1. **Which one is not a quadratic equation?**
   a. $y = 3x^3 + 2x^2 - 2$
   b. $y = 3x^2$
   c. $4x^2 + y = 2$

2. **State the vertex, axis of symmetry, and the maximum or minimum values of the following functions (the first one is done for you):**
   a. $f(x) = x^2 - 3$
   *Vertex: (0, -3)*
   *Axis of symmetry: x= 0*
   *Minimum value= -3 (because graph opens up)*

   b. $f(x) = 2(x + 2)^2 - 5$

   c. $f(x) = -3(x - 7)^2$

   d. $f(x) = \frac{1}{2}(x + 4)^2 + 4$

3. **Describe the transformations of the graphs compared to $f(x) = x^2$. (the first one is done for you)**
   a. $f(x) = -\frac{1}{3}(x - 4)^2 - 3$

   *Reflection across the x axis ( opens down)*

   *Vertical compression of 1/3*
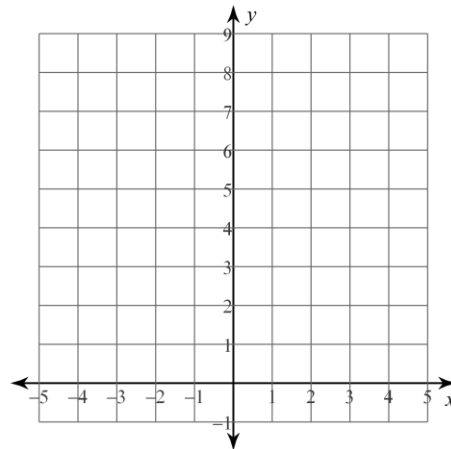
   *Shift right 4, shift down 3*

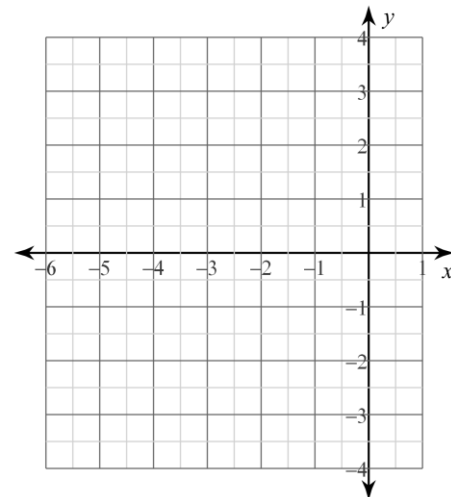   b. $f(x) = 2(x + 2)^2 - 5$

   c. $f(x) = -3(x - 7)^2$

   d. $f(x) = \frac{1}{2}(x + 4)^2 + 4$

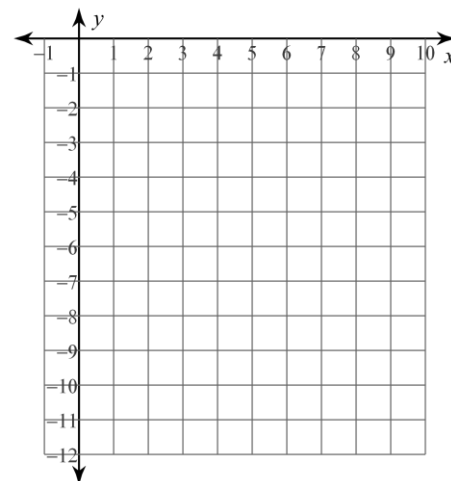4. **Graph the following Functions. State the domain and range**

$y = 2x^2$



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



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

**5. Rewrite to standard form. Find the axis of symmetry. Find the vertex.**

a. $y + 3x^2 = 6x - 4$

$$y = -3x^2 + 6x - 4$$

$To\ find\ axis\ of\ symmetry: x = -\dfrac{b}{2a}$

$$x = \frac{-6}{2(-3)}$$
$$x = 1\ \ axis\ of\ symmetry$$

*Plug  x = 1 into equation to find y*

$$y = -3(1)^2 + 6(1) - 4$$
$$y = -3 + 6 - 4$$

$$y = -1$$

*Vertex: (1,-1)*

b. $y - 4x = x^2 + 20$

c. $y = 5x^2 - 30x + 10$

**6. Rewrite vertex form to standard form. (first one is done for you)**

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

$$y = -2(x^2 - 6x + 9)\ \ + 4$$

$$y = -2x^2 + 12x - 18 + 4$$

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

b. $y = 3(x + 2)^2 - 7$

c. $y = -5(x - 1)^2 + 11$

**7. Write the equation from the graph**