

**HW 5.1**

NAME \_\_\_\_\_

1. The number of shoppers in a shopping mall,  $t$  hours after it opens, is given by  $S(t)$ . The number of store clerks needed to attend to  $s$  shoppers is given by  $C(s)$ .  
Interpret the statement  $C(S(3)) = 11$  in the context of this problem.
  
2. The new cookbook you just got gives all the oven temperatures in degrees Celsius, but your oven uses degrees Fahrenheit. Additionally, your oven runs hot and you always have to decrease the prescribed temperature by  $15^\circ F$ . Write an expression using a composition of functions that will determine how high you have to preheat your oven when a recipe from your new cookbook calls for a temperature of  $t^\circ C$ . (Hint:  $C = \frac{5}{9}(F - 32)$  and  $F = \frac{9}{5}C + 32$  are the equations to convert between degrees Celsius  $C$  and degrees Fahrenheit,  $F$ .)

3. A table of selected values is given for the functions  $f$  and  $g$ . The domain of both functions is all real numbers.

| $x$ | $f(x)$ | $x$ | $g(x)$ |
|-----|--------|-----|--------|
| -3  | 3      | -5  | 11     |
| 0   | 5      | -3  | 8      |
| 2   | 2      | 0   | -6     |
| 4   | -5     | 4   | -3     |
| 7   | 1      | 8   | -6     |

Find  $f(g(4))$ .

4. Let  $f(x) = x^2 - 1$  and  $g(x) = -3x + 7$ .

a. Find  $f(g(2))$ .

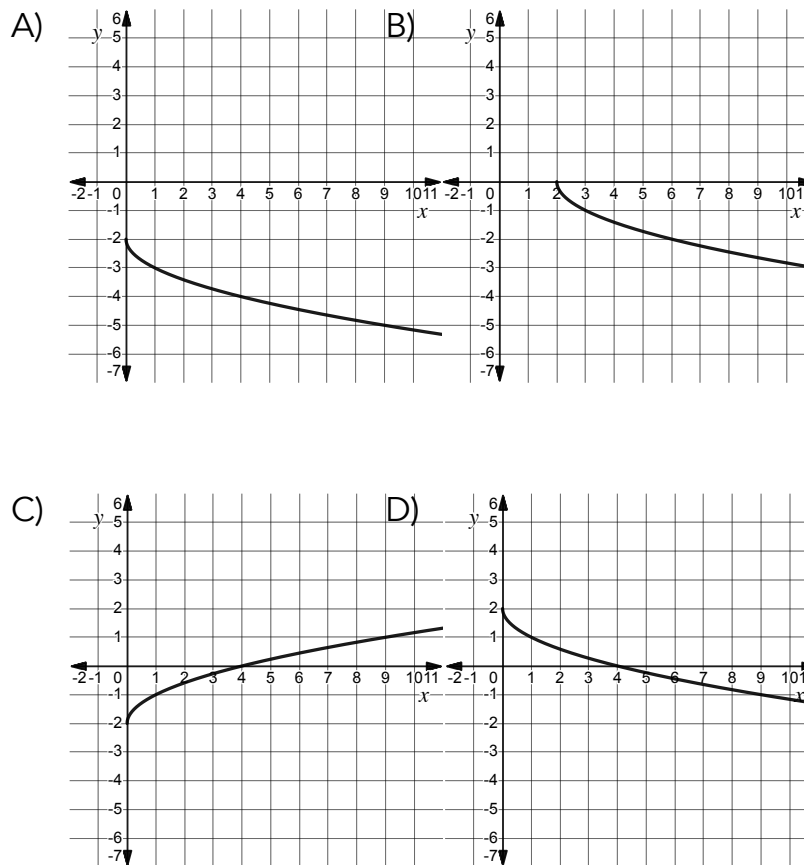
b. Write an expression for  $f(g(x))$ .

c. Find  $g(f(2))$ .

d. Write an expression for  $g(f(x))$ .

5. If  $h(f(x)) = \frac{3}{x^2 - 7}$ , find a possible expression for  $h(x)$  and  $f(x)$ .

6. Given the functions  $f(x) = -\sqrt{x}$  and  $g(x) = x - 2$ , which of the following graphs could represent  $y = g(f(x))$ ?





7. Your favorite store sends out coupons in the mail. Coupon 1 is for \$5 off your next purchase. Coupon 2 is a 20% off coupon applied to your total purchase. Let  $x$  = the total cost of your purchase at the store.

- a. Write a function,  $f(x)$ , to represent the cost of your purchase using only Coupon 1.
- b. Write a function,  $g(x)$ , to represent the cost of your purchase using only Coupon 2.
- c. Find  $f(g(75))$  and explain what this means in context.
- d. Find  $g(f(75))$  and explain what this means in context.
- e. In which order would you like the coupons applied for YOUR order? Why?

8. Let  $f(x) = \sqrt{x-2}$  and  $g(x) = \frac{4}{2x-6}$ . Which of the following is defined as a real number?

A)  $f(g(3))$

B)  $g(f(11))$

C)  $g(f(2))$

D)  $f(g(5))$

9. The graph of a function  $f$  is shown on the interval  $[-7, 5]$ . Let  $g(x) = 5x + 8$ .

a. Find  $f(g(-1))$ .

b. Find  $g(f(-3))$ .

