Mathematics 11U

1.8 –Transformations of Parent Functions

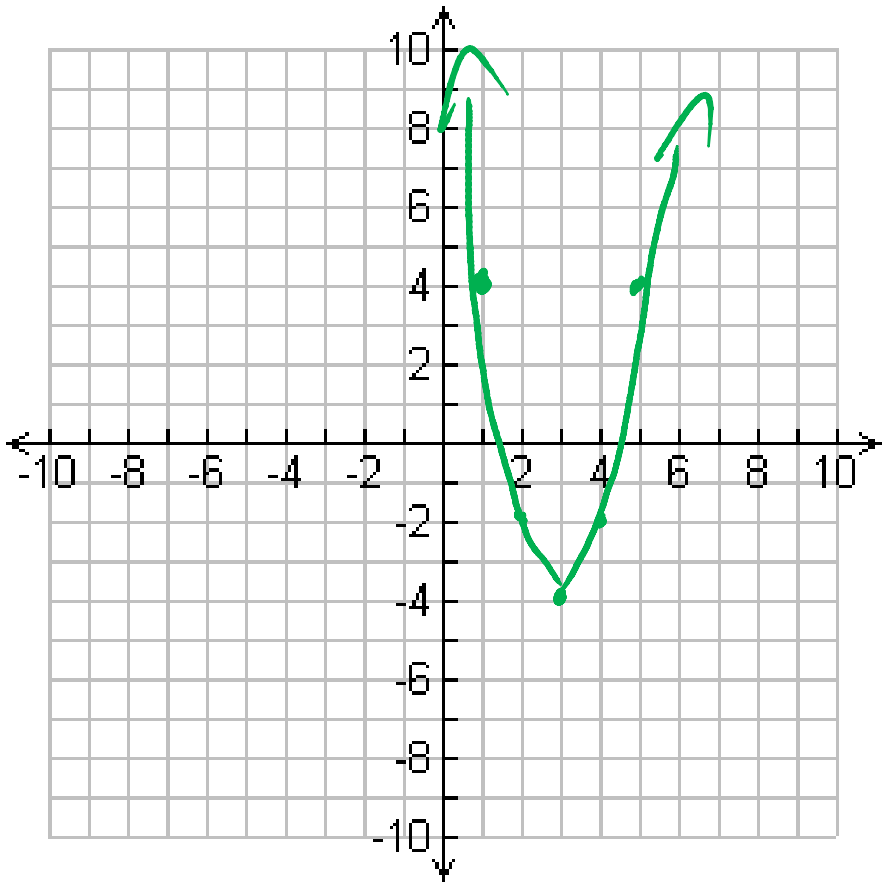
Mr. D. Hagen

$f(x)=af[k(x-d)]+c$

- a = vertical stretch – multiply with f(x) or y
- k = horizontal stretch – divide with x or multiply 1/k with x
- d = horizontal shift – add/subtract with x (always do the opposite)
- c = vertical shift – add/subtract with f(x) or y
- Notes:
  - vertical is outside the “function” while horizontal is inside.
  - k must be factored to get d.

