

反射テスト 微分 x^n の微分 01

1. 次の式を x について微分せよ. (S 級 1 分 10 秒, A 級 2 分, B 級 3 分, C 級 4 分)

(1) x^2

(2) x^7

(3) $x^{\frac{5}{2}}$

(4) $\frac{1}{x^2}$

(5) $\frac{1}{x^3}$

(6) $\frac{1}{x^7}$

(7) \sqrt{x}

(8) $\sqrt[3]{x}$

(9) $\frac{1}{\sqrt{x}}$

2. 次の式を x について微分せよ. (S 級 1 分 20 秒, A 級 2 分, B 級 3 分, C 級 4 分 20 秒)

(1) x^3

(2) $x^{\frac{7}{3}}$

(3) $\frac{1}{x^4}$

(4) $\frac{3}{2x^6}$

(5) $\sqrt[4]{x}$

(6) $\sqrt[3]{x^2}$

(7) $\frac{3}{\sqrt[3]{x}}$

(8) $\frac{x}{\sqrt[5]{x^2}}$

反射テスト 微分 x^n の微分 01 解答解説

1. 次の式を x について微分せよ。(S級1分10秒, A級2分, B級3分, C級4分)

★ $(x^n)' = nx^{n-1}$

注意すべきことは, n は x についての定数であるということ.

a^b の形は, どれが変数でどれが定数か注意して形を見極める.

$$\begin{cases} a \text{ が変数, } b \text{ が定数} & \Rightarrow (x^n)' = nx^{n-1} \\ a \text{ が定数, } b \text{ が変数} & \Rightarrow (a^x)' = a^x \log a \\ a \text{ が変数, } b \text{ も変数} & \Rightarrow \text{対数微分法} \end{cases}$$

(1) x^2

$$\begin{aligned} (x^2)' &= 2x^{2-1} \\ &= 2x \quad \dots\text{答え} \end{aligned}$$

(2) x^7

$$\begin{aligned} (x^7)' &= 7x^{7-1} \\ &= 7x^6 \quad \dots\text{答え} \end{aligned}$$

(3) $x^{\frac{5}{2}}$

$$\begin{aligned} (x^{\frac{5}{2}})' &= \frac{5}{2}x^{\frac{5}{2}-1} \\ &= \frac{5}{2}x^{\frac{3}{2}} \quad \dots\text{答え} \\ &= \frac{5}{2}x\sqrt{x} \quad \dots\text{答え} \end{aligned}$$

(4) $\frac{1}{x^2}$

$$\begin{aligned} \left(\frac{1}{x^2}\right)' &= (x^{-2})' \\ &= -2x^{-2-1} \\ &= -2x^{-3} \quad \dots\text{答え} \\ &= -\frac{2}{x^3} \quad \dots\text{答え} \end{aligned}$$

(5) $\frac{1}{x^3}$

$$\begin{aligned} \left(\frac{1}{x^3}\right)' &= (x^{-3})' \\ &= -3x^{-3-1} \\ &= -3x^{-4} \quad \dots\text{答え} \\ &= -\frac{3}{x^4} \quad \dots\text{答え} \end{aligned}$$

(6) $\frac{1}{x^7}$

$$\begin{aligned} \left(\frac{1}{x^7}\right)' &= (x^{-7})' \\ &= -7x^{-7-1} \\ &= -7x^{-8} \quad \dots\text{答え} \\ &= -\frac{7}{x^8} \quad \dots\text{答え} \end{aligned}$$

(7) \sqrt{x}

$$\begin{aligned} (\sqrt{x})' &= (x^{\frac{1}{2}})' \\ &= \frac{1}{2}x^{\frac{1}{2}-1} \\ &= \frac{1}{2}x^{-\frac{1}{2}} \quad \dots\text{答え} \\ &= \frac{1}{2}(\sqrt{x})^{-1} \\ &= \frac{1}{2\sqrt{x}} \quad \dots\text{答え} \end{aligned}$$

(8) $\sqrt[3]{x}$

$$\begin{aligned} (\sqrt[3]{x})' &= (x^{\frac{1}{3}})' \\ &= \frac{1}{3}x^{\frac{1}{3}-1} \\ &= \frac{1}{3}x^{-\frac{2}{3}} \quad \dots\text{答え} \\ &= \frac{1}{3}(\sqrt[3]{x})^{-2} \\ &= \frac{1}{3\sqrt[3]{x^2}} \quad \dots\text{答え} \end{aligned}$$

