Combining Functions (Section 4.4)

* Addition: $(f+g)(x) = f(x)+g(x)$ — Just add like terms!

Subtraction: $(f-g)(x) = f(x)-g(x)$ — Distribute the (−), then add like terms.

Multiplication: $(f\cdot g)(x) = f(x)\cdot g(x)$ — You may need to FOIL or double distribute.

Division: $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ — Remember to exclude any domain that makes the denom = 0.

ex: $5x-4 = f(x)$, $3x+8 = g(x)$ Find $(f+g)(x)$, $(f-g)(x)$, $(f\cdot g)x$, & $(f/g)(x)$.

$(f+g)(x) = f(x)+g(x)$
$= (5x-4)+(3x+8)$
$= 8x+4$

$(f-g)(x) = f(x)-g(x)$
$= (5x-4)-(3x+8)$
$= 5x-4-3x-8$
$= 2x-12$

$(f\cdot g)(x) = f(x)\cdot g(x)$
$= (5x-4)(3x+8)$
$= 15x^2+40x-12x-32$
$= 15x^2+28x-32$

$\frac{f(x)}{g(x)} = \frac{5x-4}{3x+8}$; $x \neq -8/3$

ex: using the functions above, what is $(f+g)(-2)$, $(f-g)(3)$, $(f\cdot g)(1)$, $(f/g)(2)$?

this means plug $x=-2$ into the function

$(f+g)(-2) = 8(-2)+4$
$= -16+4$
$= -12$

$(f-g)(3) = 2(3)-12$
$= 6-12$
$= -6$

$(f\cdot g)(1) = 15(1)^2+28(1)-32$
$= 15+28-32$
$= 11$

$(f/g)(2) = \frac{5(2)-4}{3(2)+8} = \frac{6}{14} = \frac{3}{7}$

ex: $f(x) = 3\cdot 8^x$, $g(x) = 2\cdot 8^x+1$ Find $(f+g)(2)$ & $(f-g)(3)$

$(f+g)(2)$: $f(x)+g(x)$ @ $x=2$
$= (3\cdot 8^x)+(2\cdot 8^x+1)$
like terms!
$= 5\cdot 8^x+1 \rightarrow$ @ $x=2$
$5\cdot 8^2+1 = 5(64)+1$
$= 321$

$(f-g)(3)$: $f(x)-g(x)$ @ $x=3$
$(3\cdot 8^x)-(2\cdot 8^x+1)$
$= 3\cdot 8^x-2\cdot 8^x-1$
$= 1\cdot 8^x-1 \rightarrow$ @ $x=3$
$= 1\cdot 8^3-1$
$= 511$