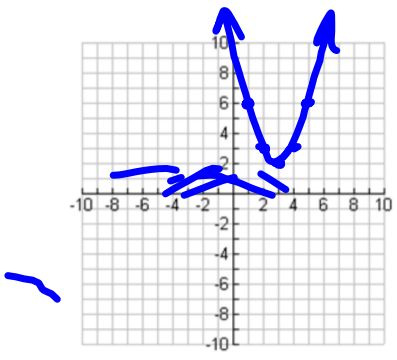
Bell Ringer

Tuesday 10/22

Graph the following functions and describe the transformations from the parent function: $y = x^2$ (0,0)

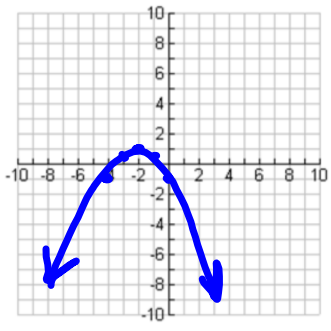
1. $f(x) = (x-3)^2 + 2$

Transformations:



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

Transformations:



$1 \cdot \frac{1}{2} = \frac{1}{2}$

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

correct ws...

Vertex Form Using Completing the Square

Name: Key Hr:

Vertex form: $y = a(x-h)^2 + k$ $\quad c = \left(\frac{b}{2}\right)^2$

Find the value of 'c' that would make a perfect square trinomial. Then write the expression as a square of a binomial.

a) $x^2 + 4x + c$ $\left(\frac{4}{2}\right)^2 = 4$

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

c) $x^2 + 18x + c$ $\left(\frac{18}{2}\right)^2 = 81$

Change the equation from standard form to vertex form. Identify the vertex and axis of symmetry.

1. $y = x^2 + 4x - 12$

$y = x^2+4x+4 - 12 - 4$

$y = (x+2)^2 - 16$

V: $(-2, -16)$

$x = -2$

2. $y = x^2 - 6x + 21$

$x^2-6x+9 + 21 - 9$

$y = (x-3)^2 + 12$

V: $(3, 12)$

$x = 3$

3. $y = x^2 - 8x + 4$

$x^2-8x+16+4-16$

$y = (x-4)^2 - 12$

V: $(4, -12)$

$x = 4$

4. $y = x^2 + 3x - 5$

$x^2+3x+\frac{9}{4} - 5 - \frac{9}{4}$

$(x+\frac{3}{2})^2 - \frac{29}{4}$ or $(x+1.5)^2 - 7.25$

$(-\frac{3}{2}, -\frac{29}{4})$ or $(-1.5, -7.25)$

$x = -\frac{3}{2}$ $\quad x = -1.5$

5. $y = 2x^2 + 4x - 12$

$2(x^2+2x-6)$

$y = 2(x^2+2x+1 - 6 - 1)$

$y = 2(x+1)^2 - 14$

V: $(-1, -14)$

$x = -1$

6. $y = -x^2 - 3x + 18$

$-1(x^2+3x-18)$

$-1(x^2+3x+\frac{9}{4} - 18 - \frac{9}{4})$

$-1((x+\frac{3}{2})^2 - \frac{81}{4})$ $\quad (-\frac{3}{2}, \frac{81}{4})$

$y = -(x+\frac{3}{2})^2 + \frac{81}{4}$ or $y = -(x+1.5)^2 + 20.25$

AOS: $x = -1.5$ or $x = -\frac{3}{2}$ $\quad (-1.5, 20.25)$

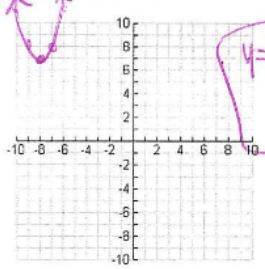
Change the equation from standard form to vertex form and identify the vertex. Then sketch a graph

