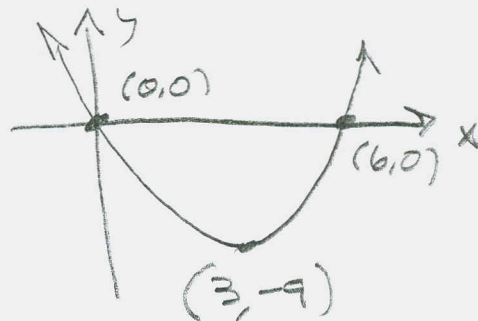


121 S3.1 I #s 10, 13, 18, 21, 26, 32, 45, 52

#s 9-20 write each quadratic function in the form $y = a(x-h)^2 + k$ & sketch its graph.

$$\begin{aligned} \textcircled{10} \quad y &= x^2 - 6x \\ &= x^2 - 6x + 3^2 - 9 \\ &= (x-3)^2 - 9 \end{aligned}$$



$$\begin{aligned} \textcircled{13} \quad y &= 2x^2 - 12x + 22 \\ y &= 2(x^2 - 6x + 11) \\ \frac{1}{2}y &= x^2 - 6x + 11 \\ &= x^2 - 6x + 3^2 - 9 + 11 \end{aligned}$$

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

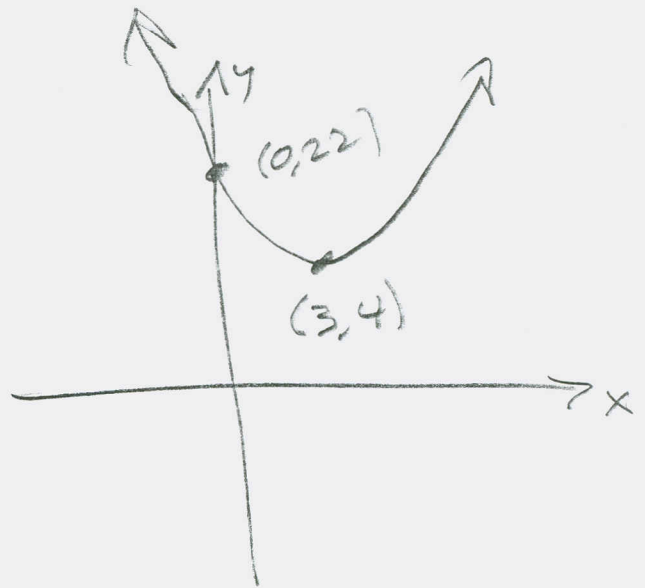
$$y = 2(x-3)^2 + 4$$

SET = 0 \Rightarrow

$$2(x-3)^2 + 4 = 0$$

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

No x-intercepts

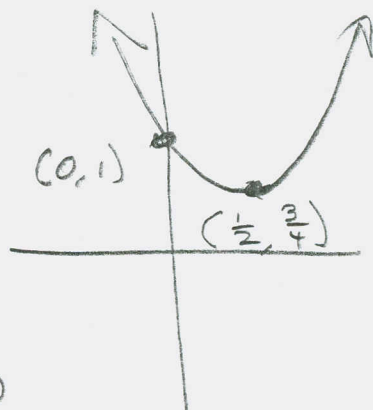


121 S 3.1 I #s 18, 21, 26, 32, 45, 52

$$\begin{aligned} \textcircled{18} \quad y &= x^2 - x + 1 \\ &= x^2 - x + \left(\frac{1}{2}\right)^2 - \frac{1}{4} + 1 \\ &= \left(x - \frac{1}{2}\right)^2 + \frac{3}{4} \end{aligned}$$

