

問題

問題 1. 導関数の定義にしたがって、次の関数の導関数を求めよ。

(1) $f(x) = 2x$ (2) $f(x) = -3x$ (3) $f(x) = -2x^2$ (4) $f(x) = 5x^2$

(5) $f(x) = 2x^3$ (6) $f(x) = -3x^3$ (7) $f(x) = 4$ (8) $f(x) = -5$

問題 2. 次の関数の導関数を求めよ。

(1) $f(x) = 4$ (2) $f(x) = -2$ (3) $f(x) = x^6$ (4) $f(x) = x^9$

問題 3. 次の関数を微分せよ。

(1) $y = 3x^2 - 2x + 5$ (2) $y = -2x^2 + x - 3$

(3) $y = -2x^3 + 4x^2 + 3x$ (4) $y = 2x^3 + 5x^2 + 9$

(5) $y = 4x^4 - 3x^3 + 6$ (6) $y = -2x^4 + 2x^2 + x - 1$

(7) $y = -\frac{1}{3}x^3 + \frac{1}{4}x^2 + 2x$ (8) $y = \frac{3}{4}x^4 + \frac{1}{3}x + \frac{1}{6}$

問題 4. 次の関数を微分せよ。

(1) $y = (x - 1)(x + 5)$ (2) $y = (x - 3)(4 - x)$

(3) $y = -x(x - 1)(x + 1)$ (4) $y = x(x + 2)(x + 3)$

(5) $y = 2(x^2 + 1)^2$ (6) $y = x(x - 1)(x^2 + x + 1)$

練習

練習 1. 導関数の定義にしたがって、次の関数の導関数を求めよ。

(1) $f(x) = 5x$ (2) $f(x) = -2x$ (3) $f(x) = -3x^2$ (4) $f(x) = 6x^2$

(5) $f(x) = 3x^3$ (6) $f(x) = -2x^3$ (7) $f(x) = 8$ (8) $f(x) = -10$

練習 2. 次の関数の導関数を求めよ。

(1) $f(x) = 7$ (2) $f(x) = -3$ (3) $f(x) = x^8$ (4) $f(x) = x^3$

練習 3. 次の関数を微分せよ。

(1) $y = 4x^2 - 3x - 2$ (2) $y = -5x^2 - 3x + 10$

(3) $y = -3x^3 - 2x^2 - 5x$ (4) $y = 4x^3 - 2x - 5$

(5) $y = 5x^4 + 2x^2 + x$ (6) $y = -3x^4 - 2x^3 + 2x^2 + 6$

(7) $y = -\frac{1}{2}x^4 - \frac{2}{3}x^2 - \frac{1}{5}x$ (8) $y = \frac{2}{3}x^3 - \frac{3}{4}x^2 - 5$

練習 4. 次の関数を微分せよ。

(1) $y = (x + 2)(x + 4)$ (2) $y = (x - 2)(5 - x)$

(3) $y = -x(x - 2)(x - 3)$ (4) $y = x(x + 3)(x - 3)$

(5) $y = 4(x^2 + 3)^2$ (6) $y = x(x + 2)^3$

解答

問題 1. 略解

$$(1) f'(x) = 2 \quad (2) f'(x) = -3 \quad (3) f'(x) = -4x \quad (4) f'(x) = 10x \\ (5) f'(x) = 6x^2 \quad (6) f'(x) = -9x^2 \quad (7) f'(x) = 0 \quad (8) f'(x) = 0$$

問題 2.

$$(1) f'(x) = 0 \quad (2) f'(x) = 0 \quad (3) f'(x) = 6x^5 \quad (4) f'(x) = 9x^8$$

問題 3.

$$(1) y' = 6x - 2 \quad (2) y' = -4x + 1 \quad (3) y' = -6x^2 + 8x + 3 \\ (4) y' = 6x^2 + 10x \quad (5) y' = 16x^3 - 9x^2 \quad (6) y' = -8x^3 + 4x + 1 \\ (7) y' = -x^2 + \frac{1}{2}x + 2 \quad (8) y' = 3x^2 + \frac{1}{3}$$

問題 4.

$$(1) y' = 2x + 4 \quad (2) y' = -2x + 7 \quad (3) y' = -3x^2 + 1 \\ (4) y' = 3x^2 + 10x + 6 \quad (5) y' = 8x^3 + 8x \quad (6) y' = 4x^3 - 1$$

練習 1. 略解

$$(1) f'(x) = 5 \quad (2) f'(x) = -2 \quad (3) f'(x) = -6x \quad (4) f'(x) = 12x \\ (5) f'(x) = 9x^2 \quad (6) f'(x) = -6x^2 \quad (7) f'(x) = 0 \quad (8) f'(x) = 0$$

練習 2.

$$(1) f'(x) = 0 \quad (2) f'(x) = 0 \quad (3) f'(x) = 8x^7 \quad (4) f'(x) = 3x^2$$

練習 3.

$$(1) y' = 8x - 3 \quad (2) y' = -10x - 3 \quad (3) y' = -9x^2 - 4x - 5 \\ (4) y' = 12x^2 - 2 \quad (5) y' = 20x^3 + 4x + 1 \quad (6) y' = -12x^3 - 6x^2 + 4x \\ (7) y' = -2x^3 - \frac{4}{3}x - \frac{1}{5} \quad (8) y' = 2x^2 - \frac{3}{2}x$$

練習 4.

$$(1) y' = 2x + 6 \quad (2) y' = -2x + 7 \quad (3) y' = -3x^2 + 10x - 6 \\ (4) y' = 3x^2 - 9 \quad (5) y' = 16x^3 + 48x \quad (6) y' = 4x^3 + 18x^2 + 24x + 8$$