

$$x^2 - 3x - 10 = 0$$

$$(x-5)(x+2) = 0$$

$$x-5=0 \quad x+2=0$$

$$\text{Vertex} = -\frac{b}{2a} = \frac{3}{2(1)}$$

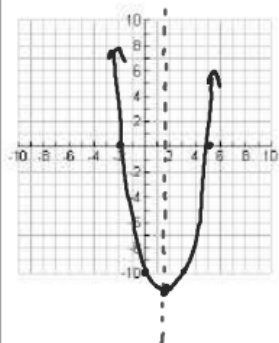
$$= \frac{3}{2}$$

$$\left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) - 10$$

$$\frac{9}{4} - \frac{9}{2} - 10$$

$$\frac{9}{4} - \frac{18}{4} - \frac{40}{4} = -\frac{49}{4}$$

$$f(x) = x^2 - 3x - 10$$



Vertex  
(1.5, -12.25)

y-intercept  
(0, -10)

Domain  
(-∞, ∞)

Int  
(1.5, ∞)

x-intercepts

$$x = 5, -2$$

A.O.S

$$x = 1.5$$

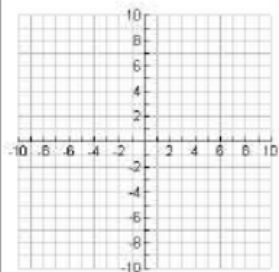
Range

$$[-12.25, \infty)$$

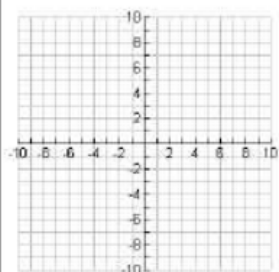
Dec

$$(-\infty, 1.5)$$

$$f(x) = 2x^2 + 7x + 3$$



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



Graphing in Intercept Form

$$f(x) = a(x-p)(x-q)$$

X-intercepts  $(p,0)$   $(q,0)$

Vertex half way between

X-intercepts

Y-intercept

Let  $x=0$

Domain  $(-\infty, \infty)$

Range  $[-4, \infty)$

Dec  $(-\infty, -1)$

Inc  $(-1, \infty)$

Domain  $(-\infty, \infty)$

Inc  $(2, \infty)$

Range  $[-1, \infty)$

Dec  $(-\infty, 2)$

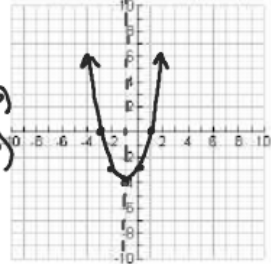
Range  $[-1, \infty)$

Dec  $(-\infty, 2)$

Use reasoning alone to sketch graphs of the following functions. Label these key points with their coordinate graphs.

- X-intercepts
- Y-intercepts
- Maximum or Minimum points
- Domain/Range
- Axis of Symmetry
- Intervals of Increasing/Decreasing

a.  $f(x) = (x+3)(x-1)$



X-intercepts  
 $x+3=0$   $x-1=0$   
 $x=-3$   $x=1$

A.O.S

$x=-1$

Y-intercept

$$f(0) = (0+3)(0-1)$$

$$(3)(-1) \quad (0, -3)$$

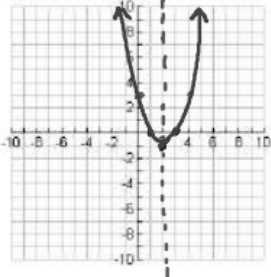
Vertex  $(-1, -4)$

$$f(-1) = (-1+3)(-1-1)$$

$$(2)(-2)$$

$$-4$$

b.  $f(x) = (x-1)(x-3)$



X-intercepts  
 $(1,0)$   $(3,0)$

A.O.S

$x=2$

Vertex  $(2, -1)$

$$f(2) = (2-1)(2-3)$$

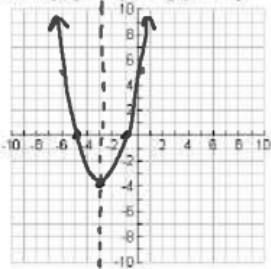
$$(1)(-1)$$

Y-intercept

$$f(0) = (0-1)(0-3)$$

$$(0, 3)$$

c.  $f(x) = (x+1)(x+5)$



X-intercepts  
 $x=-1, -5$

A.O.S  $x=-3$

Y-intercept

$$f(0) = (0+1)(0+5)$$

$$(1)(5)$$

$$(0, 5)$$

Vertex  $(-3, -4)$

$$f(-3) = (-3+1)(-3+5)$$

$$(-2)(2)$$

Domain

$(-\infty, \infty)$

Range

$[-4, \infty)$

Inc

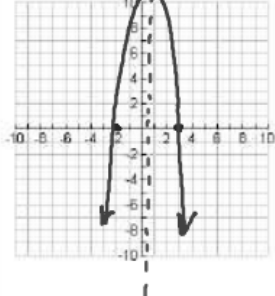
$(-3, \infty)$

Dec

$(-\infty, -3)$

$$f(.5) = -2(.5+2)(.5-3) \\ -2(2.5)(-2.5)$$

d.  $f(x) = -2(x+2)(x-3)$



X-intercepts  
 $x = -2, 3$

Vertex  
 $x = .5 \quad (.5, 12.5)$

A.O.S  
 $x = .5$

Y-intercept  
 $f(0) = -2(0+2)(0-3) \\ -2(2)(-3)$

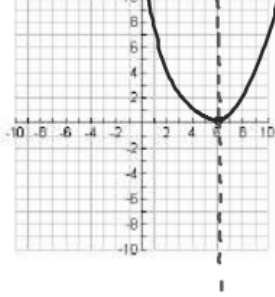
Domain  
 $(-\infty, \infty)$

$(0, 12)$

Range  
 $(-\infty, 12.5]$

Inc  $(-\infty, .5)$       Dec  $(.5, \infty)$

e.  $f(x) = 0.5(x-6)^2$



$.5(x-6)(x-6)$   
 $x = 6$

Vertex  
 $x = 6$

$$.5(6-6)^2$$

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

R:  $[0, \infty)$

I:  $(6, \infty)$

D:  $(-\infty, 6)$