

①

微分積分解法 2017 レポート (3回目)

問1. 微分を計算しなさい.

$$\frac{d}{dx} \operatorname{Arcsin}(2x\sqrt{1-x^2}) = \begin{cases} \frac{\boxed{(1)}}{\sqrt{1-x^2}} & (1-2x^2 > 0) \\ -\frac{\boxed{(1)}}{\sqrt{1-x^2}} & (1-2x^2 < 0) \end{cases}$$

問2. $f(x) = e^{\sqrt{x}}$ とする.

$$\frac{d^2 f}{dx^2}(x) = \frac{e^{\sqrt{x}}}{\boxed{(2)} x} \left(1 - \frac{1}{\sqrt{x}}\right)$$

$$\boxed{(1)} = 2$$

$$\boxed{(2)} = 4$$

問1.

$$\frac{d}{dx} \operatorname{Arcsin}(2x\sqrt{1-x^2})$$

$$= \frac{(2x\sqrt{1-x^2})'}{\sqrt{1-4x^2(1-x^2)}}$$

$$= \frac{2\sqrt{1-x^2} + 2x \cdot \frac{1}{2} \frac{(-2x)}{\sqrt{1-x^2}}}{\sqrt{(2x^2-1)^2}}$$

$$= \frac{2(1-2x^2)}{\sqrt{1-x^2}} \times \begin{cases} \frac{1}{1-2x^2} & (1-2x^2 > 0) \\ \frac{-1}{1-2x^2} & (1-2x^2 < 0) \end{cases}$$

$$= \frac{2}{\sqrt{1-x^2}} \times \begin{cases} +1 & (1-2x^2 > 0) \\ -1 & (1-2x^2 < 0) \end{cases}$$

問2.

$$\frac{d}{dx} f(x) = \frac{1}{2\sqrt{x}} e^{\sqrt{x}}$$

3

$$\begin{aligned}\frac{d^2}{dx^2} f(x) &= \frac{1}{2} \left(-\frac{1}{2}\right) \frac{1}{\sqrt{x}^3} e^{\sqrt{x}} \\ &\quad + \frac{1}{2\sqrt{x}} \left(\frac{1}{2\sqrt{x}} e^{\sqrt{x}}\right) \\ &= \frac{1}{4x} \left(-\frac{1}{\sqrt{x}} + 1\right) e^{\sqrt{x}} \quad //\end{aligned}$$