

2.6 Transformations of Functions

Name _____

Any given function may be translated to the up, down left, or right. It may also be translated about one of the axes or vertically stretched.

Transformation	Definition	Example
Up by k	$f(x) + k$	$f(x) + 5 = x^3 + 2x + 4$
Down by k	$f(x) - k$	$f(x) - 5 = x^3 + 2x - 6$
Right by k	$f(x - k)$	$f(x - 5) = (x - 5)^3 + 2(x - 5) - 1$
Left by k	$f(x + k)$	$f(x + 5) = (x + 5)^3 + 2(x + 5) - 1$
Reflect about x -axis	$-f(x)$	$-f(x) = -(x^3 + 2x - 1)$
Reflect about y -axis	$f(-x)$	$f(-x) = (-x)^3 + 2(-x) - 1$
[Vertical stretch by k]	$k \cdot f(x)$	$5f(x) = 5(x^3 + 2x - 1)$

1. Given $g(t) = \frac{1}{t} + \frac{t}{2}$:

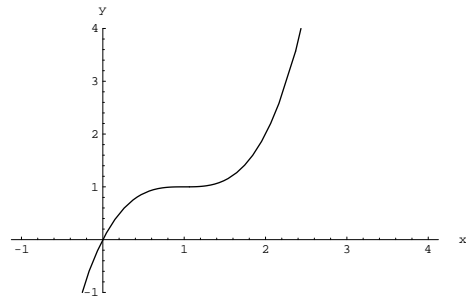
a) Translate the equation of $g(t)$ up by 3 and right by 3.

b) Reflect the equation of $g(t)$ about the y -axis then translate right 1.

c) Reflect the equation of $g(t)$ about the x -axis then translate down 3.

[d) Stretch the equation of $g(t)$ vertically by a factor of 2 and translate down 1.]

2. Given $f(x) = x^3 - 3x^2 + 3x$:



a) Graph $f(x)$ translated up by 1 and right by 3.

b) Graph $f(x)$ reflected about the y -axis then translate right 1.

c) Graph $f(x)$ reflected about the x -axis then translate down 3.

[d) Graph $f(t)$ stretched vertically by a factor of $1/2$.]