

③ P163

(1) $3^{x+1} = 3\sqrt{9}$

(両辺を 3^n の形に直す)

$$\begin{aligned} 3^{x+1} &= 9^{\frac{1}{2}} \\ &= (3^2)^{\frac{1}{2}} \\ &= 3^{2 \times \frac{1}{2}} \\ &= 3^1 \end{aligned}$$

よって

$$\begin{aligned} x+1 &= \frac{2}{2} \\ x &= \frac{2}{2} - 1 \\ \therefore x &= -\frac{1}{2} \end{aligned}$$

$$\sqrt[n]{x} = x^{\frac{1}{n}}$$

$$(x^m)^n = x^{m \times n}$$

$$\begin{aligned} x^m &= x^n \\ \updownarrow \\ m &= n \end{aligned}$$

(2) $8^x \leq 4^{x+1}$

(両辺を 2^n の形に直す)

$$\begin{aligned} (2^3)^x &\leq (2^2)^{x+1} \\ 2^{3 \times x} &\leq 2^{2 \times (x+1)} \\ 2^{3x} &\leq 2^{2x+2} \end{aligned}$$

底 2 は 1 より大きいので

$$\begin{aligned} 3x &\leq 2x+2 \\ 3x-2x &\leq 2 \end{aligned}$$

$$\therefore x \leq 2$$

$$a^x \leq a^y \text{ について}$$

(i) 底 a が 1 より大きいとき

$$x \leq y$$

(ii) 底 a が 1 より小さいとき

$$x \geq y$$

(3) $(\frac{1}{2})^{x-1} \geq (\sqrt{2})^x$

(両辺を 2^n の形に直す)

$$\begin{aligned} (2^{-1})^{x-1} &\geq (2^{\frac{1}{2}})^x \\ 2^{-1 \times (x-1)} &\geq 2^{\frac{1}{2} \times x} \\ 2^{-x+1} &\geq 2^{\frac{1}{2}x} \end{aligned}$$

底 2 は 1 より大きいので

$$-x+1 \geq \frac{1}{2}x$$

$$-x - \frac{1}{2}x \geq -1$$

$$-\frac{3}{2}x \geq -1$$

$$\therefore x \leq \frac{2}{3}$$

$$\frac{1}{x^n} = x^{-n}$$