

9/29/15

## #11 Operations w/ Functions

Adding:  $f(x) + g(x) = (f+g)(x)$

Subtracting:  $f(x) - g(x) = (f-g)(x)$

Multiplying:  $f(x) \cdot g(x) = (f \cdot g)(x)$

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

(Ex1)  $g(x) = 2x - 1$ ,  $f(x) = 6x^2 + 7x - 5$

(A)  $(g+f)(x) = (2x-1) + (6x^2 + 7x - 5)$   
 $6x^2 + 9x - 6$

(B)  $(f-g)(x) = 6x^2 + 7x - 5 - (2x - 1)$   
 $6x^2 + 7x - 5 - 2x + 1$   
 $6x^2 + 5x - 4$

yesterday

(C)  $f(3) = 6(3)^2 + 7(3) - 5$   
 $6(9) + 21 - 5$   
 $54 + 21 - 5$

$$75 - 5 = 70$$

(Ex2)  $f(x) = 3x + 8$ ,  $h(x) = 2x - 12$

(A)  $(h+f)(x) = 2x - 12 + 3x + 8$   
 $5x - 4$

(B)  $(f-h)(x) = 3x + 8 - (2x - 12)$   
 $3x + 8 - 2x + 12$   
 $1x + 20$



$h(x) = 2x - 12, f(x) = 3x + 8$

(c)  $(h \circ f)(x) = (2x - 12)(3x + 8)$

	$2x$	$-12$
$3x$	$6x^2$	$-36x$
$8$	$16x$	$-96$

$6x^2 - 20x - 96$

Yesterday

(d)  $f(-1) = 3(-1) + 8 = -3 + 8 = 5$

You try

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

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

(2)  $h(x) = 3x + 3$   
 $g(x) = -4x + 1$   
 Find  $(h+g)(10)$

$(h+g)(x) = 3x + 3 - 4x + 1$   
 $-x + 4$   
 $(h+g)(10) = -10 + 4$   
 $-6$

(3)  $g(t) = 2t + 5$   
 $f(t) = -t^2 + 5$   
 Find  $(g+f)(2)$

$(g+f)(t) = 2t + 5 - t^2 + 5$   
 $-t^2 + 2t + 10$   
 $-(2)^2 + 2(2) + 10$   
 $-4 + 4 + 10$   
 $10$



← Continued (Operations of Functions)

## Composite Function

(Ex1)  $g(x) = (x^2 + 3)$        $f(x) = (2x - 5)$

$$f(g(x)) = 2(x^2 + 3) - 5 = 2x^2 + 6 - 5 = 2x^2 + 1$$

Replace  $x$  in  
 $f$  function  
with  $g$  function

$$g(f(x)) = (2x - 5)^2 + 3$$
$$(2x - 5)(2x - 5) + 3$$
$$4x^2 - 10x - 10x + 25 + 3$$
$$4x^2 - 20x + 28$$

$2x - 5$
$2x$
$-5$

(Ex2)  $f(g(x)) = (f \circ g)(x)$

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

$$g(x) = 5x - 10$$

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

$$g(f(2)) = (g \circ f)(2)$$

$$f(2) = 2(2)^2 - 2 + 3 =$$

$$2 \cdot 4 - 2 + 3 =$$

$$8 - 2 + 3 = 9$$

$$f(2) = 9$$

$$g(f(2)) = g(9) = 5(9) - 10 = 35$$



(Ex 3)  $h(x) = 2x - 7$        $g(x) = x^2 - 7x + 7$

(A)  $h(g(s))$

$(h \circ g)(s)$

$$g(s) = 5^2 - 7(s) + 7$$

$$25 - 35 + 7$$

$$-10 + 7$$

$$g(s) = -3$$

$$h(g(s)) = 2(-3) - 7$$

$$= -6 - 7$$

$$h(g(s)) = -13$$

(B)  $g(h(-1)) =$

$(g \circ h)(-1)$

$$h(-1) = 2(-1) - 7$$

$$h(-1) = -9$$

$$g(h(-1)) = (-9)^2 - 7(-9) + 7$$

$$81 + 63 + 7$$

$$g(h(-1)) = 151$$