

ex.

문제 5.1.6)

$$f(x) = \frac{x^3 + 2x + 1}{x^2 + 4} \text{ 의 도함수를 구하여라.}$$

sof)

$$f(x) = \frac{h(x)}{g(x)}$$

$$f'(x) = \frac{h'(x)g(x) - h(x)g'(x)}{(g(x))^2}$$

$$h'(x) = 3x^2 + 2$$

$$g'(x) = 2x$$

$$(g(x))^2 = (x^2 + 4)^2$$

$$f'(x) = \frac{(3x^2 + 2)(x^2 + 4) - (x^3 + 2x + 1)(2x)}{(x^2 + 4)^2}$$

$$f'(x) = \frac{3x^4 - 12x^2 + 2x^2 - 8 + 2x^4 + 4x^2 + 2x}{(x^2 + 4)^2}$$

$$\frac{5x^4 - 6x^2 + 2x - 8}{(x^2 + 4)^2}$$

문제 5.1.4) 도함수를 구하여라.

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

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

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

$$f'(x) = 3x^2 + 2x - 2$$

$$(2) f(x) = (x+1)(x+3)(x+5)$$

$$= (x^2 + 3x + 13)(x+5)$$

$$= (x^2 + 4x + 13)(x+5)$$

$$= (2x^2 + 4)(x+5) + (x^2 + 4x + 13)$$

$$= 2x^3 + 10x + 4x^2 + 20 + x^2 + 4x + 13$$

$$= 3x^3 + 14x^2 + 23x + 33$$

$$(3) f(x) = \frac{x}{x^2 - 1} \quad x^2 - 1 = 2x^2$$

$$f'(x) = \frac{x^2 - 1 - x(2x)}{(x^2 - 1)^2}$$

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