lulumath

# Transformations of Functions from Descriptions Part II

Video Notes

Video Link

# Transformations of Functions from Descriptions

Background Knowledge:

- Transformations of Functions Part V

**Reminder:** $y = af(K(x-d))+c$ (Function Rule)

- $a$: vertical stretch or compression; vertical reflection
- $K$: horizontal stretch or compression; horizontal reflection; scale factor = $1/K$
- $d$: horizontal translation
- $c$: vertical translation

**SO IMPORTANT!!!!!!**

K MUST be factored out!

Find the equation of $h(x)$, a quadratic function, after performing the following transformations listed below on the parent function. Determine the domain and range of $h(x)$.

Parent Function: $f(x) = x^2$

$\{y \in \mathbb{R} \mid y \geq 0\}$

- Reflection in the $x$- and $y$-axes
- Translation four units left
- A horizontal compression with a scale factor of $\frac{2}{3}$
- A vertical stretch with a scale factor of 5

$\frac{1}{K} = \frac{-2}{3} \rightarrow K = \frac{-3}{2}$

$y = af(K(x-d))+c$

$a = -5 \quad K = -\frac{3}{2} \quad d = -4 \quad c = 0$

$y = -5\left(-\frac{3}{2}(x+4)\right)^2$

$y = -5\left(-\frac{3}{2}x - 6\right)^2$

Domain: $\{x \in \mathbb{R}\}$ $(-\infty, \infty)$

Range: $\{y \in \mathbb{R} \mid y \leq 0\}$ $(-\infty, 0]$