

反射テスト 微分 三角・指数・対数関数の合成と微分 01

1. $\frac{dy}{dx}$ を求めよ。(S級 1分10秒, A級 1分50秒, B級 3分, C級 4分30秒)

(1) $y = \sin^2 x$

(2) $y = \tan^2 x$

(3) $y = (\log x)^2$

(4) $y = (\log_3 x)^3$

(5) $y = e^{2x}$

(6) $y = e^{\sqrt{x}}$

2. $\frac{dy}{dx}$ を求めよ. (S 級 1 分 10 秒, A 級 1 分 50 秒, B 級 3 分, C 級 4 分 30 秒)

(1) $y = \cos^2 x$

(2) $y = \tan^3 x$

(3) $y = (\log x)^3$

(4) $y = (\log_5 x)^2$

(5) $y = e^{(x^2-x)}$

(6) $y = 2^{(1-x)}$

反射テスト 微分 三角・指数・対数関数の合成と微分 01 解答解説

1. $\frac{dy}{dx}$ を求めよ。(S級 1分10秒, A級 1分50秒, B級 3分, C級 4分30秒)

(1) $y = \sin^2 x$

(2) $y = \tan^2 x$

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

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

(3) $y = (\log x)^2$

(4) $y = (\log_3 x)^3$

$$\begin{aligned} y' &= 2 \log x \cdot (\log x)' \\ &= 2 \log x \cdot \frac{1}{x} \\ &= \frac{2 \log x}{x} \quad \dots \text{答え} \end{aligned}$$

$$\begin{aligned} y' &= 3(\log_3 x)^2 \cdot (\log_3 x)' \\ &= 3(\log_3 x)^2 \cdot \frac{1}{x \log 3} \\ &= \frac{3(\log_3 x)^2}{x \log 3} \quad \dots \text{答え} \end{aligned}$$

(5) $y = e^{2x}$

(6) $y = e^{\sqrt{x}}$

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

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

2. $\frac{dy}{dx}$ を求めよ。(S級1分10秒, A級1分50秒, B級3分, C級4分30秒)

(1) $y = \cos^2 x$

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

(2) $y = \tan^3 x$

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

(3) $y = (\log x)^3$

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

(4) $y = (\log_5 x)^2$

$$\begin{aligned}y' &= 2 \log_5 x \cdot (\log_5 x)' \\ &= 2 \log_5 x \cdot \frac{1}{x \log 5} \\ &= \frac{2 \log_5 x}{x \log 5} \quad \dots \text{答え}\end{aligned}$$

(5) $y = e^{(x^2-x)}$

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

(6) $y = 2^{(1-x)}$

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