

Exercise

$$f(x) = 2 - 2x$$

$$g(x) = x^2 + 1$$

Calculate

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

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

$$c) (f \cdot g)(x) = (2 - 2x)(x^2 + 1)$$

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

$$e) (f \circ g)(x) = f(g(x)) = f(x^2 + 1) = 2 - 2(x^2 + 1) = 2 - 2x^2 - 2 = -2x^2$$

$$f) (g \circ f)(x) = g(f(x)) = g(2 - 2x) = (2 - 2x)^2 + 1 = 4 - 8x + 4x^2 + 1 = 4x^2 - 8x + 5$$

$$g) (f \circ f)(x) = f(2 - 2x) = 2 - 2(2 - 2x) = 2 - 4 + 4x = 4x - 2$$

$$h) (g \circ g)(x) = g(x^2 + 1) = (x^2 + 1)^2 + 1 = x^4 + 2x^2 + 2$$