

Function TransformationsHorizontal Translation: $f(x) \rightarrow f(x - a)$ $(x, y) \rightarrow (x + a, y)$ Horizontal dilation $f(x) \rightarrow f(bx)$ $(x, y) \rightarrow (x/b, y)$ Vertical dilation $f(x) \rightarrow cf(x)$ $(x, y) \rightarrow (x, cy)$ Vertical Translation: $f(x) \rightarrow f(x) + d$ $(x, y) \rightarrow (x, y + d)$ Reflection in x-axis $f(x) \rightarrow -f(x)$ $(x, y) \rightarrow (x, -y)$ Reflection in y-axis $f(x) \rightarrow f(-x)$ $(x, y) \rightarrow (-x, y)$

1. For each function, list the base function, describe the transformations and draw the function by transforming the base function.

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

b) $f(x) = 3 - \sqrt{x - 1}$

c) $f(x) = 1 - 2|x|$

d) $f(x) = \frac{-3}{(x + 2)^2}$

2. Write the equation for the final transformed graph:

a) $f(x) = x^3$ shift to the left 6 units:

b) $f(x) = |x|$ stretch vertically by a factor of 2, shift right 1, and shift up 3

3. Given the graph of $f(x)$, sketch the graphs of the transformations.

- a) $3 - f(x)$
- b) $f(2x)$
- c) $(1/2) f(x-1) - 2$
- d) $3 - f(2x - 1)$