7. $y = x^2 + 16x + 71$

$x^2+16x+64+71-64$

$y = (x+8)^2 + 7$

V: $(-8, 7)$

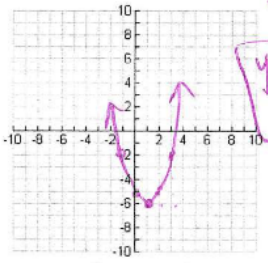


8. $y = x^2 - 2x - 5$

$y = x^2 - 2x + 1 - 5 - 1$

$y = (x-1)^2 - 6$

V: $(1, -6)$

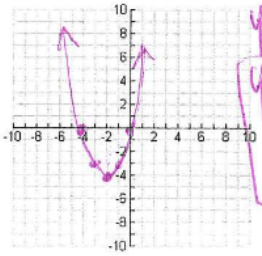


9. $y = x^2 + 4x$

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

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

V: $(-2, -4)$



10. $y = -x^2 - 6x - 5$

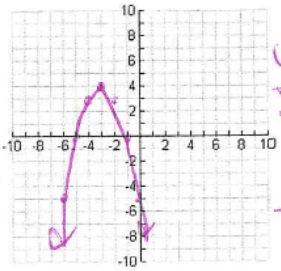
$y = -(x^2+6x+5)$

$y = -(x^2+6x+9+5-9)$

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

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

V: $(-3, 4)$



11. $y = -2x^2 + 4x + 3$

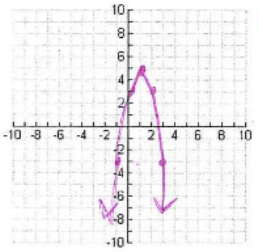
$y = -2(x^2 - 2x - \frac{3}{2})$

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

$= -2((x-1)^2 - \frac{5}{2})$

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

V: $(1, +5)$



12. $y = 3x^2 + 6x + 9$

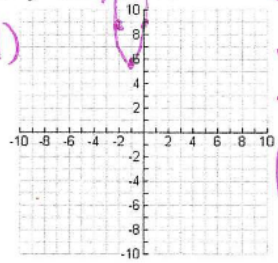
$y = 3(x^2+2x+3)$

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

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

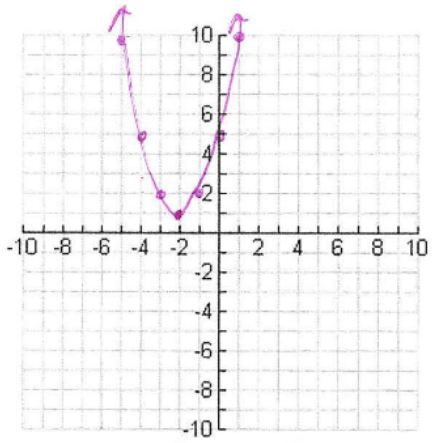
$y = 3(x+1)^2 + 6$

V: $(-1, 6)$



Given the quadratic equations in standard form, find the following and graph:

13. $y = x^2 + 4x + 5$



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

$(x+2)^2 + 1$

- A) Vertex Form $y = (x+2)^2 + 1$
- B) Vertex $(-2, 1)$
- C) Axis of Symmetry $x = -2$
- D) Max/Min min at 1
- E) y-intercept $(0, 5)$
- F) x-intercept(s): none
- G) Domain: $(-\infty, \infty)$
- H) Range: $[1, \infty)$
- I) Find f(4): 37

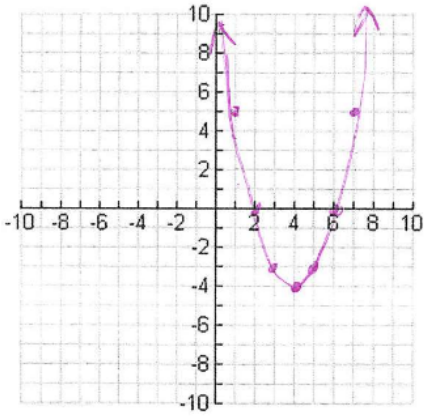
$f(4) = 4^2 + 4(4) + 5$

$= 16 + 16 + 5$

$= 32 + 5$

$= 37$

14. $y = x^2 - 8x + 12$



$y = x^2 - 8x + 16 + 12 - 16$

$(x-4)^2 - 4$

- A) Vertex Form $y = (x-4)^2 - 4$
- B) Vertex $(4, -4)$
- C) Axis of Symmetry $x = 4$
- D) Max/Min min at -4
- E) y-intercept $(0, 12)$
- F) x-intercept(s): $(2, 0)$ and $(6, 0)$
- G) Domain: $(-\infty, \infty)$
- H) Range: $[-4, \infty)$
- I) Find f(3): -3

