

Learning Target 20: I can describe the transformation(s) that changed a graph of $f(x)$ by replacing with $f(x) + k$, $f(x) - k$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative).

Graphs can change in the following ways:

1) Rigid Transformations

The **shape and size** of the parent graph **stays the same**.

The entire graph is just **moving position**.

Two types:

a) Translations (Shifts)

Just **moving around** the graph.

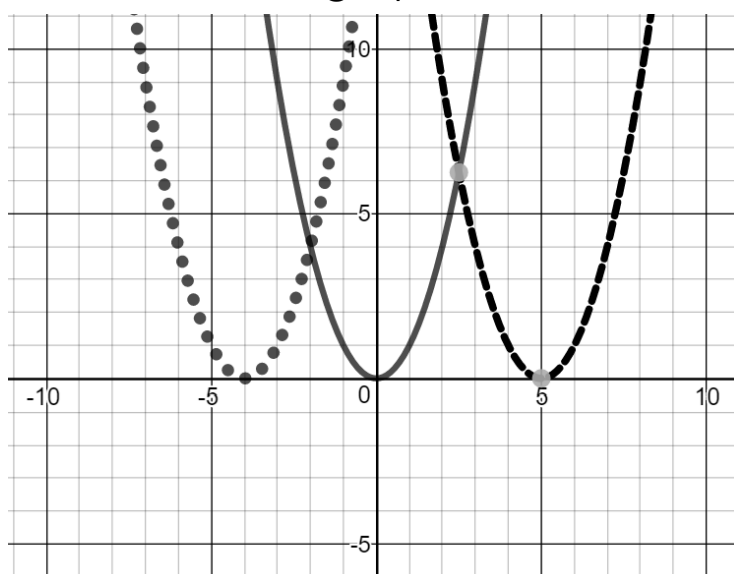
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Change in x 's – **horizontal** translation

(shifts the entire graph h units to the **right or left**)

$f(x - h)$ shifts the entire graph **right**

$f(x + h)$ shifts the entire graph **left**



change in x
 \rightarrow opposite
of what you
expect

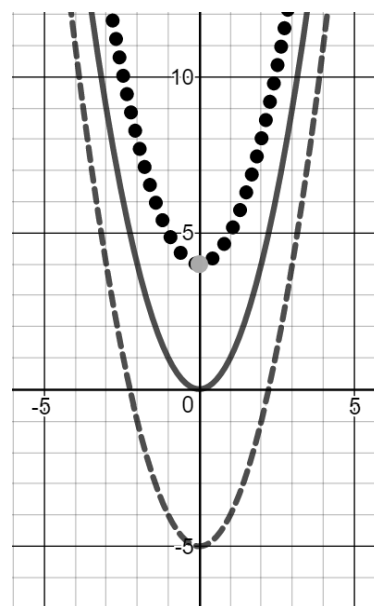
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Change in y 's – **vertical** translation

(shifts the entire graph k units **up or down**)

$f(x) + k$ shifts the entire graph **up**

$f(x) - k$ shifts the entire graph **down**



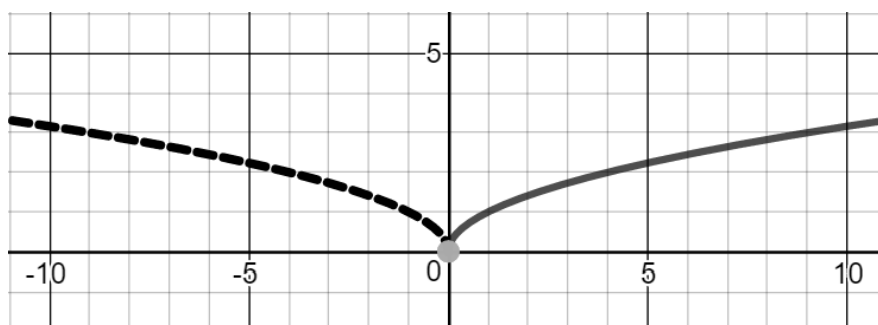
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b) Reflections

The **mirror image** of the graph over the **x - or y -axis**.

