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$$0) 3 \cdot 2^{x+3} = 192 \cdot 3^{x-3}$$

$$3 \cdot 2^{x+3} = 2^6 \cdot 3 \cdot 3^{x-3}$$

$$3 \cdot 2^{x+3} = 2^6 \cdot 3^{1+x-3}$$

$$\begin{cases} 1 = x - 2 \\ x = 3 \end{cases}$$

$$\begin{cases} x + 3 = 6 \\ x = 6 - 3 \\ x = 3 \end{cases}$$

$$\begin{aligned} \text{P/ } 2^{4x} - 2^{2x} - 12 &= 0 & 2^x &= t \\ 2^{x^4} - 2^{x^2} - 12 &= 0 & t^2 &= z \\ t^4 - t^2 - 12 &= 0 \end{aligned}$$

$$z^2 - z - 12 = 0$$

$$z = \frac{+1 \pm \sqrt{1 - 4 \cdot (-12)}}{2} = \frac{1 \pm 7}{2} \begin{matrix} \nearrow 4 \\ \searrow -3 \end{matrix}$$

$$t^2 = 4 \rightarrow t = \sqrt{4} \begin{matrix} \nearrow +2 \\ \searrow -2 \end{matrix}$$

$$t^2 = -3 \quad \cancel{\text{X}}$$

$$2^x = t$$

$$2^x = 2$$

$$x = 1$$

$$\boxed{x = 1}$$

$$2^x = -2$$

$$\cancel{\text{X}}$$

$$9) (4^x - 64) \cdot (3^x - 81) = 0$$

$$2^{2x} - 2^6 = 0 \quad 3^x - 3^4 = 0$$

$$2x = 6$$

$$\boxed{x = 3}$$

$$\boxed{x = 4}$$

$$2) \frac{8}{6^x} = 3^{-x}$$

$$\frac{2^3}{(2 \cdot 3)^x} = \frac{1}{3^x} \quad 3^x \cdot 2^3 = 2^x \cdot 3^x$$

$$\frac{2^x}{2^3} = 2^3 \quad \cancel{3^x = 3^x}$$

$$\boxed{x = 3}$$

$$3) \frac{2}{4^x - 2^x} = 1$$

$$\frac{2}{2^{2x} - 2^x} = \frac{1}{1} ; \quad 2 = 2^{2x} - 2^x$$

$$2^x = t$$

$$2^x = 2$$

$$\boxed{x = 1}$$

$$2 = t^2 - t \quad t^2 - t - 2 = 0$$

$$t = \frac{1 \pm \sqrt{1 - 4 \cdot (-2)}}{2}$$

$$t = \frac{1 \pm \sqrt{9}}{2} = \begin{cases} \frac{4}{2} = \boxed{2} \\ \frac{-2}{2} = \boxed{-1} \end{cases}$$