MTH 30 Homework Section 1.7

#36 $f(x) = 6x^2 - x - 1$ $g(x) = x - 1$

$(f+g)(x) = \underbrace{6x^2 - x - 1}_{f(x)} + \underbrace{x - 1}_{g(x)} = 6x^2 - 2$, domain: $\mathbb{R}$

$(f-g)(x) = (\underbrace{6x^2 - x - 1}_{f(x)}) - (\underbrace{x - 1}_{g(x)}) = 6x^2 - 2x$, domain: $\mathbb{R}$

$(fg)(x) = f(x) \cdot g(x) = (6x^2 - x - 1)(x - 1) =$

$= 6x^3 - 6x^2 - x^2 + x - x + 1 = 6x^3 - 7x^2 + 1$, domain: $\mathbb{R}$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{6x^2 - x - 1}{x - 1}$ *, domain: $\{x \mid x \neq 1\}$ or $(-\infty, 1) \cup (1, \infty)$

$x - 1 \neq 0$

let's factor $6x^2 - x - 1$ to see if we can cancel $x - 1$:

$6x^2 - x - 1 = \underbrace{6x^2 + 2x}_{GCF = 2x} \underbrace{- 3x - 1}_{GCF = -1} = 2x(3x+1) - 1(3x+1) =$

$ac = 6 \cdot (-1) = -6 : 2, -3$

$= (2x - 1)(3x + 1)$

no $(x-1)$, so cannot cancel.