

# Chapter 1 : Introduction to Functions

## 1.6 Exploring Transformations of Parent Functions

**Learning Goal :** To investigate transformations of parent functions

Question : Do transformations of other parent functions behave in the same way as transformations of quadratic functions?

**General Transformations:**  $g(x) = af(x \pm d) \pm c$

where "a" is \_\_\_\_\_ and changes \_\_\_\_\_

"c" is \_\_\_\_\_ and changes \_\_\_\_\_

"d" is \_\_\_\_\_ and changes \_\_\_\_\_

**Communication Tip**

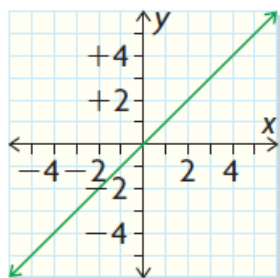
The function defined by  $g(x) = af(x \pm d) \pm c$  describes a transformation of the graph of  $f$ .  
Therefore:

When $f(x) = x^2$ , then $g(x) = a(x \pm d)^2 \pm c$
When $f(x) = \sqrt{x}$ , then $g(x) = a\sqrt{x \pm d} \pm c$
When $f(x) = \frac{1}{x}$ , then $g(x) = \frac{a}{x \pm d} \pm c$
When $f(x) =  x $ , then $g(x) = a x \pm d  \pm c$

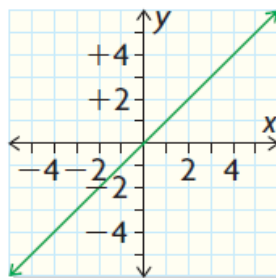
**Linear :**

$f(x) = x$

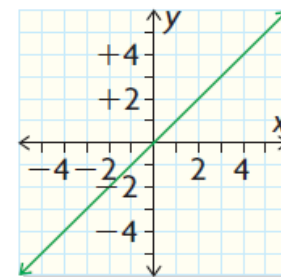
$g(x) = 2x$



$h(x) = (x - 3)$



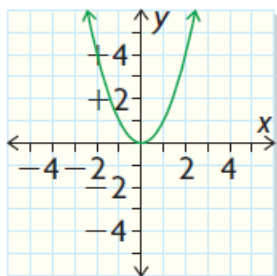
$k(x) = x + 4$



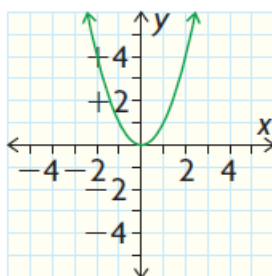
**Quadratic**

$f(x) = x^2$

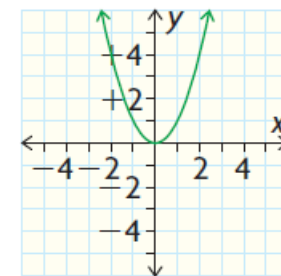
$g(x) = -2x^2$



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



$k(x) = x^2 + 4$



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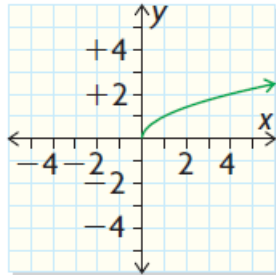
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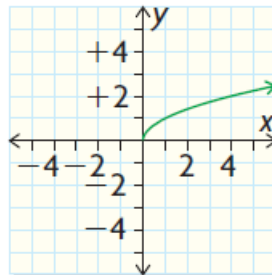
**Square Root**

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

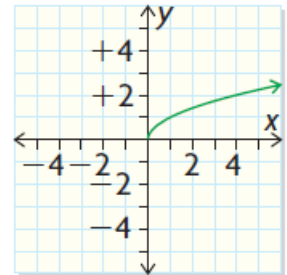
$$g(x) = -2\sqrt{x}$$



$$h(x) = \sqrt{x-3}$$

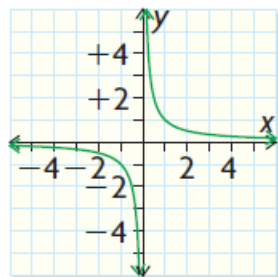


$$k(x) = \sqrt{x+4}$$

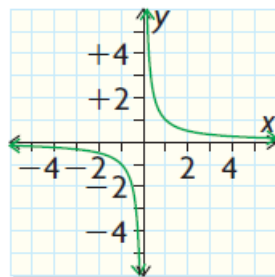
**Reciprocal**

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

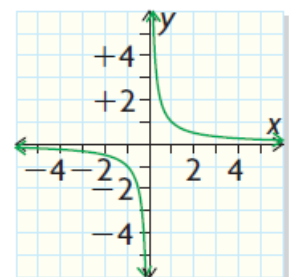
$$g(x) = \frac{-2}{x}$$



$$h(x) = \frac{1}{x-3}$$

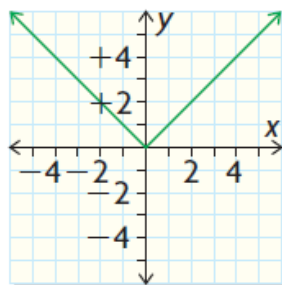


$$k(x) = \frac{1}{x} + 4$$

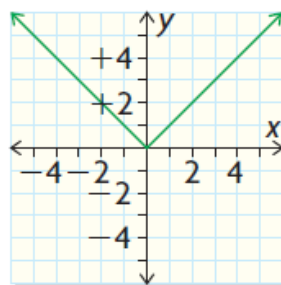
**Absolute Value**

$$f(x) = |x|$$

$$g(x) = -2|x|$$



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



$$k(x) = |x| + 4$$

