

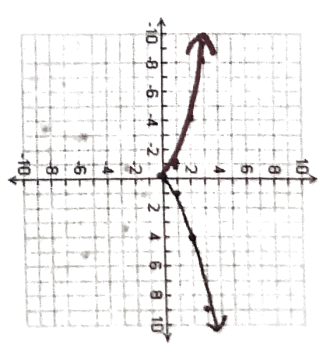
Horizontal Transformations

Equation	Equivalent Function Notation	Table	Graph												
$f(x) = (x - 3)^3$	$f(x) = x^3$ Graph $f(x - 3)$	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>f(x)</th> </tr> </thead> <tbody> <tr><td>1</td><td>-8</td></tr> <tr><td>2</td><td>-1</td></tr> <tr><td>3</td><td>0</td></tr> <tr><td>4</td><td>1</td></tr> <tr><td>5</td><td>8</td></tr> </tbody> </table>	x	f(x)	1	-8	2	-1	3	0	4	1	5	8	
x	f(x)														
1	-8														
2	-1														
3	0														
4	1														
5	8														
$f(x) = x + 4 $	$f(x) = x $ Graph $f(x + 4)$	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>f(x)</th> </tr> </thead> <tbody> <tr><td>-6</td><td>2</td></tr> <tr><td>-5</td><td>1</td></tr> <tr><td>-4</td><td>0</td></tr> <tr><td>-3</td><td>1</td></tr> <tr><td>-2</td><td>2</td></tr> </tbody> </table>	x	f(x)	-6	2	-5	1	-4	0	-3	1	-2	2	
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-6	2														
-5	1														
-4	0														
-3	1														
-2	2														
$f(x) = (2x)^2$	$f(x) = x^2$ Graph $f(2x)$	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>f(x)</th> </tr> </thead> <tbody> <tr><td>-1</td><td>4</td></tr> <tr><td>-1/2</td><td>1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1/2</td><td>1</td></tr> <tr><td>1</td><td>4</td></tr> </tbody> </table>	x	f(x)	-1	4	-1/2	1	0	0	1/2	1	1	4	
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1/2	1														
1	4														
$f(x) = \left(\frac{1}{2}x\right)^2$	$f(x) = x^2$ Graph $f\left(\frac{1}{2}x\right)$	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>f(x)</th> </tr> </thead> <tbody> <tr><td>-4</td><td>4</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>2</td><td>1</td></tr> <tr><td>4</td><td>4</td></tr> </tbody> </table>	x	f(x)	-4	4	-2	1	0	0	2	1	4	4	
x	f(x)														
-4	4														
-2	1														
0	0														
2	1														
4	4														

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

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

x	f(x)
0	0
-1	1
-4	2
-9	3



Summarize your findings about horizontal transformations:

Predict how each of these is different from the parent function:

a) $f(x) = \sqrt{x-100}$

right 100

b) $g(x) = x^3$

Graph $g(x+8)$
left 8

c) $h(x) = |2x|$

horizontal compression

d) $j(x) = x^2$

Graph: $j(-\frac{1}{5}x)$
horizontal stretch
reflect over y axis

2) Write an equation for a quadratic function shifted 5 units right

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

3) Write an equation for a cubic function horizontally stretched by a factor of $\frac{1}{5}$.

$$f(x) = (\frac{1}{5}x)^3$$

4) Write an equation for a square root function reflected across the y-axis.

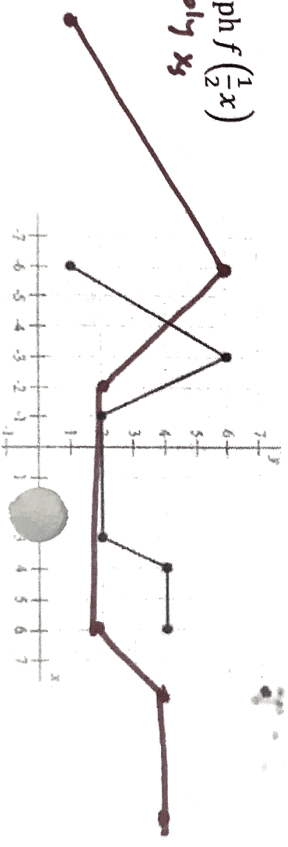
$$f(x) = \sqrt{-x}$$

5) Write an equation for a cube root function horizontally compressed by a factor of 5.

$$f(x) = \sqrt[3]{5x}$$

6) $f(x)$ is graphed to the right. Graph $f(\frac{1}{2}x)$

multiply x_2



Vertical Transformations

The y-values are affected

$$f(x) + b$$

Move graph up b units

$$f(x) - b$$

Move graph down b units

$$a \cdot f(x)$$

Stretch graph vertically (gets narrower) by a when $a > 1$
Compress graph vertically (gets wider) by a when $0 < a < 1$

$$-f(x)$$

Reflection across the x-axis

Horizontal Transformations

The x-values are affected

$$f(x + b)$$

Move graph left b units

$$f(x - b)$$

Move the graph right b units

$$f(a \cdot x)$$

Compress graph horizontally (gets narrower) by a when $a > 1$
Stretch graph horizontally (gets wider) by a when $0 < a < 1$

$$f(-x)$$

Reflect graph across the y-axis

Functions and Transformations HW 2

If the parent function is $f(x) = x^2$, describe in Words the Effect on the Parent Function

1. $f(x) + 10$
2. $f(x) - 10$
3. $f(x + 10)$
4. $f(x - 10)$
5. $f(10x)$
6. $f(x + 5)$
7. $10f(x)$
8. $\frac{1}{10}f(x)$
9. $-f(x)$
10. $f(-x)$
11. $f(x + 10) - 10$
12. $-f(x - 10)$