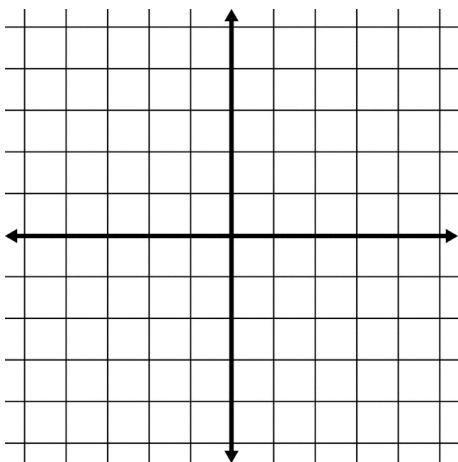


1.6 Exploring Transformations of the Parent Functions

The purpose of this Investigation is to recall your memory of quadratic transformations from grade 10, $y=a(x-h)^2+k$, and extrapolate from these, transformations for any of the Parent Functions.

- Recall how each of the variables in $y=a(x-h)^2+k$ transform the parent $y=x^2$ function. Without using a calculator, use your knowledge of transformations to sketch the graphs of $y=x^2$, $y=2x^2$, $y=0.5x^2$, $y=-x^2$ on the same graph.



Describe how the a variable transforms x^2

a -

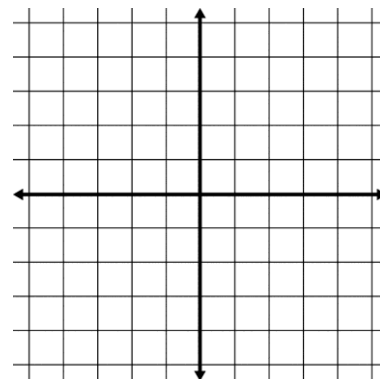
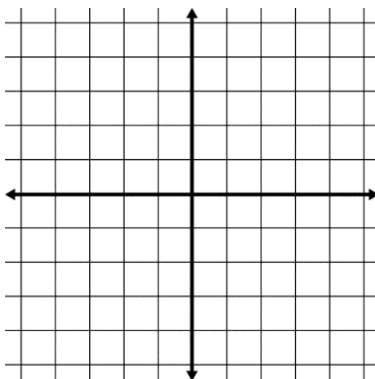
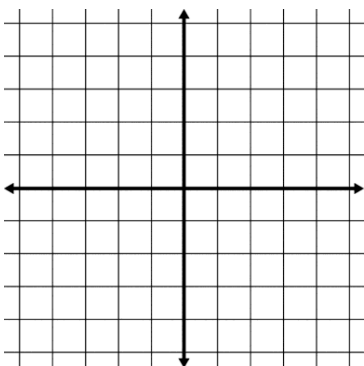
- Using the graphing calculator, compare the graphs of a) x^3 , $2x^3$, and $-x^3$ b) \sqrt{x} , $2\sqrt{x}$, and $-\sqrt{x}$ c) $1/x$, $2/x$, and $-1/x$ d) $|x|$, $2|x|$, and $-|x|$. How do these compare with the transformations from 1?

- Sketch what you believe the following graphs will look like:

$$f(x) = \sqrt{x} + 2$$

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

$$h(x) = |x+2| - 3$$



- Use your graphing calculator to check the sketches you made in part 3.

1.6 Exploring Transformations of the Parent Functions

5. Explain the difference between $f(x) = \frac{1}{x+3}$ and $g(x) = \frac{1}{x} + 3$. Use your calculator to check your answer.

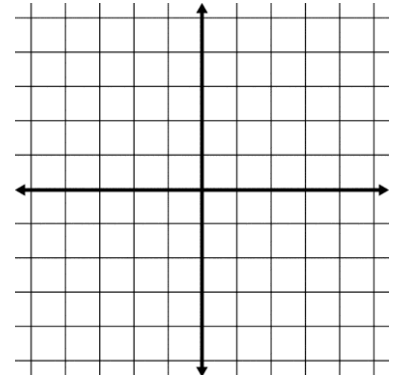
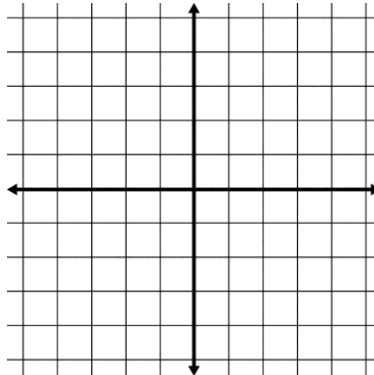
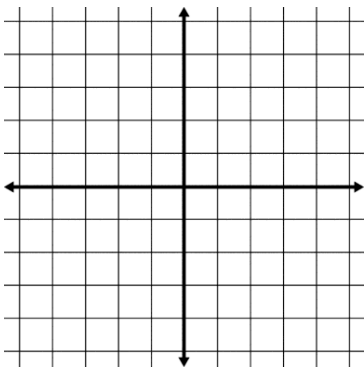
6. To describe the transformation of any generic parent function $f(x)$, we use the formula, $g(x) = af(k(x-d))+c$ (we will teach k later). Using this language, sketch graphs of the following transformation:

$$g(x) = -f((x-2))+1 \text{ if}$$

$$f(x) = \sqrt{x}$$

$$f(x) = \frac{1}{x}$$

$$h(x) = |x|$$



7. Going forward, we will be using RST charts to map transformations from a parent function to something new. In order to do this, we need to have memorized key points from each of the parent functions. Complete the tables of key points below:

$$y=x^2$$

| x | y |
|---|---|
| 0 | |
| 1 | |
| 2 | |

$$y=x^3$$

| x | y |
|----|---|
| -1 | |
| 0 | |
| 1 | |
| 2 | |

$$y=\sqrt{x}$$

| x | y |
|---|---|
| 0 | |
| 1 | |
| 4 | |

$$y=1/x$$

| x | y |
|----|---|
| -1 | |
| 1 | |

$$y=|x|$$

| x | y |
|----|---|
| -1 | |
| 0 | |
| 1 | |