Sec 1.4 Building Functions from Functions

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

Difference: $(f - g)(x) = f(x) - g(x)$

Product: $(fg)(x) = f(x) \cdot g(x)$

Quotient: $(f/g)(x) = \dfrac{f(x)}{g(x)}$

example:

$f(x) = 3x^2 + 2x + 1$ $\quad$ $g(x) = 2x^2 - 4x - 7$

find:

$(f + g)(x) = (3x^2+2x+1) + (2x^2-4x-7) = 5x^2-2x-6$

$(f - g)(x) = (3x^2+2x+1) + (-2x^2+4x+7) = x^2+6x+8$

$(fg)(x) = (3x^2+2x+1)(2x^2-4x-7) =$

$6x^4 - 12x^3 - 21x^2 + 4x^3 - 8x^2 - 14x + 2x^2 - 4x - 7$

$6x^4 - 8x^3 - 27x^2 - 18x - 7$

$(f/g)(x) = \dfrac{3x^2+2x+1}{2x^2-4x-7}$

ex. Find f/g. State the domain.

$f(x)=\sqrt{3x+6}$ $=0$

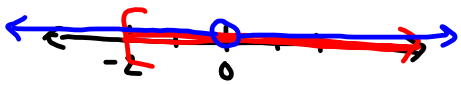
$3x=-6$

$x=-2$

$D: [-2,\infty)$

$g(x)=\dfrac{1}{x}$ $x=0$

$D: (-\infty,0)\cup(0,\infty)$



D of $\frac{f}{g}$ is only what overlaps.

$$\frac{f}{g}=\frac{\sqrt{3x+6}}{\frac{1}{x}}=\sqrt{3x+6}\cdot\frac{x}{1}=x\sqrt{3x+6}$$

$D: [2,0)\cup(0,\infty)$

You do:

Find f/g and state domain.

$f(x)=\sqrt{4x-8}$ $=0$

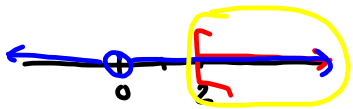
$x=2$

$D: [2,\infty)$

$g(x)=\dfrac{3}{2x}$ $=0$

$x=0$

$D: (-\infty,0)\cup(0,\infty)$



New domain = what overlaps

New Domain : $[2,\infty)$

$$\frac{f}{g}:\ \frac{\sqrt{4x-8}}{\frac{3}{2x}}=\sqrt{4x-8}\cdot\frac{2x}{3}=\frac{2x}{3}\sqrt{4x-8}$$

Keep, change, flip