

## Operations with Functions

### Not all rules can be added together

If  $f$  and  $g$  are two functions with a common domain, then the sum of  $f$  and  $g$ , is defined to be:  $(f + g)(x) = f(x) + g(x)$ .

The difference of  $f$  and  $g$  is defined by:  $(f - g)(x) = f(x) - g(x)$  and the quotient of  $f$  and  $g$  is defined by  $(f/g)(x) = \frac{f(x)}{g(x)}$  where  $g(x)$  cannot be zero.

If  $f(x) = 3x$  and  $g(x) = x - 4$ ,

$$f(x) + g(x) = 3x + (x - 4)$$

$$(f + g)(x) = 4x - 4$$

$$(f + g)(2) = 4(2) - 4 = 4$$

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