Precalculus

1-08 Combinations of Functions

Combining Functions

- Add $(f+g)(x) = f(x) + g(x)$
- Subtract $(f-g)(x) = f(x) - g(x)$
- Multiply $(fg)(x) = f(x)g(x)$
- Divide $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

If $f(x) = x + 2$ and $g(x) = x - 2$, find

$(f+g)(x)$

$(f-g)(x)$

$(fg)(x)$

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

Composition

- $(f \circ g)(x) = f\big(g(x)\big)$
- _____ g into f

If $f(x) = x^2$ and $g(x) = x - 1$, find

$f \circ g$

$g \circ f$

- Domain of $(f \circ g)$ is all x in domain of _____ such that _____ is in the domain of _____.
- $x \to g \to f$

If $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{x}$, find the domain of $f \circ g$

Decompose

- Find $f(x)$ and $g(x)$ so that $(f \circ g)(x) = h(x)$
- Pick a portion to be $g(x)$, then replace that with x to get $f(x)$

Decompose $h(x) = 2|x+3|$

Decompose $h(x) = \sqrt[3]{\frac{8-x}{5}}$