$f(3) = 3^2 - 8(3) + 12$

$= 9 - 24 + 12$

$= 9 - 12$

$= -3$

Week #9 Packet due!!!

REVIEW!

Solve for x

$f(x) = -4x^2 - 8x - 4 = 0$

$-4(x^2+2x+1)=0$

(-1, 0)

(-1, 0)

$f(x) = -4(x+1)(x+1) = 0$

$-4 \neq 0$ $x+1=0$ $x+1=0$ $x=-1,-1$

Factored form:

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

X-intercepts --> set = to 0 and solve:

X: int

$a(x - p)(x - q) = 0$

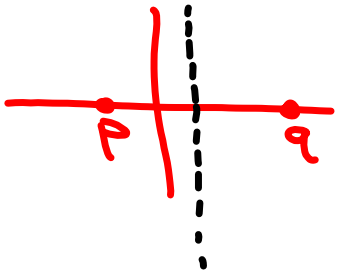
$x - p = 0$ (+p, +p) $x = p$

$x - q = 0$ (+q, +q) $x = q$

(p, 0)

(q, 0)

Axis of symmetry: $x = \frac{p+q}{2}$



Graph the quadratic function. Label the vertex, axis of symmetry and x-intercepts. (zeros/roots/sol) Describe the domain and range.

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

x-intercepts: $(x-2)(x+2)=0$

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

$+2 \quad +2 \quad -2 \quad -2$

$(2,0)$ $(-2,0)$

Axis of Symmetry:

$\frac{2+(-2)}{2}=\frac{0}{2}=0=x$

Vertex:

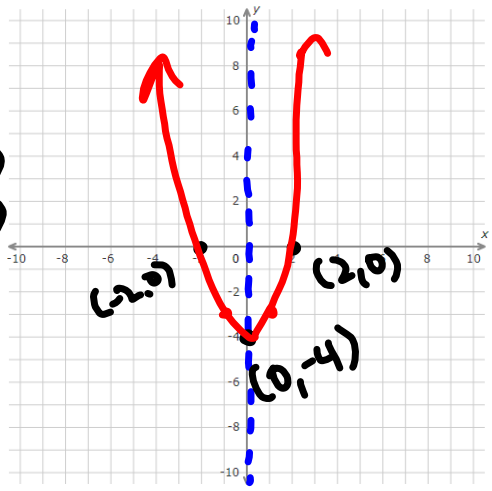
$(0,-4)$

Domain:

$(-\infty,\infty)$

Range:

$[-4,\infty) \quad y \geq -4$



Graph the quadratic function. Label the vertex, axis of symmetry and x-intercepts. Describe the domain and range.

$h(x) = -2(x - 7)(x - 3)$ $-2(-2)(2) = 8$

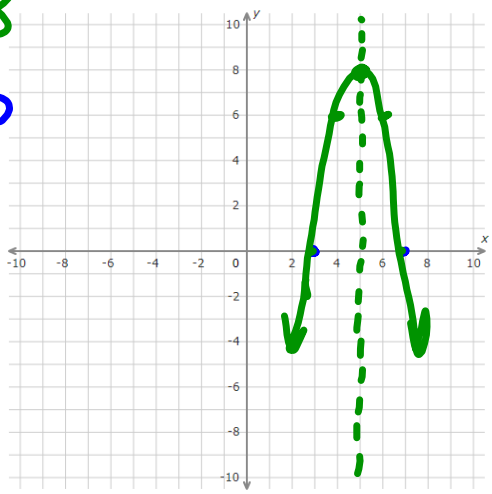
x-intercepts: $x-7=0$ $x-3=0$ $(7,0)$ $(3,0)$

Axis of Symmetry: $x=5$ $\frac{7+3}{2}=\frac{10}{2}=5$

Vertex: $(5,8)$

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

Range: $(-\infty,8]$



$1 \cdot -2 =$
$4 \cdot -2 = -8$

Graph the quadratic function. Label the vertex, axis of symmetry and x-intercepts. Describe the domain and range.

