Standard $y = ax^2 + bx + c$

Intercept $y = a(x-p)(x-q)$

Graphing in Vertex Form

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

Vertex (h, k)

y-intercept
Let $x = 0$

Locate the vertex of each quadratic function. Tell whether it is a maximum value or a minimum value. Find the y-intercept for each equation.

$g(x) = (x-3)^2 + 5$

Vertex $(3, 5)$
minimum
$(0-3)^2 + 5$
$(-3)^2 + 5$
$9 + 5$
$(0, 14)$

$f(x) = -3(x-7)^2 - 12$

$V(7, -12)$
max
$-3(0-7)^2 - 12$
$-3(-7)^2 - 12$
$-3(49) - 12$
$-147 - 12$ $(0, -159)$

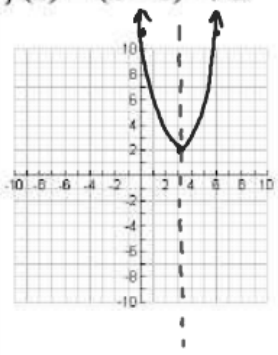
$m(x) = (x+1)^2 + 25$

$V(-1, 25)$
min
$(0+1)^2 + 25$
$(0, 26)$

$n(x) = -2(x+6)^2 + 20$

$V(-6, 20)$
max
$-2(0+6)^2 + 20$
$-2(6)^2 + 20$
$-2(36) + 20$
$-72 + 20$
-52

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

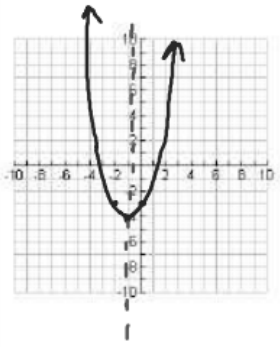


Vertex $(3, 2)$
A.O.S $x = 3$
y-intercept
$(0-3)^2 + 2$
$(-3)^2 + 2$
$9 + 2 = 11$

D: $(-\infty, \infty)$
R: $[2, \infty)$
I: $(3, \infty)$
D: $(-\infty, 3)$

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

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



V: (-1,-4)

A.O.S. x=-1

y-int (0,-3)

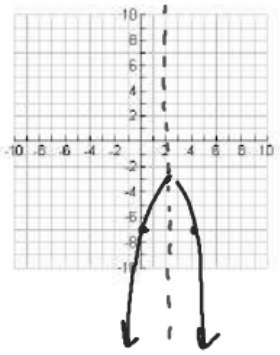
D $(-\infty, \infty)$

R $[-4, \infty)$

Inc $(-1, \infty)$

Dec $(-\infty, -1)$

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



V(2,-3)

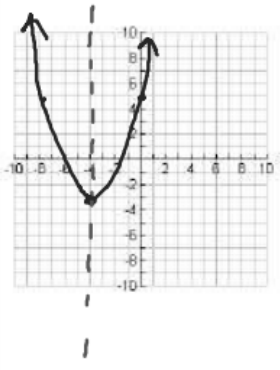
$-(0-2)^2 - 3$

$-(-2)^2 - 3$

$-(4) - 3$

$-4-3 = -7$

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



V(-4,-3)

y-int (0,5)

Standard $\longrightarrow$ Intercept

$y = ax^2 + bx + c$ Factor $y = a(x-p)(x-q)$

Standard $\Rightarrow$ Vertex

$ax^2+bx+c \rightarrow a(x-h)^2+k$

Complete the Square

a has to equal 1

Step 1 Divide b term by 2

Step 2 Square answer from step 1

$\left(\frac{15}{2}\right)^2$

Find the value of *c* that completes the square. Write your expression as a square of a binomial.

$x^2 + 12x + c$

$x^2+12x+36$

$(x+6)^2$

$x^2 - 6x + c$

x^2-6x+9

$(x-3)^2$

$\left(\frac{11}{2}\right)^2 = \frac{121}{4}$

$\frac{11}{1}$

$x^2 - 15x + c$

$x^2-15x+\frac{225}{4}$

$(x-\frac{15}{2})^2$

$x^2 - \frac{25}{13}x + c$

$\left(\frac{25}{26}\right)^2$

$x^2-\frac{25}{13}+\frac{625}{676}$

$\left(x-\frac{25}{26}\right)^2$

$x^2 + 11x + c$

$x^2+11x+\frac{121}{4}$

$(x+\frac{11}{2})^2$

Use completing the square to write each function in vertex form. Label the vertex and find the y-intercept.

$f(x) = x^2 - 6x + 11$

$f(x)-11 = x^2-6x+9$

$+9$

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

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

$V(3,2)$

$f(x) = x^2 - 2x - 9$

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

$+1$

$f(x)+10 = (x-1)^2$

$f(x) = (x-1)^2-10$

$V(1,-10)$