

SOLUCIONES

1. Simplifique cada expresión y exprese sin exponentes negativos.

$$\text{a. } (2s^3t^{-3})\left(\frac{1}{4}s^5\right)(2t)$$

$$= \frac{4}{4}s^3t^{-3}s^5t$$

$$= s^8t^{-3+1}$$

$$= s^8t^{-2}$$

$$= \frac{s^8}{t^2}$$

$$\text{b. } \left(\frac{4p^3q^{-1}}{8p^{-2}q^2}\right)^3$$

$$= \left(\frac{4}{8}p^{3-(-2)}q^{-1-2}\right)^3$$

$$= \left(\frac{1}{2}p^5q^{-3}\right)^3$$

$$= \left(\frac{1}{2}\right)^3 p^{15}q^{-9}$$

$$= \frac{1}{2^3}p^{15}\frac{1}{q^9}$$

$$= \frac{p^{15}}{8q^9}$$

$$\text{c. } \left(\frac{3xy^{-\frac{1}{2}}z^{-3}}{x^{\frac{1}{2}}y^{-\frac{5}{2}}z^2}\right)^{-2}$$

$$= \left(3x^{1-\frac{1}{2}}y^{-\frac{1}{2}-\left(-\frac{5}{2}\right)}z^{-3-2}\right)^{-2}$$

$$= \left(3x^{\frac{1}{2}}y^2z^{-5}\right)^{-2}$$

$$= 3^{-2}x^{-1}y^{-4}z^{10}$$

$$= \frac{1}{3^2}\frac{1}{x}\frac{1}{y^4}z^{10}$$

$$= \frac{z^{10}}{9xy^4}$$

2. Simplifique cada expresión, considerando que las variables representan números reales positivos.

a. $\sqrt[4]{16x^8y^9z^3}$

$$\begin{aligned} &= \sqrt[4]{16} \sqrt[4]{x^8} \sqrt[4]{y^9} \sqrt[4]{z^3} \\ &= \sqrt[4]{2^4} \sqrt[4]{x^8} \sqrt[4]{y^8 y} \sqrt[4]{z^3} \\ &= 2x^2 y^2 \sqrt[4]{y} \sqrt[4]{z^3} \end{aligned}$$

b. $\sqrt{3a^3b^6} \cdot \sqrt{27ab^2}$

$$\begin{aligned} &= \sqrt{3a^3b^6(27ab^2)} \\ &= \sqrt{81a^4b^8} \\ &= 9a^2b^4 \end{aligned}$$

c. $\frac{\sqrt{75x^4y^6z}}{\sqrt{3x^2y^{-10}z}}$

$$\begin{aligned} &= \sqrt{\frac{75x^4y^6z}{3x^2y^{-10}z}} \\ &= \sqrt{25x^{4-2}y^{6-(-10)}z^{1-1}} \\ &= \sqrt{25x^2y^{16}z^0} \\ &= \sqrt{25x^2y^{16}} \\ &= 5xy^8 \end{aligned}$$

d. $\frac{\sqrt[5]{128x^0y^9}}{\sqrt[5]{4x^5y^{-1}}}$

$$\begin{aligned} &= \sqrt[5]{\frac{128x^0y^9}{4x^5y^{-1}}} \\ &= \sqrt[5]{\frac{32y^{9-(-1)}}{x^5}} \\ &= \sqrt[5]{\frac{32y^{10}}{x^5}} \\ &= \frac{\sqrt[5]{32y^{10}}}{\sqrt[5]{x^5}} \\ &= \frac{2y^2}{x} \end{aligned}$$

3. Combine los radicales.

a. $3\sqrt[3]{40x} + \sqrt[3]{135x}$

$$\begin{aligned} &= 3\sqrt[3]{2^3 \cdot 5x} + \sqrt[3]{3^3 \cdot 5x} \\ &= 3 \cdot 2\sqrt[3]{5x} + 3\sqrt[3]{5x} \\ &= 6\sqrt[3]{5x} + 3\sqrt[3]{5x} \\ &= 9\sqrt[3]{5x} \end{aligned}$$

b. $3\sqrt{50} + \sqrt{18} + 5\sqrt{32} - \sqrt{162}$

$$\begin{aligned} &= 3\sqrt{5^2 \cdot 2} + \sqrt{3^2 \cdot 2} + 5\sqrt{2^4 \cdot 2} - \sqrt{3^4 \cdot 2} \\ &= 3(5)\sqrt{2} + 3\sqrt{2} + 5(2^2)\sqrt{2} - 3^2\sqrt{2} \\ &= 15\sqrt{2} + 3\sqrt{2} + 20\sqrt{2} - 9\sqrt{2} \\ &= 29\sqrt{2} \end{aligned}$$