

<3장 연습문제 정답>

연습문제 3.1

1. (a) 11 (b) -1 (c) 7

3. (a) $\frac{22}{3}$ (b) $\frac{1}{2\sqrt{2}}$ (c) 1

5. (a) 미분불가능하다. (b) 미분가능하다. (c) 미분불가능하다.

7. (a) $y' = 4x + 1$ (b) $y' = -3x^2$

(c) $y' = 0$ (d) $y' = 0$

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

(g) $y' = -\frac{2x}{(x^2-1)^2}$ (h) $y' = \frac{1}{(x+1)^2}$

연습문제 3.2

1. (a) $y' = 0$ (b) $y' = 0$

(c) $y' = 36x^8 + 18x^5$ (d) $y' = 15x^4 - 8x^3$

(e) $y' = \frac{3}{2}x^2 - \frac{2}{3}x$ (f) $y' = -\frac{5}{4}x^4 + \frac{1}{3}x^2 - 5$

3. (a) $y' = 12x^3 - \frac{2}{x^3}$

(b) $y' = -8x + 6 + \frac{9}{x^4}$

(c) $y' = 1 - \frac{2}{x^2} - \frac{12}{x^4}$

(d) $y' = x^3 + \frac{16}{x^5}$

(e) $y' = 12x - 1 - \frac{8}{x^3}$

(f) $y' = 5x^4 + 3x^2 + 2x + \frac{2x}{(x^2 - 1)^2}$

5. (a) $y' = 3x^2 + 4x - 5$

(b) $y' = 72x^2 - 28x - 11$

(c) $y' = 24x^3 + 21x^2 + 30x + 21$ (d) $y' = -10x^4 - 4x^3 + 18x^2 + 6x - 4$

연습문제 3.3

1. (a) $y' = 20x(x^2 + 5)^9$

(b) $y' = 7(-3x^2 + 2)(-x^3 + 2x)^6$

(c) $y' = 4(4x^3 - 3)(x^4 - 3x - 1)^3$

(d) $y' = 5(-5x^4 + 12x^3)(-x^5 + 3x^4 + 6)^4$

(e) $y' = 9\left(1 - \frac{1}{x^2}\right)\left(x + \frac{1}{x}\right)^8$

(f) $y' = 6\left(1 + \frac{1}{x^2}\right)\left(x - \frac{1}{x}\right)^5$

(g) $y' = 3\left(2x - \frac{2}{x^3}\right)\left(x^2 + \frac{1}{x^2}\right)^2$

(h) $y' = 8\left(2x + \frac{2}{x^3}\right)\left(x^2 - \frac{1}{x^2}\right)^7$

$$3. (a) y' = \frac{1}{2} (4x + 3) (2x^2 + 3x + 5)^{-\frac{1}{2}}$$

$$(b) y' = \frac{1}{2} (-9x^2 - 1) (6 - x - 3x^3)^{-\frac{1}{2}}$$

$$(c) y' = \frac{1}{3} (4x^3 + 15x^2) (x^4 + 5x^3)^{-\frac{2}{3}}$$

$$(d) y' = -x^3 (6 - x^4)^{-\frac{3}{4}}$$

$$(e) y' = -\frac{6}{5} x^2 (2x^3 + 3)^{-\frac{6}{5}}$$

$$(f) y' = \frac{1}{9} (5x^4 + 1) (4 - x - x^5)^{-\frac{10}{9}}$$

$$(g) y' = -\frac{2(8x - 3)}{3(4x^2 - 3x) \sqrt[3]{4x^2 - 3x}}$$

$$(h) y' = -\frac{3(2x - 1)}{4(x^2 - x + 1) \sqrt[4]{x^2 - x + 1}}$$

$$5. (a) -30$$

$$(b) 14$$

$$(c) -12$$

$$(d) 18$$

연습문제 3.4

$$1. (a) \frac{dy}{dx} = -\frac{x^2}{y^2}$$

$$(b) \frac{dy}{dx} = \frac{x}{2y^3}$$

$$(c) \frac{dy}{dx} = -\frac{1}{4y\sqrt{x}}$$

$$(d) \frac{dy}{dx} = -9x^2 \sqrt[3]{y^2}$$

$$(e) \frac{dy}{dx} = -\frac{2x + y^2}{2xy + 3y^2}$$

$$(f) \frac{dy}{dx} = \frac{5x^4 + 3x^2y}{x^3 + 2y}$$

3. (a) $y = -2x - 1$ (b) $y = 1$ (c) $y = -\frac{14}{5}x - \frac{6}{5}$

5. (a) $y = \frac{5}{7}x - \frac{20}{7}$ (b) $y = \frac{1}{2}x + 2$

(c) $y = \frac{9}{4}x - \frac{171}{16}$ (d) $y = -3x + 6$