Algebra 1: 3.6 General Forms for Parent Functions

Linear : $f(x) = a(x-h)+k$

Quadratic : $f(x) = a(x-h)^2+k$

Cubic : $f(x) = a(x-h)^3+k$

absolute value : $f(x) = a|x-h|+k$

radical : $f(x) = a\sqrt{x-h}+k$

Changing a, h, & k on <u>any</u> of the functions will do the same thing.

That is what we are learning about today.

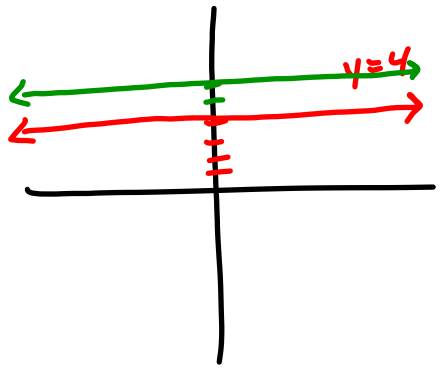
$$f(x) = a(x-h) + k$$

Changing k moves the graph Up or down
+ −

Ex: given $f(x)$, what transformation occurs if you had $f(x) + 2$

Answer: it moved up 2.

Ex: $f(x) = 4$ or $y = 4$



compare to $f(x) + 2$

$y = 4 + 2$

$y = 6$

it went up 2.

HW Ex:

* $f(x) = \frac{3}{5}x - 11$

k value -7 ↓ 7

$g(x) = f(x) - 7$

Describe the transformation from f to g.

g is the f function moved down 7 units

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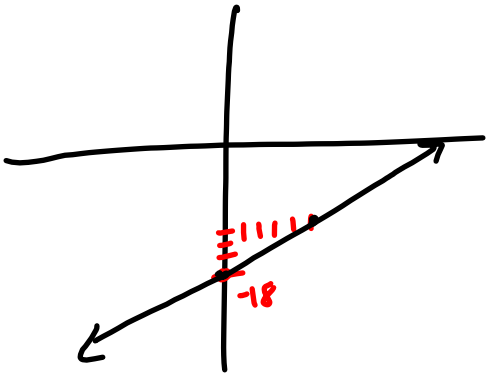
if you had to graph g...

$g = f - 7$

$g(x) = \frac{3}{5}x - 11 - 7$

so $g(x) = \frac{3}{5}x - 18$ so y-int: -18

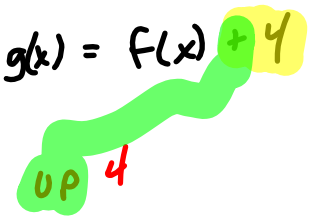
slope: $\frac{3}{5}$



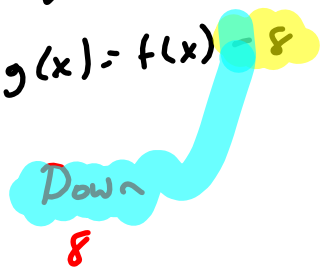
Ex: $f(x) = 2x + 15$

Describe the transformation from f to g.

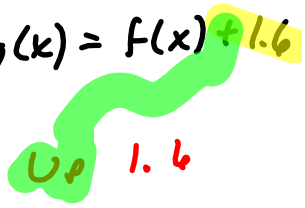
[1] $g(x) = f(x) + 4$



[2] $g(x) = f(x) - 8$



[3] $g(x) = f(x) + 1.6$



Changing h in the standard form.

h is the # inside the parentheses or unique function part.

given F(x)

an Example would be $f(x-4)$ moves right 4

$f(x+2)$ moves Left 2

Changing H.

Ex! $f(x) = -\frac{6}{5}x + 52$

describe the transformation

Since its in parentheses you know it is dealing with H.

1) $g(x) = f(x+3)$

Left 3

2) $g(x) = f(x-6)$

Right 6

3) $g(x) = F(x+\pi)$

Left π

Combining

Ex: $f(x) = 3|x+4| - 11$

1)

$g(x) = f(x-6) + 2$

Right 6

Up 2

2)

$g(x) = f(x+11) - 8$

Left 11

Down 8

Changing A.

Ex: $f(x) = \frac{3}{4}x - 8$

Describe the transformation

[1]

$g(x) = 3f(x)$

Vertical Stretch by 3

[2]

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

if a is negative it causes a Flip

And a vertical stretch by 2.

[3]

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

if a is a fraction, it shrinks instead of stretches.

Vertical Shrink by $\frac{1}{3}$

Combining Examples

given $f(x)$

Describe the transformation from f to g.

1

$g(x) = -2f(x+3) - 6$

Down 6

Left 3

Vertical Stretch by 2

Flips

2

$g(x) = \frac{1}{5}f(x-8) + 7$

Up 7

Right 8

Vertical shrink by $\frac{1}{5}$

3

$g(x) = -8f(x+5) + 9$

Up 9

Left 5

Vertical Stretch by 8

Flip

Desmos Demonstration of Standard Form:

https://www.desmos.com/calculator/kabjge1chr

Homework:

Pg 151

Numbers 7-10

HW

7. Down 3

8. Up 1

9. Left 5

10. Right 3.