Simplify.

$$\frac{a^{1}b^3c^5}{a^4b^{1}c^7} = \boxed{\frac{b^2}{a^3c^2}}$$

Simplify.

$$(x^{-1}y^2)^{-3}(x^2y^{-4})^{-3}$$

$$x^3y^{-6}x^{-6}y^{12} = x^{-3}y^6 = \boxed{\frac{y^6}{x^3}}$$

6.6

25. $\frac{1}{a}+\frac{1}{b}=\frac{1}{x}$; x

Equation w/ Fractions

$\Rightarrow$ multiply both sides by LCD

$$\frac{abx}{1}\left(\frac{1}{a}+\frac{1}{b}\right) = \frac{1}{\cancel{x}}\cdot\frac{ab\cancel{x}}{1}$$

$$\frac{\cancel{a}bx}{1}\cdot\frac{1}{\cancel{a}} + \frac{a\cancel{b}x}{1}\cdot\frac{1}{\cancel{b}} = ab$$

$\Rightarrow$ equation without fractions

$$bx + ax = ab$$

Factor out x

$$x(b+a) = ab$$

Divide by $(b+a)$

$$\boxed{x = \frac{ab}{b+a}}$$

$bx + ax =$
$(b+a)x$

$3x + 2x =$
$(3+2)x$

7.1

38. $\left(b^{\frac{2}{3}} \cdot b^{\frac{1}{6}}\right)^{6}$

$= b^{\frac{2}{\cancel{3}} \cdot \frac{\cancel{6}^{2}}{1}} \cdot b^{\frac{1}{\cancel{6}} \cdot \frac{\cancel{6}}{1}}$

$= b^{4} \cdot b^{1}$

$= \boxed{b^{5}}$

66. $\left(\dfrac{49c^{5/3}}{a^{-1/4}b^{5/6}}\right)^{-3/2}$

$49^{3/2} = \sqrt{49^{3}} = \boxed{\left(\sqrt{49}\right)^{3}}$

$49 \times 7 = 343$ ... $\overset{6}{49} = 7^{3}$

$= \dfrac{49^{-3/2}\, c^{\frac{5}{\cancel{3}}\left(\frac{-\cancel{3}}{2}\right)}}{a^{-\frac{1}{4}\left(\frac{-3}{2}\right)}\, b^{\frac{5}{\cancel{6}_{2}}\left(\frac{-\cancel{3}}{2}\right)}} = \dfrac{49^{-3/2}\, c^{-5/2}}{a^{3/8}\, b^{-5/4}}$

$= \dfrac{b^{5/4}}{49^{3/2}\, a^{3/8}\, c^{5/2}} = \boxed{\dfrac{b^{5/4}}{343\, a^{3/8}\, c^{5/2}}}$

72. $b^{-2/5}\left(b^{-3/5} - b^{7/5}\right)$

applying distributive property...

$b^{-2/5}b^{-3/5} - b^{-2/5}b^{7/5}$ $\qquad \cancel{x^2 x^3}$

$a^m a^n = a^{m+n}$

$b^{-2/5-3/5} - b^{-2/5+7/5} = b^{-5/5} - b^{5/5}$

$= b^{-1} - b = \boxed{\frac{1}{b} - b}$

$$\sqrt[n]{x^n} = \begin{cases} x, & \text{if } n \text{ is odd} \\ |x|, & \text{if } n \text{ is even} \end{cases}$$

$\sqrt[n]{x}$ = the # that we raise to the n^{th} power to get x

e.g. $\sqrt[3]{64} = 4$; $\sqrt{81} = 9$

understood to be $\sqrt[2]{81}$

$\sqrt[3]{8} = 2$

$\sqrt[3]{2^3}$

$\sqrt[3]{-8} = -2$

$\sqrt[2]{4} = 2$

$\sqrt[2]{(-2)^2} = |-2| = 2$

114. $\sqrt{x^{16}} = \sqrt[2]{x^{16}} = \sqrt[2]{(x^8)^2}$

$= |x^8| = \boxed{x^8}$

Rule

$\sqrt[n]{x^n} = x$

$x^{n/n} = x^1$

$$\boxed{\sqrt[n]{x^n} = \begin{cases} x, & n \text{ odd} \\ |x|, & n \text{ even} \end{cases}}$$

118. $\sqrt{x^2 y^{10}} = \sqrt[2]{x^2 (y^5)^2}$

$= \boxed{|x y^5|}$

124. $-\sqrt[3]{x^{15}y^{3}} = (-1)\sqrt[3]{(x^5)^3 y^3}$

$= (-1)x^5y = \boxed{-x^5y}$

136. $\sqrt[3]{-64x^9y^{12}}$

$= \sqrt[3]{(-4)^3(x^3)^3(y^4)^3}$

$= \boxed{-4x^3y^4}$

146. $\sqrt[4]{81x^4y^{20}}$

even root
$\Rightarrow$ abs. value

$= \sqrt[4]{3^4x^4(y^5)^4} = |3xy^5| = \boxed{3|xy^5|}$

(acceptable: $3xy^5$)

150. $\sqrt[5]{243x^{10}y^{40}} = \sqrt[5]{3^5(x^2)^5(y^8)^5}$

$= \boxed{3x^2y^8}$

$|x^2| = x^2$

$x^2 \geq 0$

$|3| = 3$

7.2

16. $\sqrt{60xy^7z^{12}} = \sqrt[2]{2^2 \cdot 15 \cdot x \cdot y^6 \cdot y \cdot z^{6\cdot 2}}$

$5 \cdot 12$

$5 \cdot 3 \cdot 4$

$= \sqrt[2]{2^2 \cdot 15 \cdot x \cdot (y^3)^2 \cdot y \cdot (z^6)^2}$

$= |2y^3z^6|\sqrt{15xy}$

best answer $\longrightarrow$ $= \boxed{2z^6|y^3|\sqrt{15xy}}$

(acceptable: $2y^3z^6\sqrt{15xy}$

20. $\sqrt[3]{a^8 b^{11} c^{15}}$

$11 = 9 + 2$

$b^{11} = b^9 b^2$

$= \sqrt[3]{\underline{a^6} a^2 \underline{b^9} b^2 \underline{c^{15}}}$

$8 = 6 + 2$

$a^8 = a^6 a^2$

$= \sqrt[3]{(a^2)^3 a^2 (b^3)^3 b^2 (c^5)^3}$

$= \boxed{a^2 b^3 c^5 \sqrt[3]{a^2 b^2}}$

22. $\sqrt[4]{64x^8 y^{10}}$

$= \sqrt[4]{2^6 x^8 y^{10}}$

$= \sqrt[4]{2^4 \cdot 2^2 \cdot (x^2)^4 \cdot y^8 y^2}$

$= \sqrt[4]{2^4 \cdot 4 \cdot (x^2)^4 \cdot (y^2)^4 y^2}$

$= |2x^2 y^2| \sqrt[4]{4y^2} = \boxed{2x^2 y^2 \sqrt[4]{4y^2}}$

7.1 # 39-73 odd
125-149 odd
7.2 # 11-21 odd