No x-intercepts

$$b^2 - 4ac = (-1)^2 - 4(1)(1) = -3 < 0$$



#s 21-26 Find the vertex of each ~~graph~~ quadratic function

$\textcircled{21}$ $-\frac{b}{2a}$ way

$$f(x) = 3x^2 - 12x + 1$$

$$a = 3, b = -12, c = 1$$

$$-\frac{b}{2a} = -\frac{-12}{2(3)} = \frac{12}{6} = 2$$

$$f(2) = 3(2)^2 - 12(2) + 1$$

$$= 12 - 24 + 1$$

$$= -11 \rightarrow \boxed{(2, -11)}$$

Complete the square way

$$f(x) = 3x^2 - 12x + 1$$

$$= 3\left(x^2 - 4x + \frac{1}{3}\right)$$

$$\frac{1}{3}f(x) = x^2 - 4x + \frac{1}{3}$$

$$= x^2 - 4x + 2^2 - 4 + \frac{1}{3}$$

$$= (x-2)^2 - \frac{11}{3}$$

$$f(x) = 3(x-2)^2 - 11$$

$$\boxed{(2, -11)}$$

121 § 3.1 I #s 26, 32, 45, 52

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

$$a = \frac{1}{4}, b = \frac{1}{2}, c = -1$$

$$-\frac{b}{2a} = -\frac{\frac{1}{2}}{2(\frac{1}{4})} = -\frac{\frac{1}{2}}{\frac{1}{2}}$$

$$= -\left(\frac{1}{2}\right)\left(\frac{2}{1}\right) = -1$$

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

$$= \frac{1}{4} - \frac{1}{2} - 1$$

$$= \frac{1 - 2 - 4}{4} = -\frac{5}{4}$$

$$\boxed{(-1, -\frac{5}{4})}$$

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

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

$$= x^2 + 2x + 1 - 1 - 4$$

$$= (x+1)^2 - 5$$

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

$$\boxed{(-1, -\frac{5}{4})}$$

#s 29-40 Find the range & max/min value.
Identify intervals of increase & decrease

(32) $y = (x+3)^2 + 4$



← Decrease | Increase →

$$R = [4, \infty)$$

$$Inc: [4, \infty)$$

$$Dec: (-\infty, 4]$$

121 SA, 1 I #S 45, 52

#S 41-52 Identify vertex, axis of symmetry, x-intercepts, and opening of each parabola. Then sketch.

(45) $f(x) = x^2 + 6x + 9$
 $= (x+3)^2$

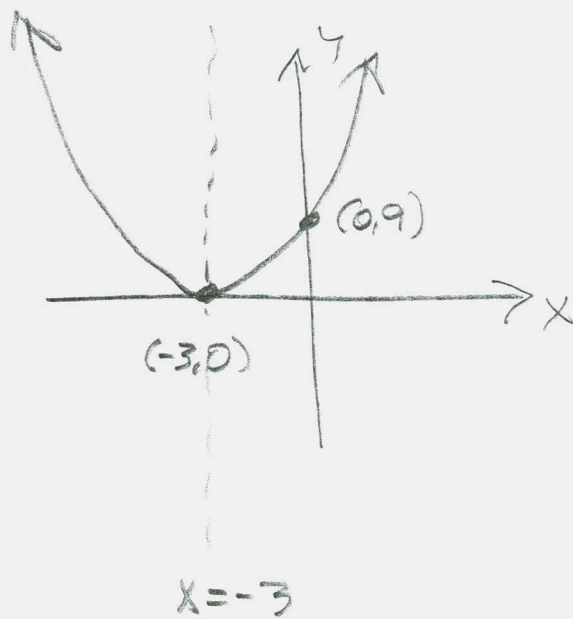
$(h, k) = (-3, 0)$

SET = 0 \Rightarrow

$(x+3)^2 = 0$

$x+3 = \pm 0 = 0$

$x = -3 \rightarrow (-3, 0)$



(52) $y = -x^2 + 2x - 6$

$-y = x^2 - 2x + 6$

$= x^2 - 2x + 1^2 - 1 + 6$

$= (x-1)^2 + 5$

$\Rightarrow y = -(x-1)^2 - 5$ $(h, k) = (1, -5)$

SET = 0 \Rightarrow

$-(x-1)^2 - 5 = 0$

$-(x-1)^2 = 5$

$(x-1)^2 = -5$

No x-int.

