Graphing in Standard Form

$f(x) = ax^2 + bx + c$

Vertex $x = \frac{-b}{2a}$

plug x back in to find y.

A.O.S $x = \frac{-b}{2a}$

X-intercepts set $f(x) = 0$
- factor
- Quad formula

Y-intercept
$(0, c)$

5

$x^2 - 4x + 5 = 0$

$\frac{-b}{2a} \pm \frac{\sqrt{b^2-4ac}}{2a}$

$\frac{4}{2(1)} \pm \frac{\sqrt{(-4)^2-4(1)(5)}}{2(1)}$

$2 \pm \frac{\sqrt{16-20}}{2}$

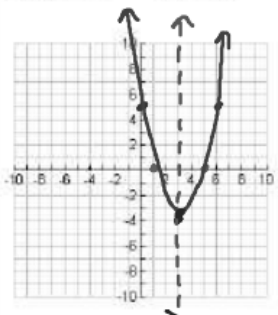
$2 \pm \frac{\sqrt{-4}}{2}$

Graph the quadratic function. Find the x-intercepts, y-intercept, Vertex (Max/Min value), axis of symmetry, domain, and range. Give intervals of increasing and decreasing.

$f(x) = x^2 - 6x + 5$

$a=1$ $b=-6$ $c=5$ Vertex

$x = \frac{-b}{2a} = \frac{6}{2(1)} = 3$ $(3, -4)$



$f(3) = 3^2 - 6(3) + 5$
$9 - 18 + 5$
-4

A.O.S $x = 3$

D: $(-\infty, \infty)$

R: $[-4, \infty)$

Dec $(-\infty, 3)$

Inc $(3, \infty)$

X-intercepts

$x^2 - 6x + 5 = 0$

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

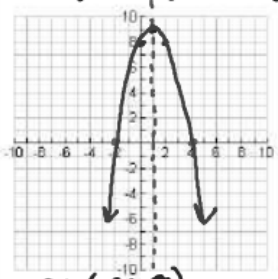
$x-5=0$ $x-1=0$

$x=5$ $x=1$

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

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

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



$f(1) = -(1)^2 + 2(1) + 8$ $(1, 9)$
$-1 + 2 + 8 = 9$

A.O.S $x = 1$

Y-inter $(0, 8)$

D: $(-\infty, \infty)$

R: $(-\infty, 9]$

Inc $(-\infty, 1)$

Dec $(1, \infty)$

$-x^2 + 2x + 8 = 0$

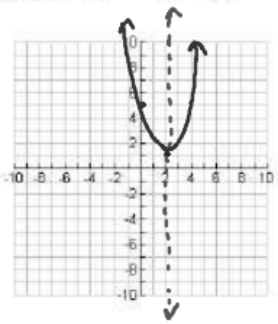
$x^2 - 2x - 8 = 0$

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

$x-4=0$ $x+2=0$

$x=4$ $x=-2$

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



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

$f(2) = 2^2 - 4(2) + 5$
$4 - 8 + 5 = 1$

A.O.S. $x = 2$

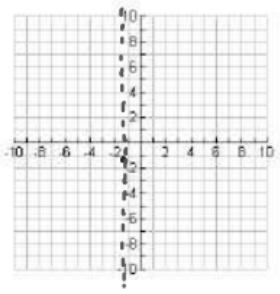
D: $(-\infty, \infty)$

R: $[1, \infty)$

Dec $(-\infty, 2)$

Inc $(2, \infty)$

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



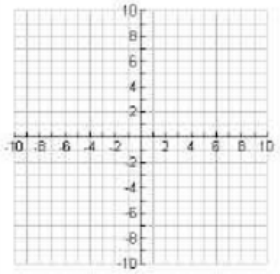
Vertex = $\frac{-b}{2a} = \frac{-3}{2(1)} = -\frac{3}{2} = -1.5$ $(-1.5, -1.25)$

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

$\frac{9}{4} - \frac{9}{2} + 1 = \frac{9}{4} - \frac{18}{4} + \frac{4}{4} = \frac{-5}{4}$

AOS $x = -1.5$

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



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