This worksheet will provide practice for adding, subtracting, dividing, and composing two functions. We will also investigate domains.

1. Let  $f(x) = \sqrt{5x+7} - 4x$  and  $g(x) = 5x^2 + 7x - 5$ . Perform the desired operations. Simplify your answers.

a.) 
$$f(x) + g(x)$$

b.) 
$$f(x) - g(x)$$

c.) 
$$\frac{f(x)}{g(x)}$$

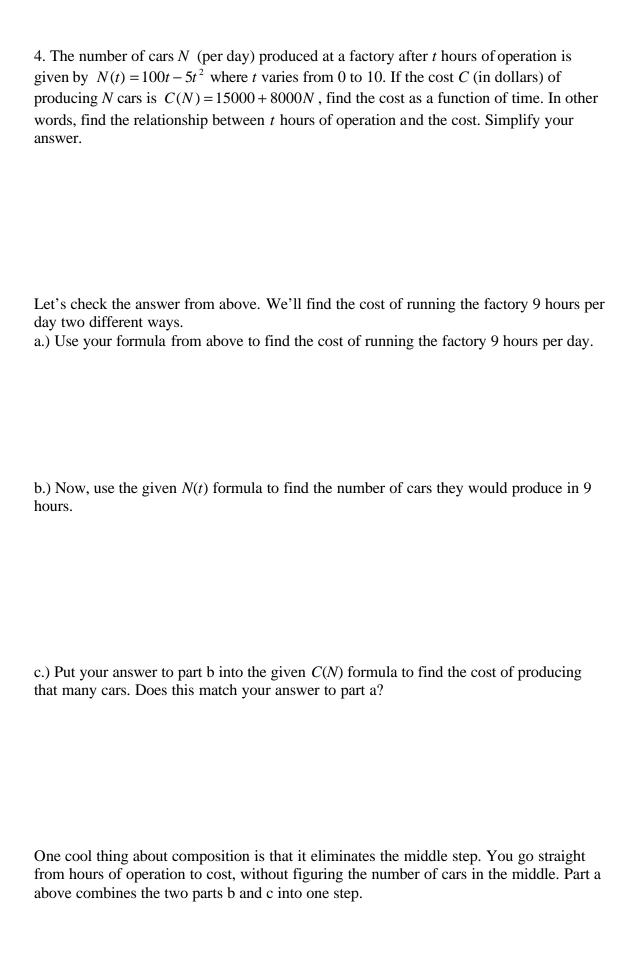
- 2. Let's think about the domain of the three functions of question 1.
- a.) What is the domain of  $f(x) = \sqrt{5x + 7} 4x$ ? (Remember, we would try to find x values that would make us square root negative numbers or divide by zero. There is no division here, so only worry about the square root part. We'll exclude such x values and what's left over is the domain.)

- b.) What is the domain of  $g(x) = 5x^2 + 7x 5$ ? (Remember, we would try to find x values that would make us square root negative numbers or divide by zero. There are no divisions or square roots here. So what's the domain?)
- c.) The domain of both f(x) + g(x) and f(x) g(x) will be the numbers that are in **both** the domains of f and g. What is the domain of f(x) + g(x) and f(x) g(x)?

d.) The domain of  $\frac{f(x)}{g(x)}$  are the numbers that are in both the domains of f and g and also, do not make g zero. If that happens, then we'd be dividing by zero and we can't do that. What's the domain of  $\frac{f(x)}{g(x)}$ ? (Solve the equation  $0 = 5x^2 + 7x - 5$  to find the values that make g zero.)

3. Let f(x) = -3x + 7 and  $g(x) = 2x^2 - 8$ . a.) Find f(g(x)). Simplify.

b.) Find g(f(x)). Simplify.



5. Let f(x) = 2x - 5 and g(x) = .5(x + 5). Show that f(g(x)) = x and g(f(x)) = x.

6. Let  $f(x) = \frac{4x^2 + 5}{3}$  and g(x) = -3x + 7. Find the following. a.) f(g(-3))

b.) 
$$g(4) + f(4)$$

c.) 
$$f(g(x))$$

d.) the domain of f(g(x)) [HINT: It's probably easiest to simply look at the formula for f(g(x)) and ask yourself "Are there any real numbers that make me divide by zero or square root negative numbers?" Exclude those from the domain.]