

反射テスト 微分 三角関数と合成関数 01

1. 次の式を x について微分せよ. (S 級 1 分, A 級 2 分, B 級 3 分 20 秒, C 級 5 分)

(1) $\sin x$

(2) $\sin x^2$

(3) $\sin x^3$

(4) $\cos x$

(5) $\cos x^2$

(6) $\cos x^3$

(7) $\tan x$

(8) $\tan x^2$

(9) $\tan x^3$

2. 次の式を x について微分せよ. (S 級 1 分, A 級 2 分, B 級 3 分 20 秒, C 級 5 分)

(1) $\sin x^4$

(2) $\sin\left(\frac{1}{x}\right)$

(3) $\cos x^5$

(4) $\cos(x^2 + 1)$

(5) $\tan x^6$

(6) $\tan(\sin x)$

反射テスト 微分 三角関数と合成関数 01 解答解説

1. 次の式を x について微分せよ. (S 級 1 分, A 級 2 分, B 級 3 分 20 秒, C 級 5 分)

(1) $\sin x$

$$(\sin x)' = \cos x \quad \dots \text{答え}$$

(2) $\sin x^2$

$$\begin{aligned} (\sin x^2)' &= (\cos x^2) \cdot 2x \\ &= 2x \cos x^2 \quad \dots \text{答え} \end{aligned}$$

(3) $\sin x^3$

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

(4) $\cos x$

$$(\cos x)' = -\sin x \quad \dots \text{答え}$$

(5) $\cos x^2$

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

(6) $\cos x^3$

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

(7) $\tan x$

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

(8) $\tan x^2$

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

(9) $\tan x^3$

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

2. 次の式を x について微分せよ. (S 級 1 分, A 級 2 分, B 級 3 分 20 秒, C 級 5 分)

(1) $\sin x^4$

$$\begin{aligned} & (\sin x^4)' \\ &= (\cos x^4) \cdot 4x^3 \\ &= 4x^3 \cos x^4 \quad \dots\text{答え} \end{aligned}$$

(2) $\sin\left(\frac{1}{x}\right)$

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

(3) $\cos x^5$

$$\begin{aligned} & (\cos x^5)' \\ &= (-\sin x^5) \cdot 5x^4 \\ &= -5x^4 \sin x^5 \quad \dots\text{答え} \end{aligned}$$

(4) $\cos(x^2 + 1)$

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

(5) $\tan x^6$

$$\begin{aligned} & (\tan x^6)' \\ &= \left(\frac{1}{\cos^2 x^6}\right) \cdot 6x^5 \\ &= \frac{6x^5}{\cos^2 x^6} \quad \dots\text{答え} \end{aligned}$$

(6) $\tan(\sin x)$

$$\begin{aligned} & \{\tan(\sin x)\}' \\ &= \frac{1}{\cos^2(\sin x)} \cdot \cos x \\ &= \frac{\cos x}{\cos^2(\sin x)} \quad \dots\text{答え} \end{aligned}$$