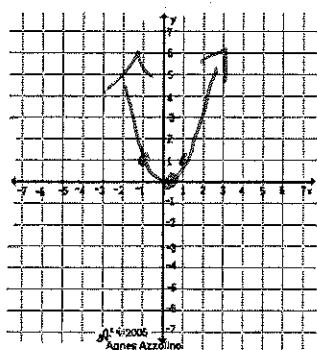


Algebra 2 Review of 3.1-3.3

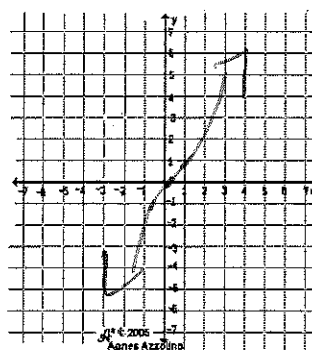
- 1) Recognize the Characteristics of the Graph of $f(x) = x^n$
- 2) Graph $f(x) = a(x-h)^n + k$ and recognize the transformations
- 3) Write equations for graphs of $f(x) = a(x-h)^n + k$

Sketch the Parent Graphs of $f(x) = x^n$

n is even



n is odd



Characteristics

$x \rightarrow +\infty, f(x) \rightarrow +\infty$
 $x \rightarrow -\infty, f(x) \rightarrow +\infty$

$x \rightarrow +\infty, f(x) \rightarrow +\infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$

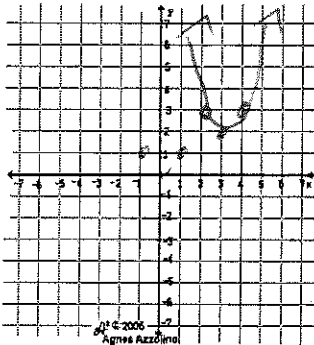
Min $y=0$ NO MAX
 Symmetry - y-axis

NO Max NO Min
 Symmetry w/ the origin
 Zero $x=0$

Zero $x=0$

Graphing $f(x) = a(x - h)^n + k$

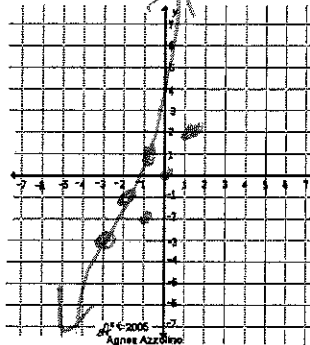
1) $f(x) = (x - 3)^4 + 2$



V/TP: (3, 2)
 Domain: $x \in \mathbb{R}$
 Range: $y \in \mathbb{R}; y \geq 2$

H-shift $\rightarrow 3$
 V-shift $\uparrow 2$

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

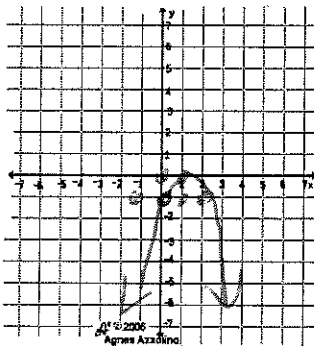


V/TP: (-2, -1)
 Domain: $x \in \mathbb{R}$
 Range: $y \in \mathbb{R}$

$\frac{-1}{1} \mid \frac{-1}{1}$ $\frac{-1}{1} \mid \frac{-2}{1}$
 $\frac{0}{1} \mid \frac{0}{1}$ $\frac{0}{1} \mid \frac{0}{1}$
 $\frac{1}{1} \mid \frac{1}{1}$ $\frac{2}{1} \mid \frac{2}{1}$
 V. Stretch BAFO 2
 H-shift $\leftarrow 2$
 V. Shift $\downarrow 1$

Graphing $f(x) = a(x - h)^n + k$

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

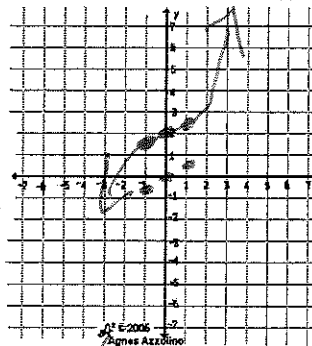


V/TP: (1, 0)
 Domain: $x \in \mathbb{R}$
 Range: $y \in \mathbb{R}; y \leq 0$

Reflection
 H-shift $\rightarrow 1$

$\frac{-1}{1} \mid \frac{-1}{1}$ $\frac{-1}{1} \mid \frac{-1}{1}$
 $\frac{0}{1} \mid \frac{0}{1}$ $\frac{0}{1} \mid \frac{0}{1}$
 $\frac{1}{1} \mid \frac{1}{1}$ $\frac{1}{1} \mid \frac{1}{1}$

