Function Transformation

IHOP **I**nside, **H**orizontal, **Op**posite

$Af(B(x+C))+D$

A: Vertical Stretch/Compression

B: Horizontal Stretch/Compression

C: Horizontal Shift

D: Vertical Shift

Shifts

Seen through addition or subtraction either "inside" (horizontal) or "outside" (vertical) the function.

$f(x) = x^2 + 2$ has a vertical shift up 2 units

$f(x) = (x-4)^2$ has a horizontal shift right 4 units

Stretches and Compressions

Seen through multiplication either "inside" (horizontal) or "outside" (vertical) the function.

$f(x) = 2(x)^2$ is vertically stretched by 2.

$f(x) = (2x)^2$ is horizontally compressed by 2.

Combining Transformations

When dealing with multiple transformations, factor the equation out to $Af(B(x+C))+D$ to help with ordering.