

Friday, September 2, 2016

- 1.4 - Function Composition
- HW - on calendar (or MML)

Have a great 3 day weekend!!!



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1.4 - Building Functions

$$f(x) = x^2$$

Dom: $(-\infty, \infty)$

$$g(x) = \sqrt{x+1}$$

Dom: $[-1, \infty)$

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

Dom: $[-1, \infty)$

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

Dom: $[-1, \infty)$

$$(fg)(x) = f(x) \cdot g(x) = x^2 \sqrt{x+1}$$

Dom: $[-1, \infty)$

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{x^2}{\sqrt{x+1}}$$

Dom: $(-1, \infty)$

Function Composition

plug one function into another function for the variable

$$\sin(x^2) \begin{matrix} \rightarrow \sin(x) \\ \downarrow x^2 \end{matrix}$$

* $(f \circ g)(x) = f(g(x))$ * put $g(x)$ into $f(x)$ for x *

* $(g \circ f)(x) = g(f(x))$ * put $f(x)$ into $g(x)$ for x , *

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

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

Domain: $[-1, \infty)$ (see $g(x)$ function)

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

Domain: $x^2+1 \geq 0$
 $x^2 \geq -1$ always true -
no restriction
 $(-\infty, \infty)$

⑩ $f(g(1)) = f(5) = 3(5) = \boxed{15}$

$g(1) = 1+4=5$