

* To complete the

square the
in front of
 x^2 must be 1

$$\frac{-11}{3} + \frac{4(3)}{1(3)}$$

$$\frac{-11}{3} + \frac{12}{3}$$

Use Completing the square to describe the graph each function. Then use the quadratic formula to find the x-intercepts

c) $f(x) = 3x^2 + 12x + 11$

$$y = 3x^2 + 12x + 11$$

$$\begin{array}{r} -11 \\ \hline \end{array}$$

$$\frac{y-11}{3} = \frac{3x^2 + 12x}{3}$$

$$\frac{y}{3} - \frac{11}{3} + 4 = x^2 + 4x + 4$$

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

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

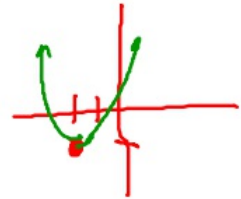
$$(3) \frac{y}{3} = 3 \left[(x+2)^2 - \frac{1}{3} \right]$$

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

$$y = 3(x+2)^2 - 1$$

Vertex $(-2, -1)$

A.O.S $x = -2$



38) $f(x) = 8 + 2x - x^2$

$$y = -x^2 + 2x + 8$$

$$\begin{array}{r} -8 \\ \hline \end{array}$$

$$\frac{y-8}{-1} = \frac{-x^2 + 2x}{-1}$$

$$-y + 8 + 1 = x^2 - 2x + 1$$

$$-y + 9 = (x-1)^2$$

$$-1 \left(-y = (x-1)^2 - 9 \right) \rightarrow y = -(x-1)^2 + 9$$

$a = -1$ $b = 2$ $c = 8$

$$x = \frac{-2}{2(-1)} \pm \frac{\sqrt{2^2 - 4(-1)(8)}}{2(-1)}$$

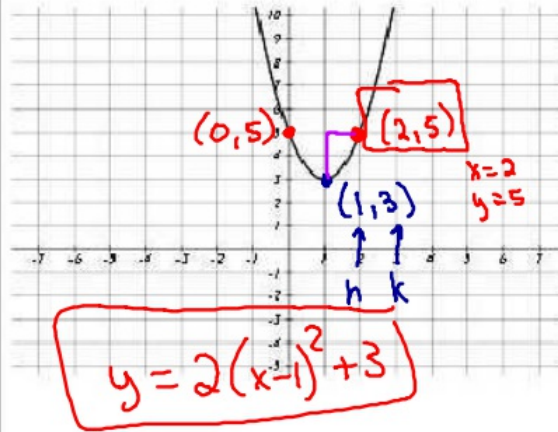
$$x = 1 \pm \frac{\sqrt{36}}{-2}$$

$$x = 1 \pm \frac{6}{-2} \rightarrow x = -2$$

$$x = 1 \pm (-3) \rightarrow x = 4$$

vertex $(1, 9)$

Write an equation for the parabola shown.



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

$$y = a(x-1)^2 + 3$$

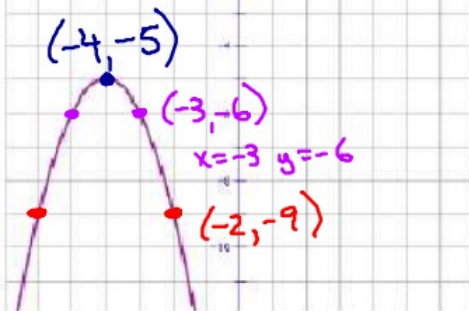
$$5 = a(2-1)^2 + 3$$

$$5 = a + 3$$

$$\begin{array}{r} -3 \\ -3 \\ \hline 2 = a \end{array}$$

Write an equation for the parabola shown.

$$y = -1(x+4)^2 - 5$$



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

$$y = a(x+4)^2 - 5$$

$$-6 = a(-3+4)^2 - 5$$

$$-6 = 1a - 5$$

$$\begin{array}{r} +5 \\ +5 \\ \hline -1 = a \end{array}$$

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

$$y = a(x+4)^2 - 5$$

$$-9 = a(-2+4)^2 - 5$$

$$-9 = 4a - 5$$

$$\begin{array}{r} +5 \\ +5 \\ \hline -4 = 4a \\ \frac{-4}{4} = \frac{4a}{4} \\ -1 = a \end{array}$$

$$a = \frac{y-k}{(x-h)^2} = \frac{(\Delta y)}{(\Delta x)^2}$$

Write an equation for the quadratic function whose graph contains the given vertex and point

Vertex $(-3, 4)$ and point $(2, 21)$

$\begin{matrix} \nearrow & \nearrow \\ h & k \end{matrix}$ $\begin{matrix} \uparrow & \nwarrow \\ x & y \end{matrix}$

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

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

$$y = \frac{17}{25}(x+3)^2 + 4$$

$$21 = a(2+3)^2 + 4$$

$$21 = 25a + 4$$

$$\begin{array}{r} -4 \\ \hline 17 = 25a \end{array}$$

$$\frac{17}{25} = \frac{25a}{25}$$

$$\frac{17}{25} = a$$

Vertex $(8, 2)$

Point $(6, 3)$

$$y = a(x-8)^2 + 2$$

$$3 = a(6-8)^2 + 2$$

$$3 = 4a + 2$$

$$\begin{array}{r} -2 \\ \hline 1 = 4a \end{array}$$

$$\frac{1}{4} = a$$

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