

$$6. \quad 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$$

$$9. \quad \frac{2^{-3}}{6^{-3}} = \left(\frac{2}{6}\right)^{-3} = \left(\frac{1}{3}\right)^{-3} = \left(\frac{3}{1}\right)^3 = 3^3 = 27$$

$$26. \quad \begin{aligned} (x^{-1}y^2)^{-3}(x^2y^{-4})^{-3} &= (x^3y^{-6})(x^{-6}y^{12}) \\ &= x^{3-6}y^{-6+12} \\ &= x^{-3}y^6 \\ &= \frac{y^6}{x^3} \end{aligned}$$

$$32. \quad \begin{aligned} \left(\frac{x^{-3}y^{-4}}{x^{-2}y}\right)^{-2} &= \frac{x^6y^8}{x^4y^{-2}} \\ &= x^{6-4}y^{8-(-2)} \\ &= x^{6-4}y^{8+2} \\ &= x^2y^{10} \end{aligned}$$

$$34. \quad 49,100,000,000 = 4.91 \times 10^{10}$$

$$36. \quad 0.000000402 = 4.02 \times 10^{-7}$$

$$38. \quad 4.03 \times 10^9 = 4,030,000,000$$

$$39. \quad -2.3 \times 10^{-6} = -0.0000023$$

$$48. \quad \begin{aligned} \frac{(7.2 \times 10^8)(3.9 \times 10^{-7})}{(2.6 \times 10^{-10})(1.8 \times 10^{-8})} &= \frac{(7.2)(3.9)}{(2.6)(1.8)} \times 10^{8-7-(-10)-(-8)} \\ &= 6 \times 10^{8-7+10+8} \\ &= 6 \times 10^{19} \end{aligned}$$

$$70. \quad \frac{12x^{1/6}y^{1/4}}{16x^{3/4}y^{1/2}} = \frac{12x^{1/6-3/4}y^{1/4-1/2}}{16} = \frac{3x^{2/12-9/12}y^{1/4-2/4}}{4} = \frac{3x^{-7/12}y^{-1/4}}{4} = \frac{3}{4x^{7/12}y^{1/4}}$$

$$77. \quad \sqrt{24x^2y^3} = \sqrt{2^2x^2y^2} \cdot \sqrt{6y} = 2|xy|\sqrt{6y}$$

$$80. \quad \sqrt[3]{54m^2n^7} = \sqrt[3]{3^3n^6} \cdot \sqrt[3]{2m^2n} = 3n^2\sqrt[3]{2m^2n}$$

$$88. \quad 4\sqrt{a^5b} - a^2\sqrt{ab} = 4\sqrt{a^4 \cdot ab} - a^2\sqrt{ab} = 4\sqrt{a^4} \cdot \sqrt{ab} - a^2\sqrt{ab} = 4a^2\sqrt{ab} - a^2\sqrt{ab} = 3a^2\sqrt{ab}$$

$$\begin{aligned}
 94. \quad (4\sqrt{a} - \sqrt{b})(3\sqrt{a} + 2\sqrt{b}) &= (4\sqrt{a})(3\sqrt{a}) + (4\sqrt{a}) \cdot (2\sqrt{b}) - \sqrt{b}(3\sqrt{a}) - \sqrt{b}(2\sqrt{b}) \\
 &= (4)(3)\sqrt{a}^2 + (4)(2)(\sqrt{a})(\sqrt{b}) - 3(\sqrt{a})(\sqrt{b}) - 2\sqrt{b}^2 \\
 &= 12a + 8\sqrt{ab} - 3\sqrt{ab} - 2b = 12a + 5\sqrt{ab} - 2b
 \end{aligned}$$

$$98. \quad (\sqrt{2x+1} - 3)^2 = \sqrt{2x+1}^2 + 2(\sqrt{2x+1})(-3) + (-3)^2 = 2x+1 - 6\sqrt{2x+1} + 9 = 2x - 6\sqrt{2x+1} + 10$$

$$105. \quad \frac{4}{\sqrt[3]{8x^2}} = \frac{4}{\sqrt[3]{2^3x^2}} = \frac{4}{2\sqrt[3]{x^2}} = \frac{\cancel{4}^2}{\cancel{2}\sqrt[3]{x^2}} = \frac{2}{\sqrt[3]{x^2}} = \frac{2}{\sqrt[3]{x^2}} \cdot \frac{\sqrt[3]{x}}{\sqrt[3]{x}} = \frac{2\sqrt[3]{x}}{\sqrt[3]{x^3}} = \frac{2\sqrt[3]{x}}{x}$$

$$111. \quad \frac{3}{\sqrt{5} + \sqrt{x}} = \frac{3}{\sqrt{5} + \sqrt{x}} \cdot \frac{\sqrt{5} - \sqrt{x}}{\sqrt{5} - \sqrt{x}} = \frac{3(\sqrt{5} - \sqrt{x})}{(\sqrt{5} + \sqrt{x})(\sqrt{5} - \sqrt{x})} = \frac{3\sqrt{5} - 3\sqrt{x}}{(\sqrt{5})^2 - (\sqrt{x})^2} = \frac{3\sqrt{5} - 3\sqrt{x}}{5 - x}$$