

10.4

$$\begin{aligned}
 1) \quad 3^{1-2n} &= 3^{1-3n} \\
 1 - 2n &= 1 - 3n \\
 \quad \quad +3n &\quad +3n \\
 \hline
 1 + n &= 1 \\
 -1 &\quad -1 \\
 \hline
 n &= 0
 \end{aligned}$$

$$\begin{aligned}
 3) \quad 4^{2a} &= 1 \\
 4^{2a} &= 1^0 \\
 \frac{2a}{a} &= \frac{0}{2} \\
 a &= 0
 \end{aligned}$$

$$\begin{aligned}
 5) \quad \left(\frac{1}{25}\right)^{-k} &= 125^{-2k-2} \\
 (5^{-2})^{-k} &= (5^3)^{-2k-2} \\
 5^{2k} &= 5^{-6k-6} \\
 2k &= -6k - 6 \\
 \quad \quad +6k &\quad +6k \\
 \hline
 \frac{8k}{8} &= -\frac{6}{8} \\
 k &= -\frac{3}{4}
 \end{aligned}$$

$$\begin{aligned}
 7) \quad 6^{2m+1} &= \frac{1}{36} \\
 6^{2m+1} &= 6^{-2} \\
 2m + 1 &= -2 \\
 \quad \quad -1 &\quad -1 \\
 \hline
 \frac{2m}{2} &= \frac{-3}{2} \\
 m &= -\frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 9) \quad 6^{-3x} &= 36 \\
 6^{-3x} &= 6^2 \\
 -\frac{3x}{-3} &= \frac{2}{-3} \\
 x &= -\frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 11) \quad 64^b &= 2^5 \\
 (2^6)^b &= 2^5 \\
 2^{6b} &= 2^5 \\
 \frac{6b}{6} &= \frac{5}{6} \\
 b &= \frac{5}{6}
 \end{aligned}$$

$$\begin{aligned}
 13) \quad \left(\frac{1}{4}\right)^x &= 16 \\
 (4^{-1})^x &= 4^2 \\
 4^{-x} &= 4^2 \\
 -\frac{x}{-1} &= \frac{2}{-1} \\
 x &= -2
 \end{aligned}$$

$$\begin{aligned}
 15) \quad 4^{3a} &= 4^3 \\
 \frac{3a}{3} &= \frac{3}{3} \\
 a &= 1
 \end{aligned}$$

$$\begin{aligned}
 17) \quad 36^{3x} &= 216^{2x+1} \\
 (6^2)^{3x} &= (6^3)^{2x+1} \\
 6^{6x} &= 6^{6x+1} \\
 6x &= 6x + 1 \\
 \quad \quad -6x &\quad -6x \\
 \hline
 0 &= 1 \\
 &false \\
 &No\ Solution
 \end{aligned}$$

$$\begin{aligned}
 19) \quad 9^{2n+3} &= 243 \\
 (3^2)^{2n+3} &= 3^5 \\
 3^{4n+6} &= 3^5 \\
 4n + 6 &= 5 \\
 \quad \quad -6 &\quad -6 \\
 \hline
 \frac{4n}{4} &= \frac{-1}{4} \\
 n &= -\frac{1}{4}
 \end{aligned}$$

$$\begin{aligned}
 21) \quad 3^{3x-2} &= 3^{3x+1} \\
 3x - 2 &= 3x + 1 \\
 \quad \quad -3x &\quad -3x \\
 \hline
 -2 &= 1 \\
 &false \\
 &No\ Solution
 \end{aligned}$$

$$\begin{aligned}
 23) \quad 3^{-2x} &= 3^3 \\
 \frac{-2x}{-2} &= \frac{3}{-2} \\
 x &= -\frac{3}{2}
 \end{aligned}$$

$$25) 5^{m+2} + 5^{-m}$$

$$m + 2 = -m$$

$$\frac{-m}{-2} = \frac{-m}{-2}$$

$$\frac{2}{-2} = \frac{-2m}{-2}$$

$$-1 = m$$

$$27) \left(\frac{1}{36}\right)^{b-1} = 216$$

$$(6^{-2})^{b-1} = 6^3$$

$$6^{-2b+2} = 6^3$$

$$-2b + 2 = 3$$

$$\frac{-2}{-2} = \frac{-2}{-2}$$

$$\frac{-2b}{-2} = \frac{1}{-2}$$

$$b = -\frac{1}{2}$$

$$29) r6^{2-2x} = 6^2$$

$$2 - 2x = 2$$

$$\frac{-2}{-2} = \frac{-2}{-2}$$

$$\frac{-2x}{-2} = \frac{0}{-2}$$

$$x = 0$$

$$31) 4 \cdot 2^{(-3n-1)} = \frac{1}{4}$$

$$2^2 \cdot 2^{-3n-1} = 2^{-2}$$

$$2^{-3n+1} = 2^{-2}$$

$$-3n + 1 = -2$$

$$\frac{-1}{-3} = \frac{-1}{-3}$$

$$\frac{-3n}{-3} = \frac{-3}{-3}$$

$$n = 1$$

$$33) 4^{3k-3} \cdot 4^{2-2k} = 16^{-k}$$

$$4^{k-1} = (4^2)^{-k}$$

$$4^{k-1} = 4^{-2k}$$

$$k - 1 = -2k$$

$$\frac{-k}{-3} = \frac{-k}{-3}$$

$$\frac{-1}{-3} = \frac{-3k}{-3}$$

$$\frac{1}{3} = k$$

$$35) 9^{-2x} \left(\frac{1}{243}\right)^{3x} = 243^{-x}$$

$$(3^2)^{-2x} (3^{-5})^{3x} = (3^5)^{-x}$$

$$3^{-4x} \cdot 3^{-15x} = 3^{-5x}$$

$$3^{-19x} = 3^{-5x}$$

$$-19x = -5x$$

$$\frac{+19x}{14} = \frac{+19x}{14}$$

$$\frac{0}{14} = \frac{14x}{14}$$

$$0 = x$$

$$37) 64^{n-2} \cdot 16^{n+2} = \left(\frac{1}{4}\right)^{3n-1}$$

$$(4^3)^{n-2} \cdot (4^2)^{n+2} = (4^{-1})^{3n-1}$$

$$4^{3n-6} \cdot 4^{2n+4} = 4^{-3n+1}$$

$$4^{5n-2} = 4^{-3n+1}$$

$$5n - 2 = -3n + 1$$

$$\frac{+3n}{8n-2} = \frac{+3n}{8n-2}$$

$$8n - 2 = 1$$

$$\frac{+2}{8n} = \frac{+2}{8n}$$

$$\frac{8n}{8} = \frac{3}{8}$$

$$n = \frac{3}{8}$$

$$39) 5^{-3n-3} \cdot 5^{2n} = 1$$

$$5^{-n-3} = 5^0$$

$$-n - 3 = 0$$

$$\frac{+3}{-1} = \frac{+3}{-1}$$

$$\frac{-n}{-1} = \frac{3}{-1}$$

$$n = -3$$