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

$(1)^2 - 2(1) - 3 = -4$

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

$x-3=0 \quad x+1=0$

$+3 \quad -1$

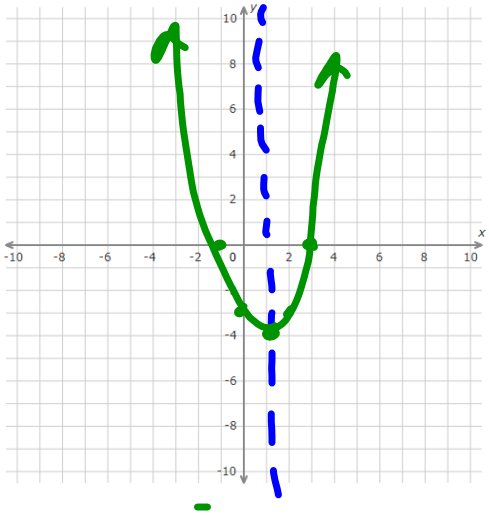
x-intercepts: $(3,0), (-1,0)$

Axis of Symmetry: $x = \frac{-1+3}{2} = 1$

Vertex: $(1,-4)$

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

Range: $[-4, \infty)$



Graph the quadratic function. Label the vertex, axis of symmetry and x-intercepts. Describe the domain and range.

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

$x(x+4)=0$

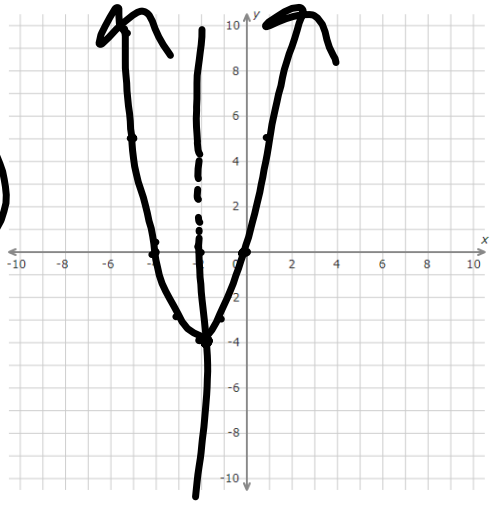
x-intercepts: $(0,0)(-4,0)$

Axis of Symmetry: -2

Vertex: $(-2,-4)$

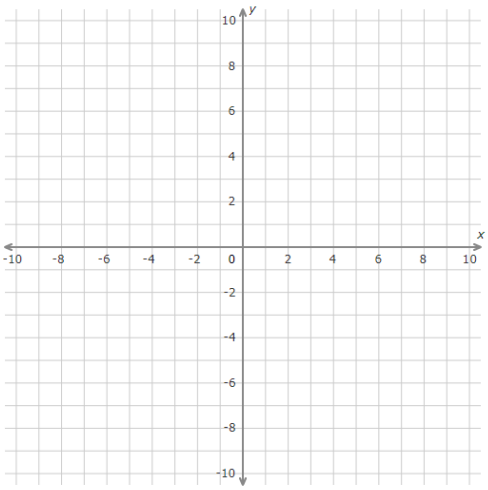
Domain: All real #'s

Range: $[-4,\infty)$



Graph the quadratic function. Label the vertex, axis of symmetry and x-intercepts. Describe the domain and range.

$y = -2x^2 - 4x + 30$



x-intercepts:

Axis of Symmetry:

Vertex:

Domain:

Range:

3.5 hw pg 158-160 #s 1-3, 7-17 odd, 21, 23, 25, 29-33 odd, 41, 42, 67-70