

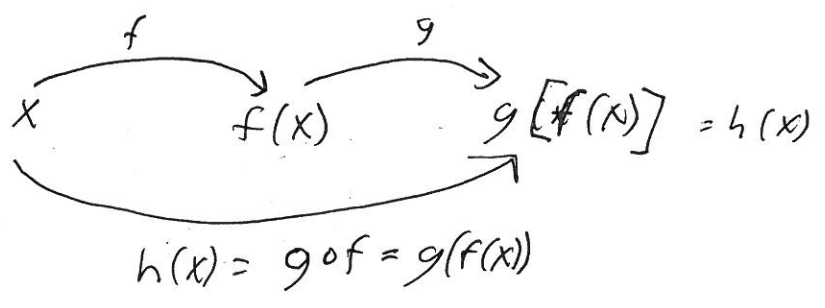
$$R(x) - C(x) = P(x) \\ = (R - C)(x)$$

Note

$$f + g = (f + g)(x) = f(x) + g(x)$$
$$f - g = (f - g)(x) = f(x) - g(x)$$
$$fg = (fg)(x) = f(x)g(x)$$
$$f/g = (f/g)(x) = f(x)/g(x)$$

composition

$$(f \circ g)(x) = f(g(x))$$



EX

$$f(x) = x^2 - 1 \qquad g(x) = \sqrt{x} + 1 \qquad h(x) = \sqrt{x + 1}$$

$$(f \circ g)(x) = f(g(x)) = (g(x))^2 - 1$$
$$= (\sqrt{x} + 1)^2 - 1$$
$$= (\sqrt{x} + 1)(\sqrt{x} + 1) - 1$$
$$= (\sqrt{x})^2 + \sqrt{x} + \sqrt{x} + 1 - 1$$
$$= x + 2\sqrt{x}$$

~~$(h \circ f)(x)$~~

$$(h \circ f)(x) = h(f(x)) = \sqrt{(f(x)) + 1}$$
$$= \sqrt{(x^2 - 1) + 1}$$
$$= \sqrt{x^2 - 1 + 1}$$
$$= \sqrt{x^2}$$
$$= x$$

Domain of $f(x) = (x+3)^{7/2} = \sqrt{x+3}^7$

if the inside $(x+3)$ is negative, then we can't take the square root, so we need $x+3$ to be larger than or equal zero to be in the domain

$$x+3 \geq 0 \Rightarrow x \geq -3$$

note, we can also determine this by considering the transformations involved

graph $g(x) = \begin{cases} x-3 & x \geq 3 \\ -x+3 & x < 3 \end{cases}$ using color 1
using color 2

x	g(x)
-2	5
0	3
2	1
3	0
4	1
6	3