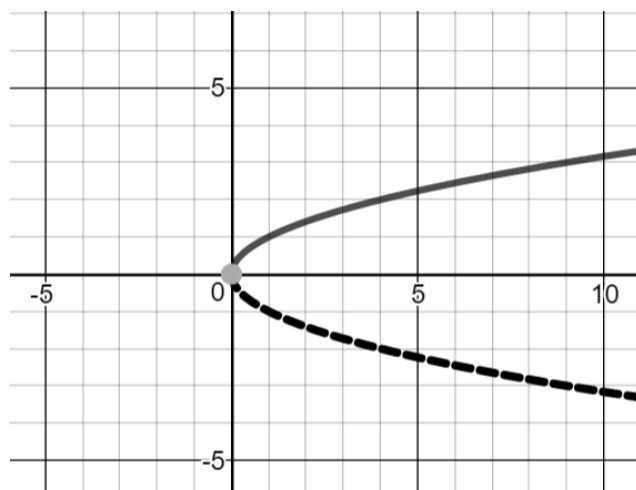
Change in x 's – reflected across the **y -axis**

$f(-x)$



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Change in y 's – reflected across the **x-axis**
-f(x)



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2) Non-Rigid Transformations (Dilations)

Causes a **distortion in the shape** of the parent graph.

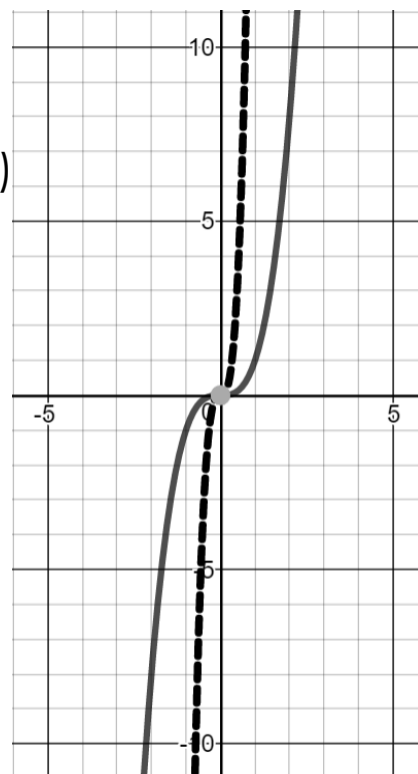
Stretch – **expands** the graph **away from the axes**

Compression (Shrink) – **compresses** the graph **to the axes**

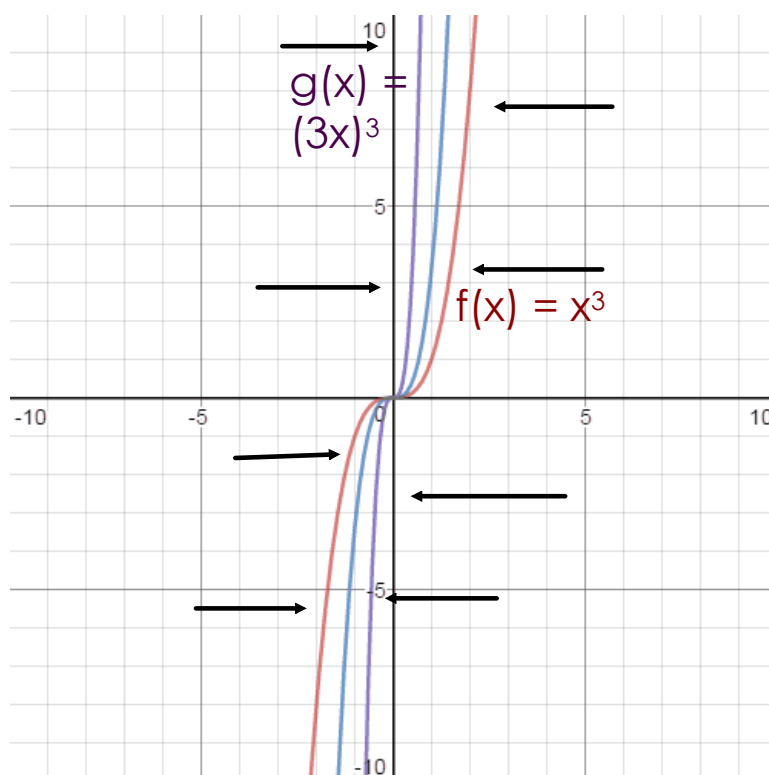
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Change in x's – **$f(bx)$**

If $b > 1$: **compresses (shrinks)** the graph **horizontally** (in the **x**-direction) by a factor of **b**.

