

099 §6.1 II #547-49

$$(47) 27^{-\frac{1}{3}} = \frac{1}{27^{\frac{1}{3}}} = \boxed{\frac{1}{3}}$$

$$\begin{array}{r} 3 \overline{) 81} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \end{array}$$

$$(49) 81^{-\frac{3}{4}} = \frac{1}{81^{\frac{3}{4}}}$$

$$= \frac{1}{(3^4)^{\frac{3}{4}}} = \frac{1}{3^3} = \boxed{\frac{1}{27}}$$

$$(51) \left(\frac{25}{36}\right)^{-\frac{1}{2}} = \frac{1}{\left(\frac{25}{36}\right)^{\frac{1}{2}}} = \left(\frac{36}{25}\right)^{\frac{1}{2}} = \frac{(6^2)^{\frac{1}{2}}}{(5^2)^{\frac{1}{2}}}$$

$$= \boxed{\frac{6}{5}}$$

$$(53) \left(\frac{81}{16}\right)^{-\frac{1}{4}} = \left(\frac{16}{81}\right)^{\frac{1}{4}} = \left(\frac{2^4}{3^4}\right)^{\frac{1}{4}} = \frac{2^{\frac{4}{4}}}{3^{\frac{4}{4}}} = \boxed{\frac{2}{3}}$$

$$(55) 16^{\frac{1}{2}} + 27^{\frac{1}{3}} = (2^4)^{\frac{1}{2}} + (3^3)^{\frac{1}{3}} = 2^{\frac{4}{2}} + 3^{\frac{3}{3}}$$

$$= 2^2 + 3 = 4 + 3 = \boxed{7}$$

$$(57) 8^{-\frac{2}{3}} + 4^{-\frac{1}{2}} = \frac{1}{8^{\frac{2}{3}}} + \frac{1}{4^{\frac{1}{2}}} = \frac{1}{(2^3)^{\frac{2}{3}}} + \frac{1}{2}$$

$$= \frac{1}{2^{\frac{6}{3}}} + \frac{1}{2} = \frac{1}{4} + \frac{1}{2} = \frac{1}{4} + \frac{1}{2} \cdot \frac{2}{2} = \frac{1+2}{4} = \boxed{\frac{3}{4}}$$

099 §6.1 II #s 59-79

#s 59-79 Simplify. Assume all bases are positive.

Bases are positive means $\sqrt{x^2} = x$

If they do NOT say "Bases are positive,"

then $\sqrt{x^2} = |x|$.

$$(59) \quad x^{\frac{3}{5}} x^{\frac{1}{5}} = x^{\frac{3}{5} + \frac{1}{5}} = \boxed{x^{\frac{4}{5}}}$$

$$(61) \quad (a^{\frac{3}{4}})^{\frac{4}{3}} = a^{\left(\frac{3}{4}\right)\left(\frac{4}{3}\right)} = a^1 = \boxed{a}$$

$$(63) \quad \frac{x^{\frac{1}{5}}}{x^{\frac{3}{5}}} = x^{\frac{1}{5} - \frac{3}{5}} = x^{-\frac{2}{5}} = \boxed{\frac{1}{x^{\frac{2}{5}}}}$$

$$(65) \quad \frac{x^{\frac{5}{6}}}{x^{\frac{2}{3}}} = x^{\frac{5}{6} - \frac{2}{3}} = x^{\frac{5}{6} - \frac{4}{6}} = x^{\frac{5-4}{6}} = \boxed{x^{\frac{1}{6}}}$$

$$(67) \quad (x^{\frac{3}{5}} y^{\frac{5}{6}} z^{\frac{1}{3}})^{\frac{3}{5}} = x^{\left(\frac{3}{5}\right)\left(\frac{3}{5}\right)} y^{\left(\frac{5}{6}\right)\left(\frac{3}{5}\right)} z^{\left(\frac{1}{3}\right)\left(\frac{3}{5}\right)}$$
$$= \boxed{x^{\frac{9}{25}} y^{\frac{1}{2}} z^{\frac{1}{5}}} \quad \left(\frac{\frac{1}{5}}{2}\right)\left(\frac{\frac{3}{5}}{1}\right) = \frac{1}{2} \checkmark$$

