

微分の8つの公式

$$1. (x^\alpha)' = \alpha x^{\alpha-1}$$

$$2. (\sin x)' = \cos x$$

$$3. (\cos x)' = -\sin x$$

$$4. (\tan x)' = \frac{1}{\cos^2 x}$$

$$5. (e^x)' = e^x$$

$$6. (a^x)' = a^x \cdot \log a$$

$$7. (\log x)' = \frac{1}{x} \quad (x > 0)$$

$$8. \{\log f(x)\}' = \frac{f'(x)}{f(x)} \quad (f(x) > 0)$$

(対数は全て自然対数、 $a > 0$ かつ $a \neq 1$ )

練習

次の関数を微分する

$$1. y = 2^x - 3e^x$$

$$2. y = \log x + x^5$$

$$3. y = 2\cos x + 3\sin x$$

$$4. y = \log(\sin x) + \tan x$$

解

$$1. y' = (2^x - 3e^x)'$$

$$= (2^x)' - (3e^x)'$$

$$= 2^x \cdot \log 2 - 3e^x$$

$$2. y' = (\log x + x^5)'$$

$$= (\log x)' + (x^5)'$$

$$= \frac{1}{x} + 5x^4$$

$$= \frac{1+5x^4}{x}$$

$$3. y' = (2\cos x + 3\sin x)'$$

$$= 2(\cos x)' + 3(\sin x)'$$

$$= -2\sin x + 3\cos x$$

$$\begin{aligned} 4. \quad y' &= \{ \log(\sin x) + \tan x \}' \\ &= \{ \log(\sin x) \}' + (\tan x)' \\ &= \frac{(\sin x)'}{\sin x} + \frac{1}{\cos^2 x} \end{aligned}$$