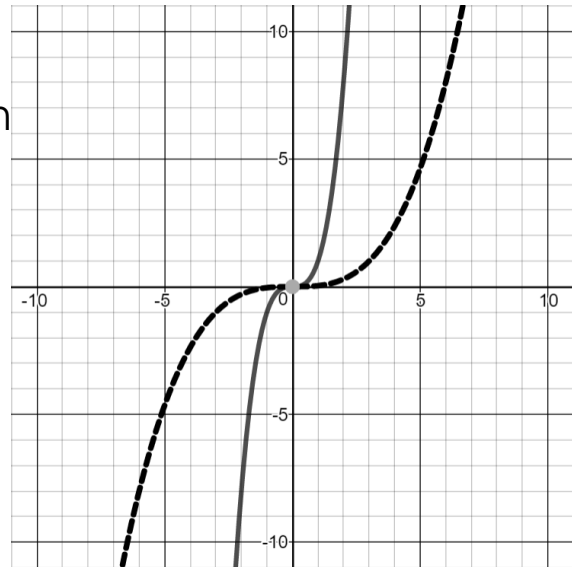


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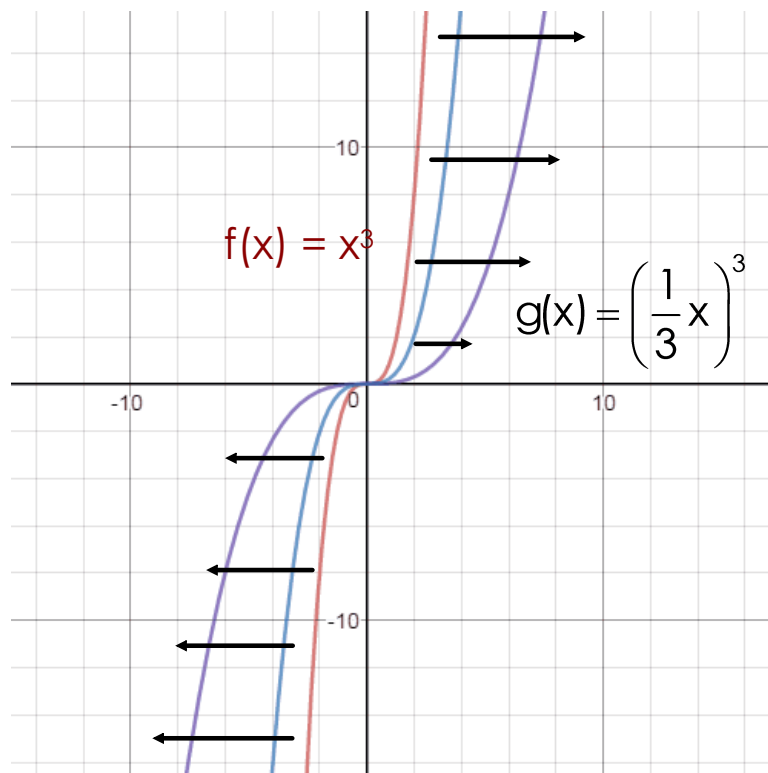


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Change in x's – **$f(bx)$**
 If $0 < b < 1$: **stretches** the graph
horizontally (in the **x**-direction)
 by a factor of **$1/b$** .