(9) $\frac{1}{\sqrt{x}}$

$$\begin{aligned} \left(\frac{1}{\sqrt{x}}\right)' &= (x^{-\frac{1}{2}})' \\ &= -\frac{1}{2}x^{-\frac{1}{2}-1} \\ &= -\frac{1}{2}x^{-\frac{3}{2}} \quad \dots\text{答え} \\ &= -\frac{1}{2\sqrt{x^3}} \quad \dots\text{答え} \\ &= -\frac{1}{2x\sqrt{x}} \quad \dots\text{答え} \end{aligned}$$

2. 次の式を x について微分せよ。(S級1分20秒, A級2分, B級3分, C級4分20秒)

(1) x^3

$$\begin{aligned} (x^3)' &= 3x^{3-1} \\ &= 3x^2 \quad \dots\text{答え} \end{aligned}$$

(2) $x^{\frac{7}{3}}$

$$\begin{aligned} \left(x^{\frac{7}{3}}\right)' &= \frac{7}{3}x^{\frac{7}{3}-1} \\ &= \frac{7}{3}x^{\frac{4}{3}} \quad \dots\text{答え} \\ &= \frac{7}{3}x\sqrt[3]{x} \quad \dots\text{答え} \end{aligned}$$

(3) $\frac{1}{x^4}$

$$\begin{aligned} \left(\frac{1}{x^4}\right)' &= (x^{-4})' \\ &= -4x^{-4-1} \\ &= -4x^{-5} \quad \dots\text{答え} \\ &= -\frac{4}{x^5} \quad \dots\text{答え} \end{aligned}$$

(4) $\frac{3}{2x^6}$

$$\begin{aligned} \left(\frac{3}{2} \cdot \frac{1}{x^6}\right)' &= \frac{3}{2} \cdot (x^{-6})' \\ &= \frac{3}{2} \cdot (-6)x^{-6-1} \\ &= -9x^{-7} \quad \dots\text{答え} \\ &= -\frac{9}{x^7} \quad \dots\text{答え} \end{aligned}$$

(5) $\sqrt[4]{x}$

$$\begin{aligned} (\sqrt[4]{x})' &= \left(x^{\frac{1}{4}}\right)' \\ &= \frac{1}{4}x^{\frac{1}{4}-1} \\ &= \frac{1}{4}x^{-\frac{3}{4}} \quad \dots\text{答え} \\ &= \frac{1}{4\sqrt[4]{x^3}} \quad \dots\text{答え} \end{aligned}$$

(6) $\sqrt[3]{x^2}$

$$\begin{aligned} (\sqrt[3]{x^2})' &= \left(x^{\frac{2}{3}}\right)' \\ &= \frac{2}{3}x^{\frac{2}{3}-1} \\ &= \frac{2}{3}x^{-\frac{1}{3}} \quad \dots\text{答え} \\ &= \frac{2}{3\sqrt[3]{x}} \quad \dots\text{答え} \end{aligned}$$

(7) $\frac{3}{\sqrt[3]{x}}$

$$\begin{aligned} \left(\frac{3}{\sqrt[3]{x}}\right)' &= \left(3x^{-\frac{1}{3}}\right)' \\ &= 3 \cdot \left(-\frac{1}{3}\right)x^{-\frac{1}{3}-1} \\ &= -x^{-\frac{4}{3}} \quad \dots\text{答え} \\ &= -\frac{1}{\sqrt[3]{x^4}} \quad \dots\text{答え} \\ &= -\frac{1}{x\sqrt[3]{x}} \quad \dots\text{答え} \end{aligned}$$

(8) $\frac{x}{\sqrt[5]{x^2}}$

$$\begin{aligned} \left(\frac{x}{\sqrt[5]{x^2}}\right)' &= \left(x \cdot x^{-\frac{2}{5}}\right)' \\ &= \left(x^{\frac{3}{5}}\right)' \\ &= \frac{3}{5}x^{\frac{3}{5}-1} \\ &= \frac{3}{5}x^{-\frac{2}{5}} \quad \dots\text{答え} \\ &= \frac{3}{5\sqrt[5]{x^2}} \quad \dots\text{答え} \end{aligned}$$