

Name:

Key

Answer the questions in the spaces provided. Show all necessary work. If you run out of space, use the back side and leave a message to indicate that you have done so. If you have any questions, raise your hand and I will come try to answer.

1. Let  $f(x)$  be a function whose domain is  $0 \leq x \leq 10$  and whose range is  $-12 \leq y \leq 12$ .

- (a) (5 points) Write a function,  $g(x)$ , so that this graph of the composition  $f(g(x))$  will look like the graph of  $f(x)$ , shifted to the left by 6. State the domain and range of  $f(g(x))$ .

Fix a fn.

-1 on (a).

OK on  
nest

$$g(x) = x + 6$$

Domain:  $-6 \leq x \leq 4$

(shifted left 6)

Range:  $-12 \leq y \leq 12$  (unchanged)

Shift  
right  
-2

$$g(x) = f(x+6)$$

- (b) (5 points) Write a function,  $h(x)$ , so that the graph of the composition  $h(f(x))$  will look like the graph of  $f(x)$ , shifted up by 13. State the domain and range of  $h(f(x))$ .

$$h(x) = x + 13$$

Domain

$$0 \leq x \leq 10$$

(unchanged)

Range

$$1 \leq x \leq 25$$

(shifted up 13)

$$h(x) = f(x) + 13$$

(c) (5 points) Compute the domain of  $f(5x - 8)$

$$0 \leq 5x - 8 \leq 10$$

$$8 \leq 5x \leq 18$$

$$\frac{8}{5} \leq x \leq \frac{18}{5}$$

(d) (5 points) Compute the range of  $-\frac{1}{4}f(x) - 4$

$$-12 \leq f(x) \leq 12$$

$$3 \geq -\frac{1}{4}f(x) \geq -3$$

$$-1 \geq -\frac{1}{4}f(x) - 4 \geq -7$$

$$\underline{-1 \geq y \geq -7}$$

forget to

flip...

~~AND~~ -1

Backwards?

-3