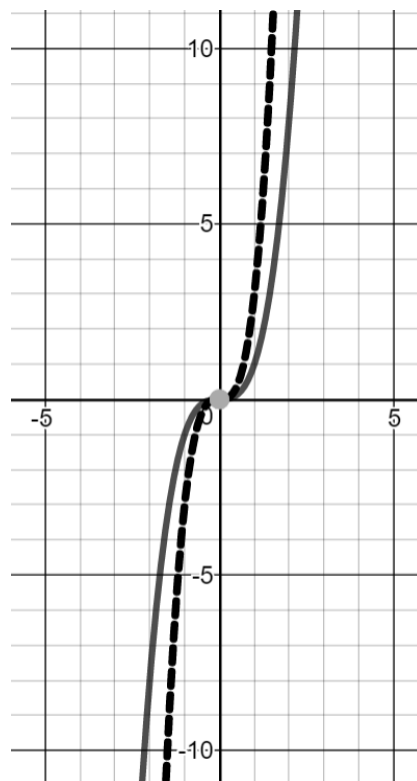
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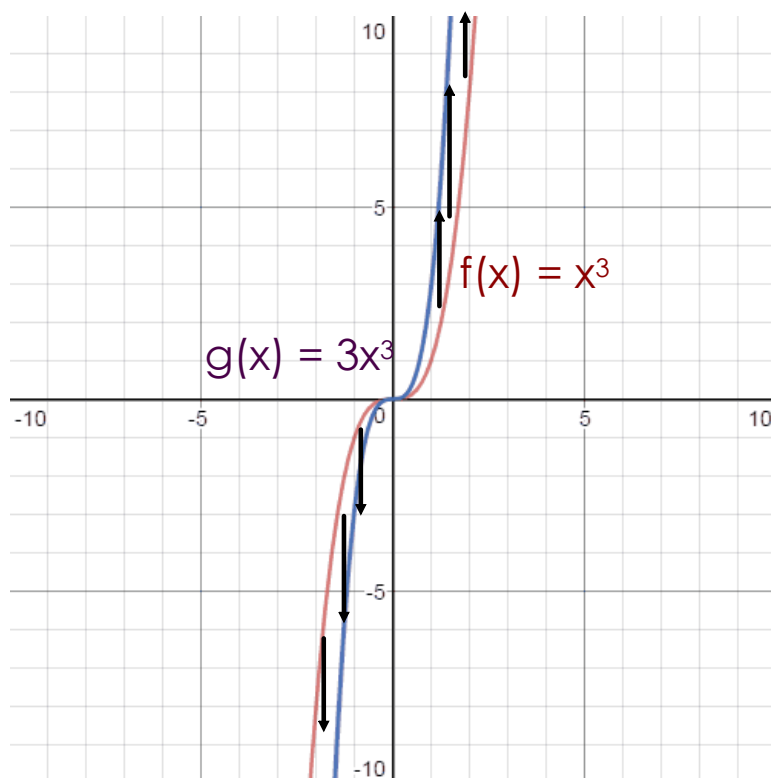
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Change in y's – **$a f(x)$**

If $a > 1$: **stretches** the graph **vertically** (in the **y**-direction) by a factor of **a** .