099 § 6.1 II #s 69-79

69

$$\frac{a^{\frac{3}{4}} b^2}{a^{\frac{7}{8}} b^{\frac{1}{4}}} = a^{\frac{3}{4} - \frac{7}{8}} b^{2 - \frac{1}{4}} = a^{-\frac{1}{8}} b^{\frac{7}{4}}$$

$$= \boxed{\frac{b^{\frac{7}{4}}}{a^{\frac{1}{8}}}}$$

71

$$\frac{(y^{\frac{2}{3}})^{\frac{3}{4}}}{(y^{\frac{1}{3}})^{\frac{2}{5}}} = \frac{y^{(\frac{2}{3})(\frac{3}{4})}}{(y^{\frac{1}{3}})^{\frac{2}{5}}} = \frac{y^{\frac{1}{2}}}{y^{\frac{2}{5}}}$$

$$= y^{\frac{1}{2} - \frac{2}{5}} = y^{\frac{5-2}{10}} = \boxed{y^{\frac{3}{10}}}$$

73

$$\left(\frac{a^{-\frac{1}{4}}}{b^{\frac{1}{2}}} \right)^8 = \frac{(a^{-\frac{1}{4}})^8}{(b^{\frac{1}{2}})^8} = \frac{a^{(-\frac{1}{4})(8)}}{b^{(\frac{1}{2})(8)}} = \frac{a^{-2}}{b^4}$$

$$= \boxed{\frac{1}{a^2 b^4}}$$

099 §6.1 II #s 75-9

(75) (a) $\sqrt{25} = \boxed{5}$

(b) $\sqrt{.25} = \boxed{.5}$ $\sqrt{\frac{25}{100}} = \sqrt{\frac{5^2}{10^2}} = \sqrt{\left(\frac{5}{10}\right)^2} = \frac{5}{10} = \frac{1}{2} = .5$

(c) $\sqrt{2500} = 50$ $\sqrt{(25)(100)} = \sqrt{25}\sqrt{100} = 5 \cdot 10 = \boxed{50}$

(d) $\sqrt{.0025} = \sqrt{\frac{25}{10000}} = \sqrt{\frac{5^2}{10^4}} = \frac{\sqrt{5^2}}{\sqrt{10^4}} = \frac{(5^2)^{\frac{1}{2}}}{(10^4)^{\frac{1}{2}}} = \frac{5}{10^2} = \frac{5}{100} = \boxed{.05}$

(77) $\sqrt{16a^4b^8} = \sqrt{2^4} \sqrt{a^4} \sqrt{b^8} = \boxed{2^2 a^2 b^4 = 4a^2b^4}$

(b) $\sqrt[3]{16a^4b^8} = (2^4 a^4 b^8)^{\frac{1}{3}} = 2^{\frac{4}{3}} a^{\frac{4}{3}} b^{\frac{8}{3}}$

$= 2^{\frac{3}{3} + \frac{1}{3}} a^{\frac{3}{3} + \frac{1}{3}} b^{\frac{6}{3} + \frac{2}{3}} = 2^{1 + \frac{1}{3}} a^{1 + \frac{1}{3}} b^{2 + \frac{2}{3}}$

$= 2 \cdot 2^{\frac{1}{3}} a \cdot a^{\frac{1}{3}} b^2 \cdot b^{\frac{2}{3}} = 2ab^2 \cdot 2^{\frac{1}{3}} a^{\frac{1}{3}} b^{\frac{2}{3}}$

$= 2ab^2 (2^{\frac{1}{3}} a^{\frac{1}{3}} b^{\frac{2}{3}})^{\frac{1}{3}} = \boxed{2ab^2 \sqrt[3]{2ab^2}}$

099 § 6.1 II #s 77-9

$$\textcircled{77} \textcircled{c} \sqrt[4]{16a^4b^8} = 16^{\frac{1}{4}}(a^4)^{\frac{1}{4}}(b^8)^{\frac{1}{4}}$$

$$= \boxed{2ab^2}$$

$$\textcircled{79} (a^{\frac{1}{2}} + b^{\frac{1}{2}})^2 \text{ is } \underline{\underline{\underline{\text{NOT}}}} a+b$$

Let $a=9$, $b=4$. Then

$$(a^{\frac{1}{2}} + b^{\frac{1}{2}})^2 = (9^{\frac{1}{2}} + 4^{\frac{1}{2}})^2 = (3+4)^2 = 7^2 = 49,$$

BUT

$a+b = 9+4 = 13$, and, in case you
didn't know, $13 \neq 49!$ 