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

- V. str of 2
- H. shift of +3
- V. shift of -4



$f(x) = x^2$

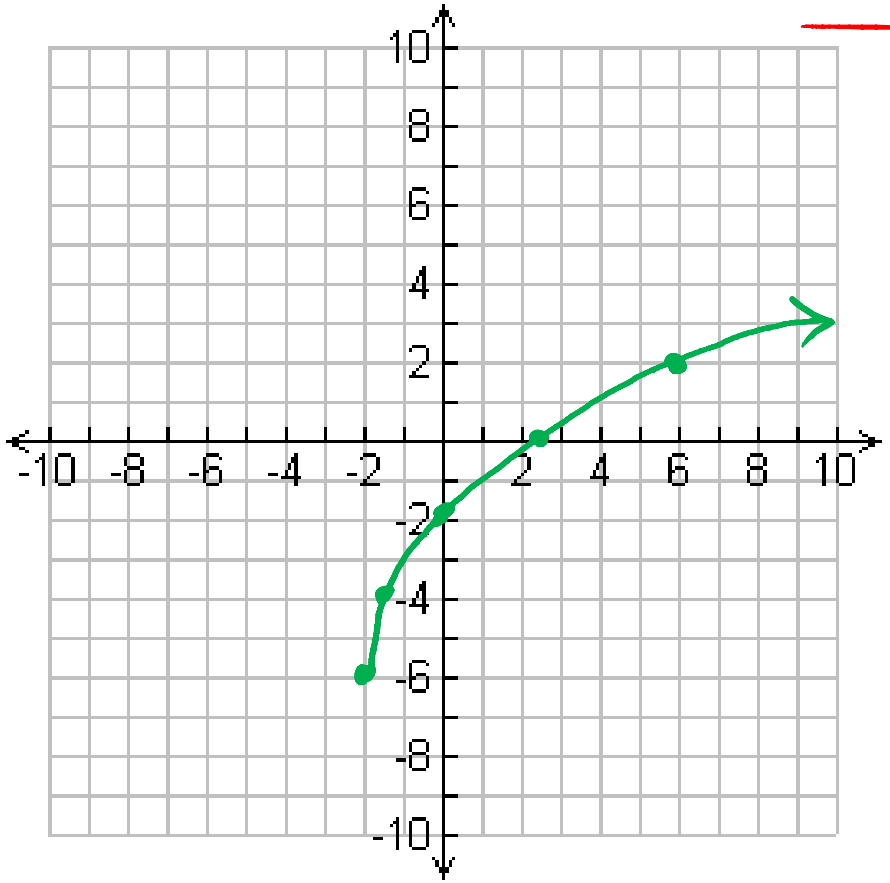
x	y
-2	4
-1	1
0	0
1	1
2	4

x+3	2y-4
1	4
2	-2
3	-4
4	-2
5	4

$$f(x) = 2\sqrt{2x+4} - 6$$

$2(x+2)$

- V. Str of 2
- H. Str of $\frac{1}{2}$
- H. Shift of -2
- V. shift of -6

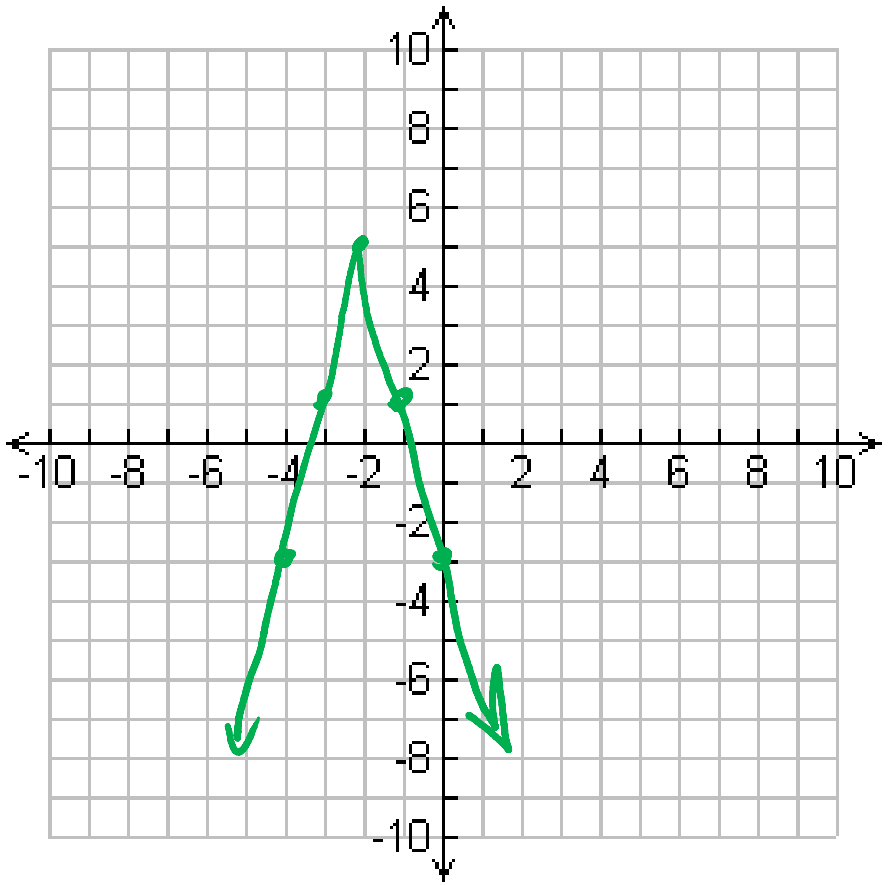


$f(x) = \sqrt{x}$

x	y	$\frac{1}{2}x - 2$	$2y - 6$
0	0	-2	-6
1	1	-1.5	-4
4	2	0	-2
9	3	2.5	0
16	4	6	2

