$f(x) = x^2 + 2x$ $(-\infty, \infty)$ $\quad g(x) = 6 - x^2$ $(-\infty, \infty)$

$f + g = x^2 + 2x + 6 - x^2$

$= 2x + 6 \quad D: (-\infty, \infty)$

$f - g = x^2 - 2x - (6 - x^2)$

$2x^2 - 2x - 6 \quad D: (-\infty, \infty)$

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

$6x^2 - x^4 + 12x - 2x^3$

$-x^4 - 2x^3 + 6x^2 + 12x$

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

$\frac{f}{g} = \frac{x^2 + 2x}{6 - x^2}$

$D: (-\infty, -\sqrt{6}) \cup (-\sqrt{6}, \sqrt{6}) \cup (\sqrt{6}, \infty)$

$6 - x^2 = 0$

$\sqrt{6} = \sqrt{x^2}$

$x = \pm\sqrt{6}$

7) $f(x) = 2x^2 + 4x$ $(-\infty, \infty)$ $\quad g(x) = \frac{1}{2x}$ $(-\infty, 0) \cup (0, \infty)$

$f + g = 2x^2 + 4x + \frac{1}{2x}$

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

$f - g = 2x^2 + 4x - \frac{1}{2x}$

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

$\frac{2x^3}{2x} + \frac{4x}{2x}$

$f \cdot g = (2x^2 + 4x)\left(\frac{1}{2x}\right)$

$= x + 2$

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

$\frac{f}{g} = \frac{2x^2 + 4x}{\frac{1}{2x}} = 4x^3 + 8x^2$ $\quad (-\infty, 0) \cup (0, \infty)$

8) $f(x) = \frac{1}{x-4}$ $g(x) = \frac{1}{6-x}$

D: $(-\infty, 4) \cup (4, \infty)$ D: $(-\infty, 6) \cup (6, \infty)$

$f+g = \frac{1}{x-4} + \frac{1}{6-x}$

$(-\infty, 4) \cup (4, 6) \cup (6, \infty)$

$f \cdot g = \left(\frac{1}{x-4}\right)\left(\frac{1}{6-x}\right)$

$\frac{f}{g} = \frac{\frac{1}{x-4}}{\frac{1}{6-x}} \cdot \frac{6-x}{1} = \frac{6-x}{x-4}$

10) $g(x) = |x-3|$ $(-\infty, \infty)$ $\quad f(x) = \sqrt{x}$ $[0, \infty)$

$\frac{g}{f} = \frac{|x-3|}{\sqrt{x}}$ $\quad D: (0, \infty)$

$\frac{f}{g} = \frac{\sqrt{x}}{|x-3|}$ $\quad D: [0,3) \cup (3, \infty)$