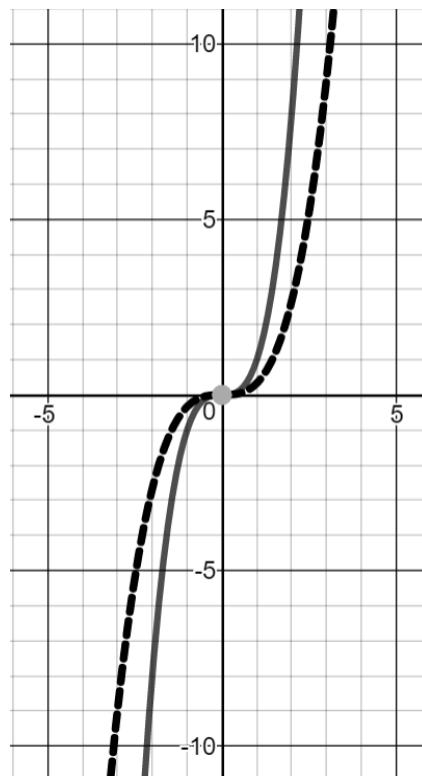


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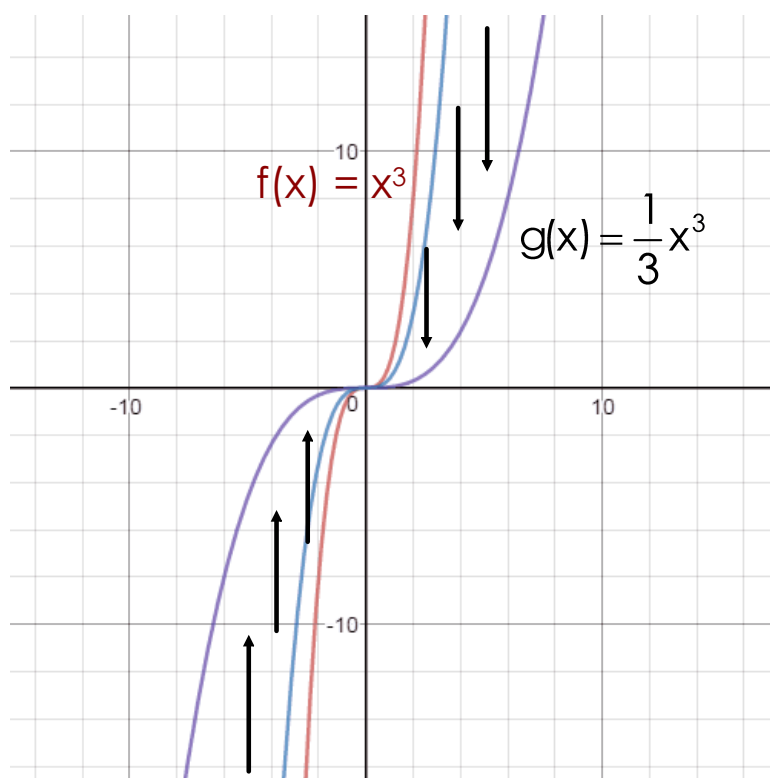


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Change in y 's – $a f(x)$
If $0 < a < 1$: **compresses (shrinks)**
the graph **vertically** (in the
 y -direction) by a factor of **$1/a$** .



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Dec 6-1:48 PM

Identify the parent function and determine how the new graph is different from the parent function.

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

Parent function: _____

Dec 5-11:04 PM

Identify the parent function and determine how the new graph is different from the parent function.

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

Parent function: _____

Dec 5-11:04 PM

Identify the parent function and determine how the new graph is different from the parent function.

$$f(x) = \frac{1}{3}\sqrt[3]{x} - 2$$

Parent function: _____

Dec 5-11:04 PM

Identify the parent function and determine how the new graph is different from the parent function.

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

Parent function: _____

Dec 5-11:04 PM

Identify the parent function and determine how the new graph is different from the parent function.

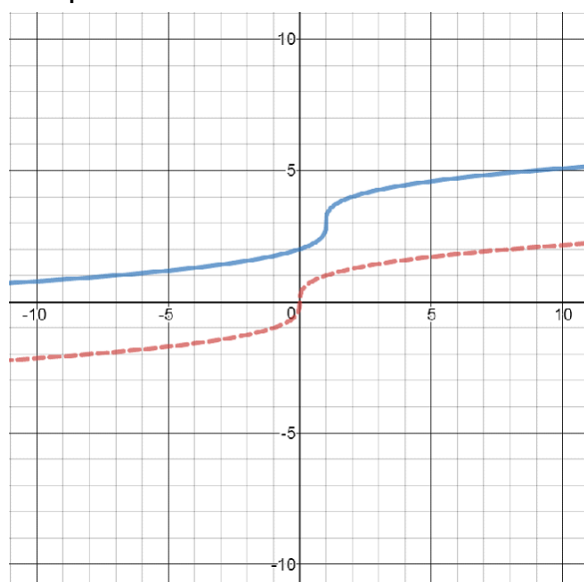
$$f(x) = -\left|\frac{1}{4}(x+2)\right| - 5$$

Parent function: _____

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Identify the parent function and determine how the new graph is different from the parent function.

