Chapter 1.7: Combinations of Functions and Composite Functions

pay attention to domain and the x value.

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

$(g \circ f)(x)$ $(f \circ g)(x)$ $\left(\frac{f}{g}\right)(x)$

Let $f(x) = x^2 - 3$ and $g(x) = 4x + 5$

$(f+g)(x)$

$f(x) + g(x)$

$x^2 - 3 + (4x+5)$

$x^2 + 4x + 2$

$(f+g)(3)$

$3^2 + 4(3) + 2$

$9 + 12 + 2$

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Domain is the common domain

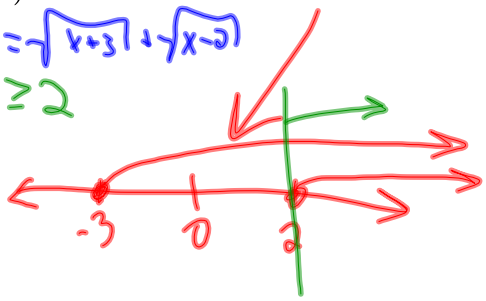
Let $f(x) = \sqrt{x+3}$ and $g(x) = \sqrt{x-2}$

$x \geq -3$ $x \geq 2$

$(f+g)(x)$ Domain?

$(f+g)(x) = \sqrt{x+3} + \sqrt{x-2}$

$x \geq 2$



$f(x) = 2x - 1 \quad g(x) = x^2 + x - 2$

also determine the domain for each.

$(f - g)(x)$ $(fg)(x)$ $\left(\frac{f}{g}\right)(x)$

$(2x-1)(x^2+x-2)$

$2x^3 + 2x^2 - 4x$

$+ \quad -x^2 - x + 2$

$2x^3 + x^2 - 5x + 2$

$\frac{2x-1}{x^2+x-2}$

$x \in \mathbb{R} \mid x \neq -2, 1$

Composite Functions:

$(f \circ g)(x)$

$f(g(x))$

$(g \circ f)(x)$

$g(f(x))$

x is the domain of g and g is the domain of f.

$f(x) = 3x - 4$ $g(x) = x^2 + 6$

$(f \circ g)(x)$

$f(g(x))$

$f(x^2+6)$

$3(x^2+6) - 4$

$3x^2 + 18 - 4$

$3x^2 + 14$

$(g \circ f)(x)$

$g(f(x))$

$g(3x-4)$

$(3x-4)^2 + 6$

$(3x-4)(3x-4) + 6$

$9x^2 - 24x + 16 + 6$

$9x^2 - 24x + 22$

$f(x) = \frac{2}{x-1}$

$x \in \mathbb{R} \mid x \neq 1$

$g(x) = \frac{3}{x}$

$x \in \mathbb{R} \mid x \neq 0$

$(f \circ g)(x)$

Domain?

$f(g(x))$

$f\left(\frac{3}{x}\right)$

$\frac{2}{\frac{3-x}{x}}$

$\frac{2x}{3-x}$

$x \in \mathbb{R} \mid x \neq 1, x \neq 0, x \neq 3$

Decomposing Functions:

Breaking the functions apart, kind of like factoring.

$$h(x) = \sqrt[3]{x^2 + 1}$$

$f(x) = \sqrt[3]{x}$ $g(x) = x^2 + 1$

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

Homework: Chapter 1.7 pg.206
#'s 3,11,15,17,25,31,43