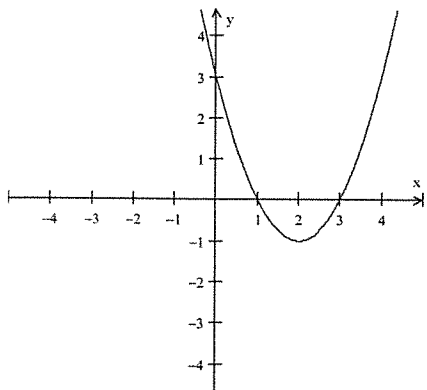


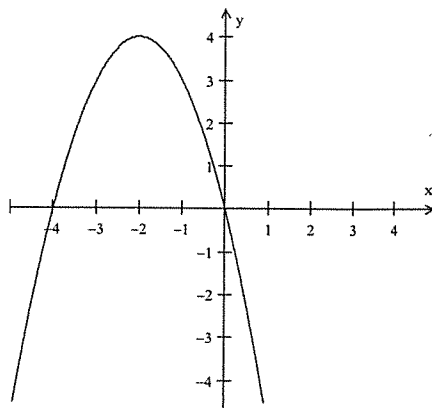
Algebra P4
Practice Test #3

No calculators. Show all work for full credit.

1. Identify (any point should be written as a point!):



vertex: $(2, -1)$
 domain: All real numbers
 range: $y \geq -1$
 zeros: $(3, 0)$ & $(1, 0)$
 y-intercept: $(0, 3)$
 axis of symmetry: $x = 2$



vertex: $(-2, 4)$
 domain: All real numbers
 range: $y \leq 4$
 zeros: $(0, 0)$ & $(-4, 0)$
 y-intercept: $(0, 0)$
 axis of symmetry: $x = -2$

2. Solve the system of equations by graphing

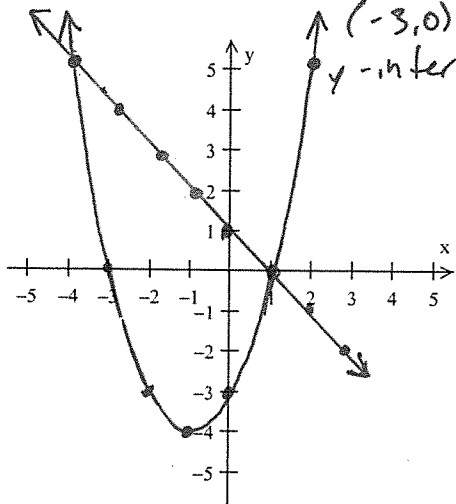
$$y = x^2 + 2x - 3 = (x+3)(x-1)$$

$$y = -x + 1$$

x-intercepts are

$(-3, 0)$ & $(1, 0)$

y-intercept: $(0, -3)$



solution(s): $(1, 0)$ and $(-4, 5)$

3. A water balloon is thrown up into the air. Its height can be described by the equation

$$y = x^2 - 6x + 12, \text{ where } x \text{ is the time in seconds.}$$

Find the time when the balloon is highest, and find its height then.

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

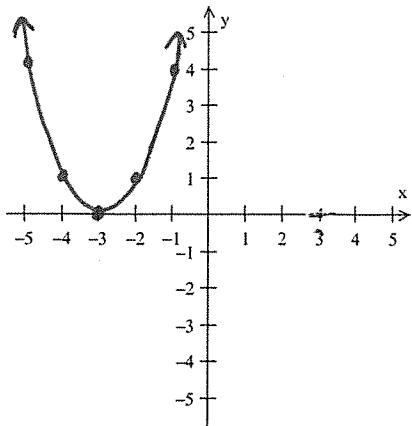
3 seconds

$$y = 3^2 - 6(3) + 12 = 3$$

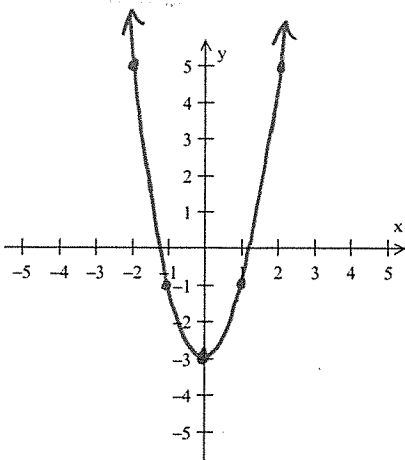
3 feet

This highest point is the vertex. The x-value (time) of the vertex is $-\frac{b}{2a}$.

