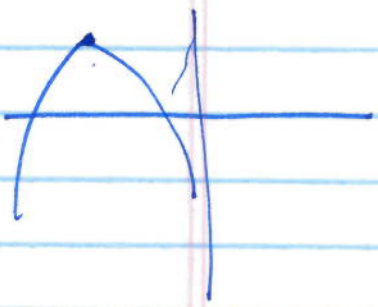
Sect 3.1 p250 Extra prints

(28)

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

axis of Symmetry $x = \frac{-b}{2a} = \frac{-(-4)}{2(-1)}$

$f(-2) = -4 + 8 + 1$ $\boxed{x = -2}$



Vertex $(-2, 5)$. max ✓

y-intercepts. $(0, 1)$.

$b^2 - 4ac = 16 - 4(-1)(1) = \boxed{20}$ ✓

$\sqrt{20} = \sqrt{4 \times 5} = 2\sqrt{5}$. $x = \frac{4 \pm \sqrt{20}}{-2} = \boxed{-2 \pm \sqrt{5}}$ ✓

$x = \frac{4 \pm 2\sqrt{5}}{-2} = -2 \pm \sqrt{5}$

(#30) $f(x) = 2x^2 - x + 1$

Axis of Symmetry. $x = \frac{-(-1)}{4} = \frac{1}{4}$

$= 2\left(x^2 - \frac{1}{2}x + \left(\frac{1}{4}\right)^2\right) + 1 - 2\cdot\left(\frac{1}{4}\right)^2$

$= 2\left(x - \frac{1}{4}\right)^2 + \frac{7}{8}$

Vertex $\left(\frac{1}{4}, \frac{7}{8}\right)$ min.

Vertex $\left(\frac{1}{4}, \frac{7}{8}\right)$

min

No x-intercepts

y-int $(0, 1)$

(32) $f(x) = -(x^2 + x - 30)$.

$= -\left(x^2 + x + \frac{1}{4}\right) + 30 + \frac{1}{4}$

$f(x) = -\left(x + \frac{1}{2}\right)^2 + \frac{121}{4}$

Vertex $\left(-\frac{1}{2}, \frac{121}{4}\right)$ max

$-\left(x + \frac{1}{2}\right)^2 + \frac{121}{4} = 0$

$\left(x + \frac{1}{2}\right)^2 = \frac{121}{4}$

$x + \frac{1}{2} = \pm\sqrt{\frac{121}{4}} = \pm\frac{11}{2}$.

$x = -\frac{1}{2} \pm \frac{11}{2}$ $\begin{cases} x = -6 \\ x = 5 \end{cases}$

(34) $f(x) = x^2 + 10x + 14$

$f(x) = x^2 + 10x + 25 + 14 - 25$

$= (x+5)^2 - 11$

$(x+5)^2 - 11 = 0$ Vertex $(-5, -11)$ min.

$(x+5)^2 = 11$ two-x-int.

$x+5 = \pm\sqrt{11}$ $x = -5 \pm \sqrt{11}$

$x = -5 \pm \sqrt{11}$ y-int $(0, 14)$.

(36) $f(x) = -4x^2 + 24x - 41$

$= -4(x^2 - 6x + 9) - 41 + \underbrace{9 \times 4}_{36}$

$= -4(x-3)^2 - 5.$

$f(x) = -4(x-3)^2 - 5$

Vertex $(3, -5)$ max.

No x-intercept.

(42) Vertex $(-4,-1)$ Point $(-2,4)$.

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

$$f(x) = a(x+4)^2 - 1$$

$$f(-2) = a(-2+4)^2 - 1 = 4$$

$$4a - 1 = 4$$

$$\boxed{a = \frac{5}{4}}$$

$$\boxed{f(x) = \frac{5}{4}(x+4)^2 - 1}$$

$$\boxed{\frac{-b}{2a} = -4} \qquad \boxed{4a - 2b + c = 4}$$

$$\boxed{a\left(\frac{-b}{2a}\right)^2 + b\left(\frac{-b}{2a}\right) + c = -1}$$