

Graphing All functions

→ Base Function : $g(x)$

Ex: $g(x) = \ln(x)$, $g(x) = e^x$, $g(x) = x^2$, $g(x) =$

→ Specific Function : $f(x)$

Ex: $f(x) = 3 + 2x^2$, $f(x) = 3\ln(x+1)$.

→ Get $f(x)$ in terms of its corresponding $g(x)$ function.

Manipulations of the Base functions

steps

1 $g(x-k)$: Horizontal translation, $(+k) = \rightarrow$, $(-k) = \leftarrow$.

3 $g(x)+k$: Vertical translation, $(+k) = \uparrow$, $(-k) = \downarrow$.

2 $\left\{ \begin{array}{l} g(-x) : \text{Reflect across } y\text{-axis,} \\ -g(x) : \text{Reflect across } x\text{-axis.} \end{array} \right.$

4 $\left\{ \begin{array}{l} K g(x) : \text{no general rule. } K > 1 = \text{"pull arrows"}, K < 1 = \text{"push arrows."} \\ g(Kx) : \text{no general rule.} \end{array} \right.$

The Order in which to evaluate the Manipulations

Horizontal

"Harvy"

Rotational $\left\{ \begin{array}{l} x\text{-axis} \\ y\text{-axis} \end{array} \right.$

Vertical

Ex: $f(x) = -(x-2)^2 + 3 = -g(x-2) + 3$, base function $g(x) = x^2$

1st $2 \rightarrow$

2nd rotate about x -axis

3rd $3 \uparrow$