

③ p173

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

よって

$$\begin{aligned}
 x+1 &= \frac{2}{3} \\
 x &= \frac{2}{3} - 1 \\
 x &= \underline{\underline{-\frac{1}{3}}}
 \end{aligned}$$

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

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

底2は1より大きいので

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

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

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

底2は1より大きいので

$$\begin{aligned}
 -(x-1) &\geq \frac{1}{2}x \\
 \text{両辺に2をかける} \\
 -2(x-1) &\geq x \\
 -2x+2 &\geq x \\
 -3x &\geq -2 \\
 x &\leq \underline{\underline{\frac{2}{3}}}
 \end{aligned}$$