$$f(x) = -4|x+2|+5$$

- V. Str of -4
- H. Sh of -2
- V. Sh of $+5$



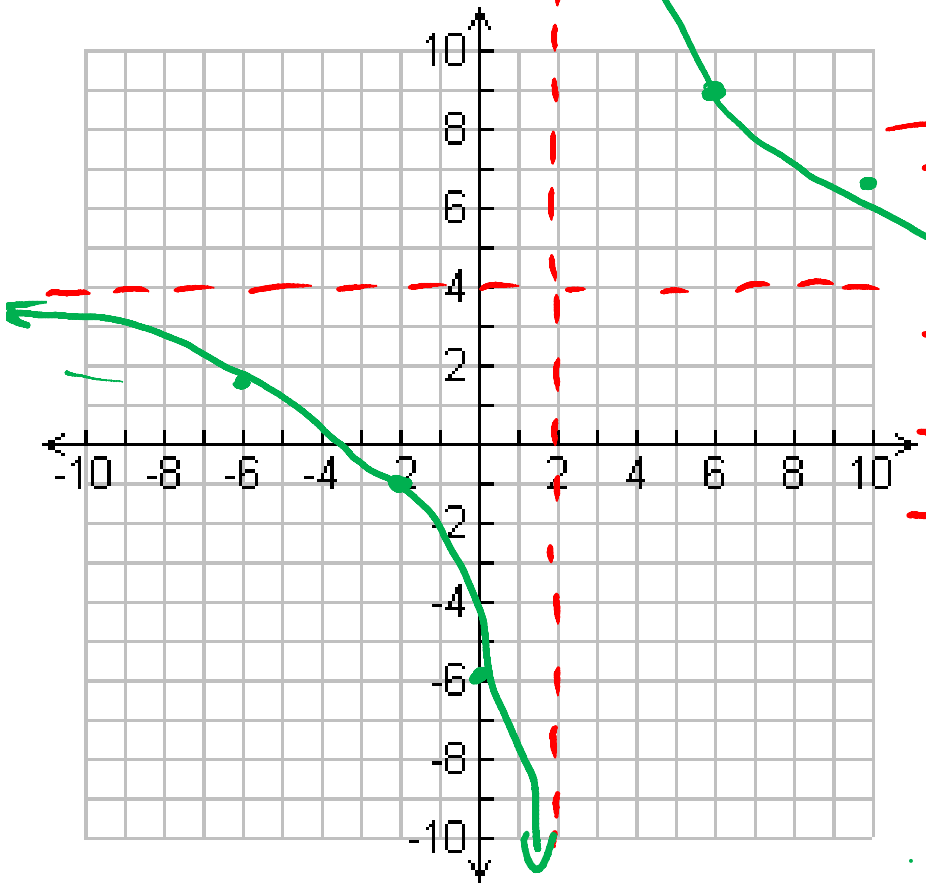
$f(x) = |x|$

x	y	$x-2$	$-4y+5$
-2	2	-4	-3
-1	1	-3	1
0	0	-2	5
1	1	-1	1
2	2	0	-3

$$f(x) = \frac{5^{a}}{\frac{1}{4}x - \frac{1}{2}} + 4$$

$\frac{1}{4}(x-2)$

- V. Str of 5
- H. Str of 4
- H. Shift of +2
- V. Shift of +4



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

x	y
-2	$-\frac{1}{2}$
-1	-1
$-\frac{1}{2}$	-2
0	0
$\frac{1}{2}$	2
1	1
2	$\frac{1}{2}$

$4x+2$	$5y+4$
-6	1.5
-2	-1
0	-6
2	4
4	14
6	9
10	6.5