

## Pre calc A      Composition Functions

3-6

warm up:

$$f(x) = x^2 - 5$$

$$g(x) = x + 2$$

a)  $f(-3)$

b)  $g(-5)$

c)  $f(x-3)$

d)  $g(a-8)$

## Pre calc A Composition Functions

3-6

warm up:

$$f(x) = x^2 - 5$$

$$g(x) = x + 2$$

a)  $f(-3) = 4$

b)  $g(-5) = -3$

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

d)  $g(a-8) = a - 6$

$$f(x) = x^2 - 5$$

$$f(x-3) = (x-3)^2 - 5$$

$$f(x) = x^2 - 5 \quad g(x) = x + 2$$

$$\text{e) } (f \circ g)(x) = f(g(x)) = f(x+2)$$

$$\text{f) } (g \circ f)(x) = (x^2 - 5) + 2$$

$$f(x) = x^2 - 5 \quad g(x) = x + 2$$

$$\begin{aligned} \text{e) } (f \circ g)(x) &= f(g(x)) = f(x+2) \\ &= (x+2)^2 - 5 \\ &= (x+2)(x+2) - 5 \\ &= x^2 + 4x + 4 - 5 \\ &= x^2 + 4x - 1 \end{aligned}$$

$$\begin{aligned} \text{f) } (g \circ f)(x) &= g(f(x)) = g(x^2 - 5) \\ g(x) &= x + 2 \\ &= (x^2 - 5) + 2 \\ &= x^2 - 5 + 2 \\ &= x^2 - 3 \end{aligned}$$

$$2) \quad f(x) = \sqrt{x-4} \quad g(x) = 2x-3$$

$$a) \quad (f \circ g)(x)$$

$$b) \quad (g \circ f)(x)$$

$$c) \quad (f \circ g)(-2)$$

$$2) f(x) = \sqrt{x-4} \quad g(x) = 2x-3$$

$$\begin{aligned} \text{a) } (f \circ g)(x) &= f(g(x)) = f(2x-3) \\ &= \sqrt{(2x-3)-4} \\ &= \sqrt{2x-3-4} \\ &= \sqrt{2x-7} \end{aligned}$$

$$\begin{aligned} \text{b) } (g \circ f)(x) &= g(f(x)) = g(\sqrt{x-4}) \\ &= 2(\sqrt{x-4}) - 3 \\ &= 2\sqrt{x-4} - 3 \end{aligned}$$

$$\begin{aligned} \text{c) } (f \circ g)(-2) &= f(g(-2)) \quad \text{side Note: } g(-2) = 2(-2) - 3 \\ &= f(-7) \quad \quad \quad = -4 - 3 \\ &= \sqrt{(-7)-4} \quad \quad \quad g(-2) = -7 \\ &= \sqrt{-11} \\ &= i\sqrt{11} \end{aligned}$$

$$3) \quad f(x) = \frac{3x}{x-1} \quad g(x) = \frac{2}{x}$$

$$a) \quad (f \circ g)(x)$$

$$b) \quad (g \circ f)(x)$$

$$c) \quad (g \circ f)(-3)$$

3)  $f(x) = \frac{3x}{x-1}$        $g(x) = \frac{2}{x}$

a)  $(f \circ g)(x) = f(g(x)) = f\left(\frac{2}{x}\right) = \frac{3\left(\frac{2}{x}\right)}{\left(\frac{2}{x}\right) - 1}$

$$= \frac{\frac{6}{x}}{\frac{2}{x} - 1} = \frac{\frac{6}{x}}{\frac{2-x}{x}}$$

double deckers are a problem!

$$\frac{\frac{6}{x} \left(\frac{x}{2-x}\right)}{\frac{2-x}{x} \left(\frac{x}{2-x}\right)} = \frac{6 \cdot x}{x(2-x)}$$

$$= \frac{6}{2-x}$$

b)  $(g \circ f)(x) = g(f(x)) = g\left(\frac{3x}{x-1}\right)$

$$= \frac{2}{\left(\frac{3x}{x-1}\right) \left(\frac{x-1}{3x}\right)}$$

$$= \frac{2(x-1)}{3x}$$

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

c)  $(g \circ f)(-3) = g(f(-3))$       side note:  $f(-3) = \frac{3(-3)}{(-3)-1}$

$$= g(2.25)$$

$$= \frac{2}{(2.25)}$$

$$= .88$$

$$= \frac{-9}{-4}$$

$$= \frac{9}{4}$$

$$f(-3) = 2.25$$



$$4) \quad f(x) = x + 2 \quad g(x) = x^2 \quad h(x) = 5x$$

$$a) \quad f(g(h(x)))$$

$$b) \quad h(f(g(x)))$$

$$c) \quad g(h(f(3)))$$

$$4) \quad f(x) = x+2 \quad g(x) = x^2 \quad h(x) = 5x$$

$$a) \quad f(g(h(x))) = f(g(5x)) = f((5x)^2) \\ = f(25x^2) \\ = (25x^2) + 2$$

$$b) \quad h(f(g(x))) = h(f(x^2)) = h(x^2 + 2) \\ = 5(x^2 + 2) \\ = 5x^2 + 10$$

$$c) \quad g(h(f(3))) = g(h(3+2)) = g(h(5)) \\ = g(5(5)) \\ = g(25) \\ = (25)^2 \\ = 625$$

HW #20  
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# 9-33  
every other odd



Also due Friday 11/8