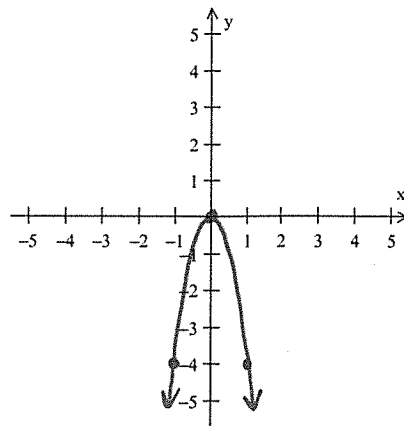
3. Graph each function.



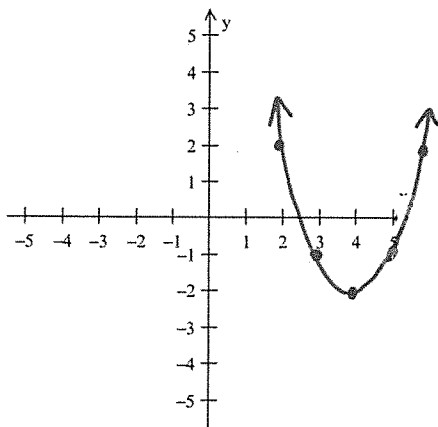
Graph: $y = (x+3)^2$



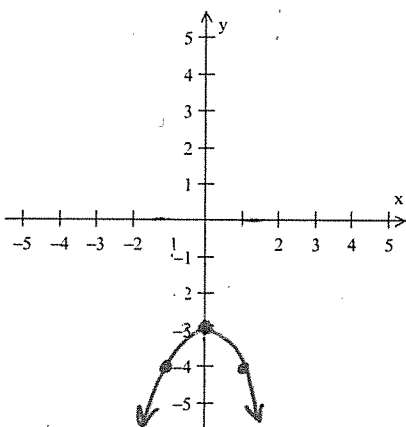
Graph: $y = 2x^2 - 3$



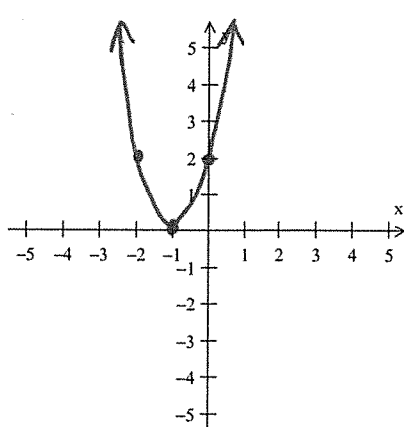
Graph: $y = -4x^2$



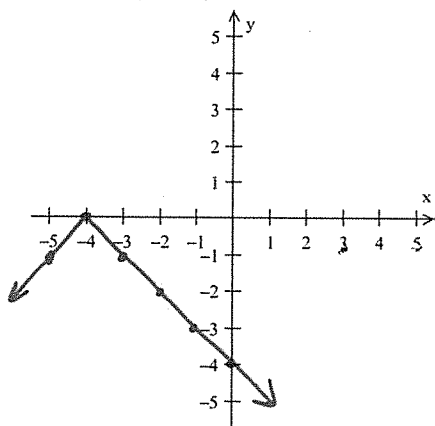
Graph: $y = (x-4)^2 - 2$



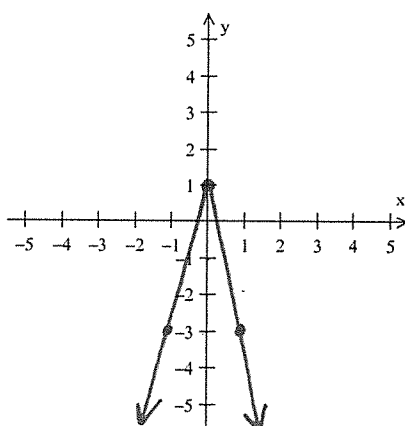
Graph: $y = -x^2 - 3$



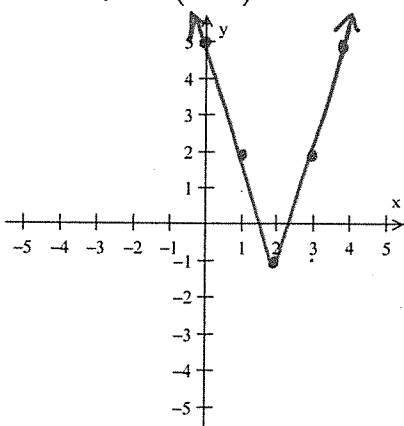
Graph: $y = 2(x+1)^2$



Graph: $y = -|x+4|$



Graph: $y = -4|x|+1$



Graph: $y = 3|x-2|-1$

4. Write the equation for the function described:

a. Base graph $y = x^2$, moved left 3 and down 5. $y = (x+3)^2 - 5$

b. Base graph $y = |x|$, vertical stretch by 3 and up 2. $y = 3|x| + 2$

c. Base graph $y = x^3$, flipped upside down and right 1. $y = -(x-1)^3$

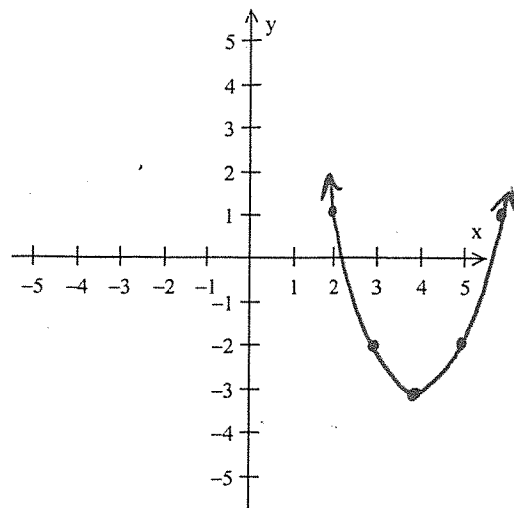
5. Turn the standard form into vertex form by completing the square, and SHOW WORK. Then graph.

$$y = x^2 - 8x + 13$$

$$y = x^2 - 8x + 16 - 16 + 13$$

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

vertex: $(4, -3)$



6. Find the vertex.

a. $y = x^2 + 4x + 1$

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

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

vertex: $(-2, -3)$

b. $y = 3x^2 + 3x + 1$

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

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

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

vertex: $(-0.5, 0.25)$

cannot put in vertex form if this is not a "1"

7. Find the zeros (x-intercepts). Write them as points.

a. $y = x^2 - 4x$

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

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

$x = 0, 4$

b. $y = x^2 - 25$

$$0 = x^2 - 25$$

$$x^2 = 25$$

$$x = \pm\sqrt{25} \rightarrow x = \pm 5$$

8. Solve for x.

a. $x^2 + 4x - 2 = 0$

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

$$x = \frac{-4 \pm \sqrt{24}}{2} = \frac{-4 \pm 2\sqrt{6}}{2}$$

$x = -2 \pm \sqrt{6}$

b. $2x^2 + 3x = -1$

$$2x^2 + 3x + 1 = 0$$

$$(2x+1)(x+1) = 0$$

$$2x+1=0 \quad x+1=0$$

$x = -\frac{1}{2}, -1$

9. If $f(x) = 3x^2 - 2$ find the following:

a. $f(0)$

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

$f(0) = -2$

b. $f(2)$

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

$f(2) = 10$

c. $f(-3)$

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

$f(-3) = 25$