

①

微積分解法 2019 レポート (10目)

問1 次の極限をもとめよ.

$$\lim_{n \rightarrow \infty} \sqrt{n} (\sqrt{n+2} - \sqrt{n}) = \boxed{(1)}$$

問2 次の極限をもとめよ.

$$\lim_{x \rightarrow 2-0} \frac{x-2}{\sqrt{x^2-4x+4}} = \boxed{(2)}$$

ただし、 $\boxed{(1)}$, $\boxed{(2)}$ は整数.

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

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

問1.

$$\begin{aligned} & \sqrt{n} (\sqrt{n+2} - \sqrt{n}) \\ &= \sqrt{n} \frac{(\sqrt{n+2} + \sqrt{n})(\sqrt{n+2} - \sqrt{n})}{(\sqrt{n+2} + \sqrt{n})} \\ &= \frac{\sqrt{n}}{\sqrt{n+2} + \sqrt{n}} (n+2-n) \\ &= \frac{2\sqrt{n}}{\sqrt{n+2} + \sqrt{n}} \\ &= \frac{2}{\sqrt{1+\frac{2}{n}} + 1} \longrightarrow \frac{2}{1+1} = 1 \quad (n \rightarrow \infty) \end{aligned}$$

問2.

$$\begin{aligned} & \frac{x-2}{\sqrt{x^2-4x+4}} \\ &= \frac{x-2}{\sqrt{(x-2)^2}} \end{aligned}$$

$x < 2$ なので、 $x-2 < 0$

よて

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$$5式' = \frac{x-2}{2-x} = -1$$

よち

$$\frac{x-2}{\sqrt{x^2-4x+4}} \rightarrow -1 \quad (x \rightarrow 2-0)$$