

**Composition of Functions** 12-8-14

How would you evaluate  $f(2)$  for  $f(x) = x + 1$ ?  
 $f(2) = 2 + 1 = 3$

How would you evaluate  $f(-3)$ ?  
 $f(-3) = -3 + 1 = -2$

How would you evaluate  $f(k)$ ?  
 $f(k) = k + 1$

$f(2k)$ ?  $f(2k) = 2k + 1$

$f(x + 3)$ ?  $f(x + 3) = x + 3 + 1 = x + 4$

$f(g(x))$ ?  
 Now, let  $g(x) = x^2$ . How would you evaluate  $f(g(x))$ ?  
 $f(x^2) = x^2 + 1$

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2, 15, 5

$h(n) = -3n$   
 $-3(-8) = 24$

$g(n) = 4n - 3$   
 $4(-8) - 3 = -35$

$(h-g)(-8) = 24 - 35$   
 $59$

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$f(x) = 2x + 1$  and  $g(x) = x - 5$

Find  $f(g(2))$

```

    graph TD
      A[2] --> B["x-5  
2-5"]
      B --> C["2x+1  
2(-3)+1"]
      C --> D[-5]
  
```

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Example 1: Let  $f(x) = 2x$  and  $g(x) = x^3$ . Find  $f(g(2))$ .

$f(g(2))$   $g(2) = 2^3 = 8$   
 $f(8) = 2(8) = 16$

Example 2: Let  $g(x) = 3x + 1$  and  $h(x) = 2x + 1$ . Find  $g(h(-2))$ .

$g(-3) = 3(-3) + 1$   $h(-2) = 2(-2) + 1$   
 $-8$   $-3$

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**Example 3: Try by yourself!**  
 Let  $f(x) = x^2 + 3$  and  $g(x) = x + 2$ . Find  $g(f(3))$ .

Find  $g(f(-4))$ .

$f(-4) = -4^2 + 3$   
 $16 + 3$   
 $19$

$19 + 2$   
 $(21)$

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Another way to write  $f(g(x))$  is  $(f \circ g)(x)$

Let  $f(x) = x^2 + 1$  and  $g(x) = x - 2$ . Find  $(f \circ g)(2)$ .

$f(g(2))$

Find  $(g \circ f)(-4)$ .

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**Conclusion**

1. What is the composition of a function?  
*One function into another*
2. How do you find the composition with x equal to a number? *Work inside ( ) 1st*
3. Questions?

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**Assignment:**  
**Composition of Functions**  
**Wkst**

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