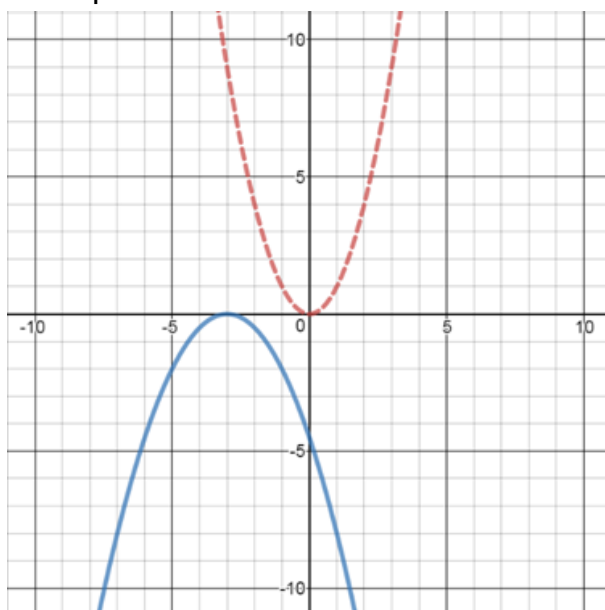
Parent Function: _____



Dec 7-1:35 PM

Identify the parent function and determine how the new graph is different from the parent function.

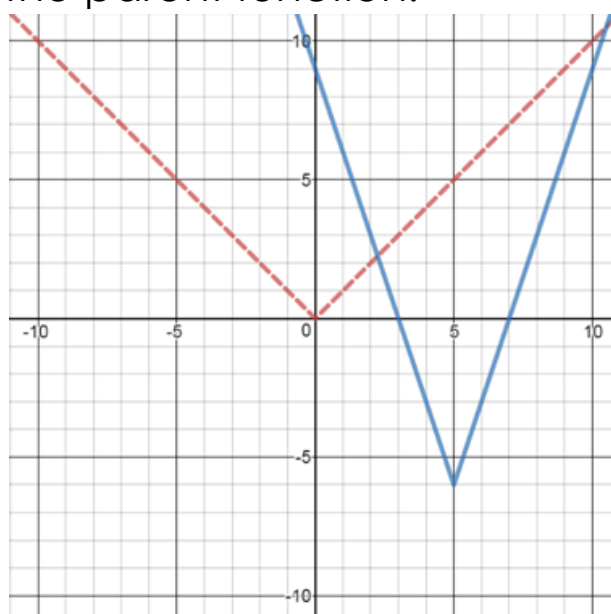
Parent Function: _____



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Identify the parent function and determine how the new graph is different from the parent function.

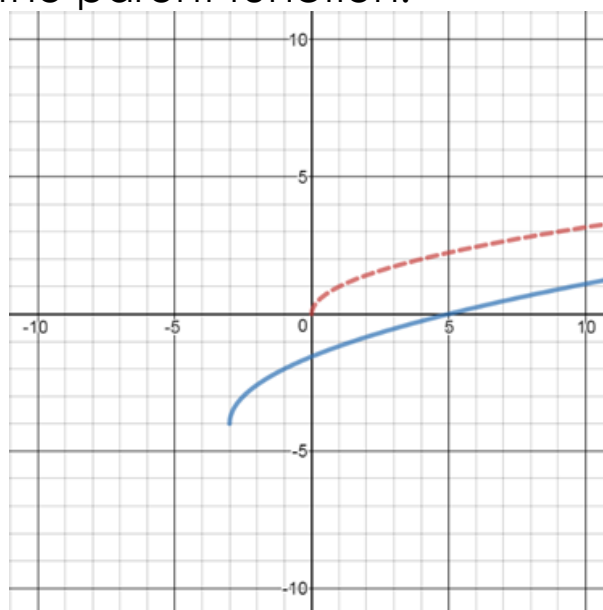
Parent Function: _____



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Identify the parent function and determine how the new graph is different from the parent function.

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