

Questions from homework: Operations of Functions Worksheet

$$\begin{aligned} \textcircled{13} \quad & g(x) = -x + 5 \\ & h(x) = x + 2 \\ & \text{Find } g(x) \div h(x) = \boxed{\frac{-x+5}{x+2}} \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad & g(x) = 4x + 5 \\ & f(x) = 4x + 1 \\ & g(x) - f(x) = 4x + 5 - (4x + 1) \\ & = 4x + 5 - 4x - 1 \\ & = 4 \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad & 2n + 1 = g(n) \\ & 3n - 2 = h(n) \\ & g(n) - h(n) \\ & 2n + 1 - (3n - 2) \\ & 2n + 1 - 3n + 2 \\ & -n + 3 \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad & g(n) = 3n - 2 \\ & f(n) = n - 1 \\ & g(n) \cdot f(n) \\ & (3n - 2)(n - 1) \\ & 3n^2 - 3n - 2n + 2 \\ & 3n^2 - 5n + 2 \end{aligned}$$

**Warm-up: after Operation of functions**

Name: \_\_\_\_\_  
Period: \_\_\_\_\_

**SHOW YOUR WORK** as demonstrated in class notes

What is the domain and range of the relation? Is the relation a function?

1.  $\{(2,6), (-3,9), (6,-4), (3,7), (-3,-4), (11,0), (0,10)\}$

D:  $\{2, -3, 6, 3, 11, 0\}$   
R:  $\{6, 9, -4, 7, 0, 10\}$   
Function? **Not**

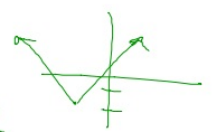
2. 

x	3	8	11	8	7
y	10	8	0	9	2

D:  $\{3, 8, 11, 8, 7\}$   
R:  $\{10, 8, 0, 9, 2\}$   
Function? **Not**

3.  $f(x) = |x+4| - 2$

D:  $\mathbb{R}$   
R:  $y \geq -2$   
Function? **yes**



4. Domain only for  $f(x) = \frac{1}{x+2}$

D:  $\mathbb{R}$  ex.  $x \neq -2$

If  $f(x) = 5x+1$ ,  $g(x) = x-7$ , and  $h(x) = 3x^2 - 5x + 2$ , find the following:

5.  $f(-3) = 5(-3) + 1$   
 $= -15 + 1$   
 $= -14$

6.  $h(-1) = 3(-1)^2 - 5(-1) + 2$   
 $= 3(1) + 5 + 2$   
 $= 10$

7.  $2f(x) = 2(5x+1)$   
 $= 10x + 2$

7.  $f(x) + g(x) =$   
 $\underline{5x+1} + \underline{x-7}$   
 $6x - 6$

8.  $f(x) - h(x) =$   
 $5x+1 - (3x^2 - 5x + 2)$   
 $5x+1 - 3x^2 + 5x - 2$   
 $-3x^2 + 10x - 1$

9.  $f(x) \cdot g(x) =$   
 $(5x+1)(x-7)$   
 $5x^2 - 35x + x - 7$   
 $5x^2 - 34x - 7$

## Composition of Functions: put one function *INSIDE* another!

For the below questions, use these functions:

$$f(x) = x^2 + 7x$$

$$g(x) = 3x + 1$$

$$h(x) = 2x - 5$$

$$f(-1) = (-1)^2 + 7(-1)$$

$$1. \quad f(g(x)) = (3x+1)^2 + 7(3x+1)$$

← Means to put function  $g$  inside  $f$ !

$$2. \quad h(f(x)) = 2(x^2 + 7x) - 5$$

$$2.a \quad g(f(x)) = 3(x^2 + 7x) + 1$$

← Means to put function  $f$  inside  $g$ !

3. **Composition:** If  $f(x) = x^2 + 3$  and  $h(x) = x + 5$ , find:

a)  $h(f(x)) =$

$$\begin{aligned} & (x^2 + 3) + 5 \\ & x^2 + 3 + 5 \\ & x^2 + 8 \end{aligned}$$

b)  $f(h(x)) =$

$$\begin{aligned} & (x+5)^2 + 3 \\ & (x+5)(x+5) + 3 \\ & x^2 + 5x + 5x + 25 + 3 \\ & x^2 + 10x + 28 \end{aligned}$$

c)  $h(h(x)) =$

$$\begin{aligned} & (x+5) + 5 \\ & x + 10 \end{aligned}$$

Then find: d)  $f(h(2)) = ((2+5)^2 + 3)$

$$\begin{aligned} & 7^2 + 3 \\ & 49 + 3 \\ & 52 \end{aligned}$$

4. **Composition:** If  $f(x) = x^2$  and  $h(x) = x + 2$ , find:

a)  $f(h(2)) = ((2+2)^2)$

$$\begin{aligned} & = 4^2 \\ & = 16 \end{aligned}$$

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

b)  $h(f(2)) = (2^2) + 2$

$$\begin{aligned} & = 4 + 2 \\ & = 6 \end{aligned}$$

c)  $h(f(0)) = ((0)^2) + 2$

$$\begin{aligned} & = 0 + 2 \\ & = 2 \end{aligned}$$

d)  $h(h(-5)) = ((-5)+2) + 2$

$$\begin{aligned} & = -3 + 2 \\ & = -1 \end{aligned}$$

### Homework

Sec 3.9 page 150: 10 – 25 all, 29, 32, 33 afterwards 7, 8, 9 *and picture graph*