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



V/TP: (0, 2)
 Domain: $x \in \mathbb{R}$
 Range: $y \in \mathbb{R}$

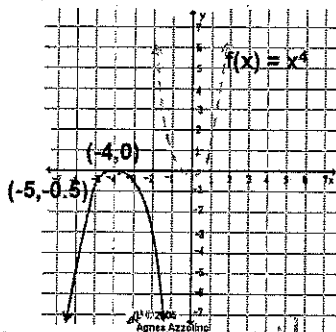
$\frac{-1}{1} \mid \frac{1}{1}$ $\frac{-1}{1} \mid \frac{1}{2}$
 $\frac{0}{1} \mid \frac{0}{1}$ $\frac{0}{1} \mid \frac{0}{1}$
 $\frac{1}{1} \mid \frac{1}{1}$ $\frac{1}{1} \mid \frac{1}{2}$
 V. Shrink BAFO $\frac{1}{2}$
 ~~$\frac{1}{1} \mid \frac{1}{1}$~~
 V. Shift $\uparrow 2$

Describe the transformations in each function

- 1) $f(x) = \frac{1}{4}(x+2)^3$ V. Shrink BAFO $\frac{1}{4}$
H. Shift $\leftarrow 2$
- 2) $f(x) = -2(x-3)^4 - 5$ Reflection V. Stretch BAFO 2
H. Shift \rightarrow
V. Shift $\downarrow 5$
- 3) $f(x) = \frac{5}{2}x^6 + 3$ V. Stretch BAFO $\frac{5}{2}$ or 2.5
V. Shift $\uparrow 3$
- 4) $f(x) = -(x+1)^5 + 4$ Reflection
H. Shift $\leftarrow 1$
V. Shift $\uparrow 4$

Writing Equations for $f(x) = a(x-h)^n + k$ Graphs

- Use what you know about the vertex or turning point to help write an equation for each graph. State the domain and range of each.

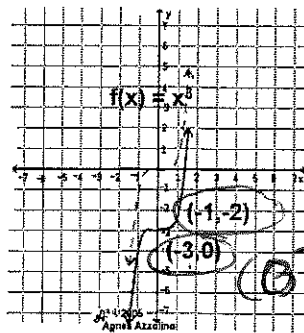


$$f(x) = a(x+4)^4 + 0$$

$$-1/2 = a(-5+4)^4 + 0$$

$$a = -\frac{1}{2}$$

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



$$f(x) = a(x+3)^3$$

$$-2 = a(1+3)^3$$

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

$$-\frac{2}{8} = \frac{a \cdot 8}{8}$$

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

Solve for a

$$f(x) = a(x+0)^3 - 3$$

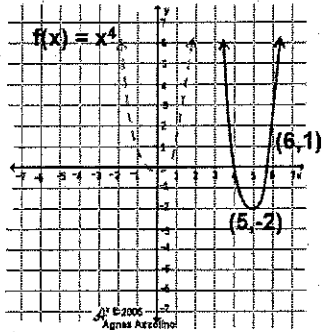
$$-2 = a(1+0)^3 - 3$$

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

$$a = 1$$

Writing Equations for $f(x) = a(x - h)^n + k$ Graphs

- Use what you know about the vertex or turning point to help write an equation for each graph. State the domain and range of each.



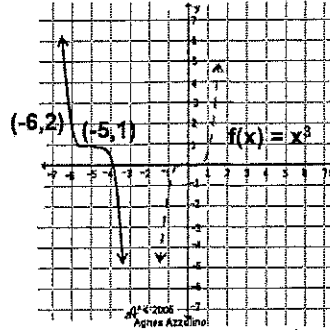
$$f(x) = a(x - 5)^4 - 2$$

$$1 = a(6 - 5)^4 - 2$$

$$\frac{1}{+2} = \frac{a}{+2} - 2$$

$$3 = a$$

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



$$f(x) = a(x + 5)^3 + 1$$

$$2 = a(-6 + 5)^3 + 1$$

$$1 = a(-1)$$

$$\frac{1}{-1} = \frac{a}{-1}$$

$$a = -1$$

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