MTH30 Homework Section 1.7

#46 $f(x) = \frac{9x}{x-4}$ $g(x) = \frac{7}{x+8}$

$(f+g)(x) = \underbrace{\frac{9x}{x-4}}_{f(x)} + \underbrace{\frac{7}{x+8}}_{g(x)} = \frac{9x(x+8)+7(x-4)}{(x-4)(x+8)} = \frac{9x^2+79x-28}{(x-4)(x+8)}$

exclude $x = 4, -8$ from the domain

domain: $\{x \mid x \neq -8 \text{ and } x \neq 4\}$

or

$(-\infty, -8) \cup (-8, 4) \cup (4, +\infty)$

$(f-g)(x) = \frac{9x}{x-4} - \frac{7}{x+8} = \frac{9x(x+8)-7(x-4)}{(x-4)(x+8)} = \frac{9x^2-65x+28}{(x-4)(x+8)}$

exclude $x = 4, -8$ from the domain

domain: $\{x \mid x \neq -8 \text{ and } x \neq 4\}$

or

$(-\infty, -8) \cup (-8, 4) \cup (4, \infty)$

$(fg)(x) = \underbrace{\frac{9x}{x-4}}_{f(x)} \cdot \underbrace{\frac{7}{x+8}}_{g(x)} = \frac{63x}{(x-4)(x+8)}$

domain: $\{x \mid x \neq -8 \text{ and } x \neq 4\}$

or

$(-\infty, -8) \cup (-8, 4) \cup (4, \infty)$

$\left(\frac{f}{g}\right)(x) = \frac{\frac{9x}{x-4}\ \} f(x)}{\frac{7}{x+8}\ \} g(x)} = \frac{9x}{x-4} \cdot \frac{x+8}{7} = \frac{9x(x+8)}{7(x-4)}$

domain: $\{x \mid x \neq 4\}$ or

$(-\infty, 4) \cup (4, \infty)$