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1. $f(x) = 2x - 1$ $g(x) = x^2$

$$(f+g)(x) = 2x - 1 + x^2 = \boxed{x^2 + 2x - 1} \quad D: (-\infty, \infty)$$

$$(f-g)(x) = 2x - 1 - x^2 = \boxed{-x^2 + 2x - 1} \quad D: (-\infty, \infty)$$

$$(fg)(x) = (2x - 1)(x^2) = \boxed{2x^3 - x^2} \quad D: (-\infty, \infty)$$

2. $f(x) = (x-1)^2$ $g(x) = 3-x$

$$(f+g)(x) = (x-1)^2 + (3-x)$$

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

$$= x^2 - 1x - 1x + 1 + 3 - x$$

$$= \boxed{x^2 - 3x + 4} \quad D: (-\infty, \infty)$$

$$(f-g)(x) = (x-1)^2 - (3-x)$$

$$= x^2 - 1x - 1x + 1 - 3 + x$$

$$= \boxed{x^2 - x - 2} \quad D: (-\infty, \infty)$$

$$(fg)(x) = (x-1)^2(3-x)$$

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

$$= 3x^2 - x^3 - 6x + 2x^2 + 3 - x$$

$$= \boxed{-x^3 + x^2 - 7x + 3} \quad D: (-\infty, \infty)$$

7. $f(x) = x^2$

$$g(x) = \sqrt{1-x^2}$$

$$\left(\frac{f}{g}\right)(x) = \boxed{\frac{x^2}{\sqrt{1-x^2}}} \quad D: (-1, 1)$$

$$\left(\frac{g}{f}\right)(x) = \boxed{\frac{\sqrt{1-x^2}}{x^2}} \quad D: (-1, 0) \cup (0, 1)$$

8. $f(x) = x^3$

$$g(x) = \sqrt[3]{1-x^3}$$

$$\left(\frac{f}{g}\right)(x) = \frac{x^3}{\sqrt[3]{1-x^3}}$$

$$D: (-\infty, 1) \cup (1, \infty)$$

$$\left(\frac{g}{f}\right)(x) = \frac{\sqrt[3]{1-x^3}}{x^3}$$

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