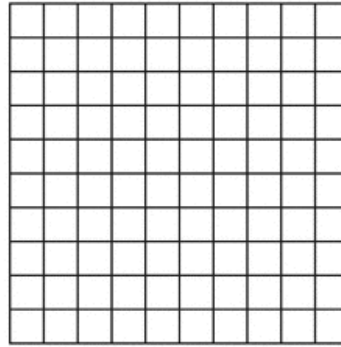


**Aim: How do we find arithmetic combinations of functions?****I. Do Now:**

1. Explain the difference between each pair of functions:
- (a)  $f(x) = (-x)^2$  and  $f(x) = -x^2$
- (b)  $f(x) = 2|x|$  and  $f(x) = |2x|$
2. Given the graph of  $f(x)$ , sketch and label the graph of



(a)  $f(2x)$

(b)  $2f(x)$

**II. Arithmetic Combinations of Functions.** All basic arithmetic operations can be performed on two functions:

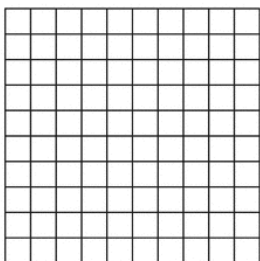
3. If  $f(x) = 3x + 2$  and  $g(x) = x^2 - 1$ , find each of the following:
- (a)  $f(x) + g(x)$
- (d)  $f(x) - g(x)$
- (c)  $f(x) \cdot g(x)$
- (d)  $f(x) \div g(x)$

The domain of an arithmetic combination consists of all real numbers in the domains of both functions. (Division has a further restriction, i.e.  $g(x) \neq 0$ )

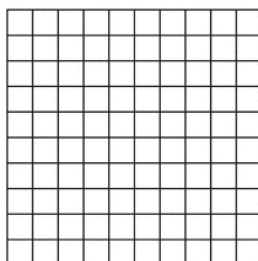
**III. Applications.**

4. Given  $g(x) = 2x + 1$  and  $h(x) = x^2 + 2x - 1$ , find each in simplest form:
- (a)  $(g + h)(x)$
- (b)  $(g - h)(x)$
- (c)  $(h - g)(x)$
- (d)  $(gh)(x)$
- (d)  $\left(\frac{g}{h}\right)(x)$
- (e)  $(g + h)(2)$

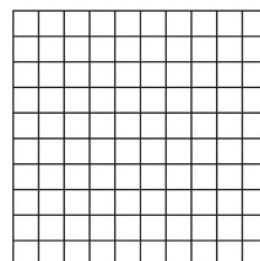
5. Given the graphs of  $f(x)$  and  $g(x)$  below, graph each:



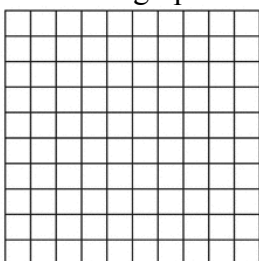
(a)  $(f + g)(x)$



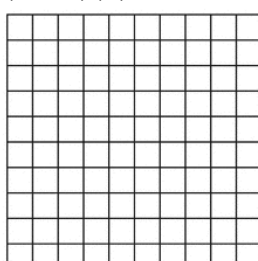
(b)  $(f - g)(x)$



6. Given the graphs of  $h(x)$  and  $m(x)$  below, graph each:



(a)  $(m + h)(x)$



(b)  $(m - h)(x)$

