

section 8.5

$$246-a) \frac{\sqrt{48}}{\sqrt{75}} = \frac{\sqrt{16} \sqrt{3}}{\sqrt{25} \sqrt{3}} = \frac{4 \sqrt{3}}{5 \sqrt{3}} = \frac{4}{5}$$

$$246-b) \frac{\sqrt[3]{81}}{\sqrt[3]{24}} = \frac{\sqrt[3]{27} \sqrt[3]{3}}{\sqrt[3]{8} \sqrt[3]{3}} = \frac{\sqrt[3]{(3)^3} \sqrt[3]{3}}{\sqrt[3]{(2)^3} \sqrt[3]{3}} = \frac{3 \sqrt[3]{3}}{2 \sqrt[3]{3}} = \frac{3}{2}$$

$$248-a) \frac{\sqrt{108n^7}}{\sqrt{243n^3}} = \frac{\sqrt{36n^6} \sqrt{3n}}{\sqrt{81n^2} \sqrt{3n}} = \frac{6n^3 \sqrt{3n}}{9n \sqrt{3n}} = \frac{2n^2}{3}$$

$$248-b) \frac{\sqrt[3]{54y}}{\sqrt[3]{16y^4}} = \frac{\sqrt[3]{27} \sqrt[3]{2y}}{\sqrt[3]{8y^3} \sqrt[3]{2y}} = \frac{3 \sqrt[3]{2y}}{2y \sqrt[3]{2y}} = \frac{3}{2y}$$

$$250-a) \frac{\sqrt{196q}}{\sqrt{484q^5}} = \frac{\sqrt{196} \sqrt{q}}{\sqrt{484q^4} \sqrt{q}} = \frac{14 \sqrt{q}}{22q^2 \sqrt{q}} = \frac{7}{11q^2}$$

$$250-b) \frac{\sqrt[3]{16m^4}}{\sqrt[3]{54m}} = \frac{\sqrt[3]{8m^3} \sqrt[3]{2m}}{\sqrt[3]{27} \sqrt[3]{2m}} = \frac{2m \sqrt[3]{2m}}{3 \sqrt[3]{2m}} = \frac{2m}{3}$$

$$252-a) \frac{\sqrt{98n^2s^{10}}}{\sqrt{2n^3s^4}} = \frac{\sqrt{49s^{10}} \sqrt{2n}}{\sqrt{n^2s^4} \sqrt{2n}} = \frac{7s^5 \sqrt{2n}}{n s^2 \sqrt{2n}} = \frac{7s^3}{n}$$

$$252-b) \frac{\sqrt[3]{-375y^4z^{-2}}}{\sqrt[3]{3y^{-2}z^4}} = \frac{(\sqrt[3]{-125})(\sqrt[3]{3})(\sqrt[3]{y^4})(\sqrt[3]{z^{-2}})}{(\sqrt[3]{3})(\sqrt[3]{y^{-2}})(\sqrt[3]{z^4})} = \frac{(-3)(\sqrt[3]{3})(\sqrt[3]{y})^4(\sqrt[3]{z})^{-2}}{(\sqrt[3]{3})(\sqrt[3]{y})^{-2}(\sqrt[3]{z})^4}$$

$$= \frac{(-3)(\sqrt[3]{y})^4(\sqrt[3]{y})^2}{(\sqrt[3]{z})^4(\sqrt[3]{z})^2} = \frac{(-3)(\sqrt[3]{y})^6}{(\sqrt[3]{z})^6} = \frac{-3y^2}{z^2}$$

$$254-a) \frac{\sqrt{810c^{-3}d^7}}{\sqrt{1000cd^{-1}}} = \frac{(\sqrt{81})(\sqrt{10})(\sqrt{c^{-3}})(\sqrt{d^7})}{(\sqrt{100})(\sqrt{10})(\sqrt{c})(\sqrt{d^{-1}})} = \frac{9(\sqrt{c})^{-3}(\sqrt{d})^7}{10(\sqrt{c})(\sqrt{d})^{-1}}$$

$$= \frac{9(\sqrt{d})^7(\sqrt{d})}{10(\sqrt{c})(\sqrt{c})^3} = \frac{9(\sqrt{d})^8}{10(\sqrt{c})^4} = \underline{\underline{\frac{9d^4}{10c^2}}}$$

$$254-b) \frac{\sqrt[3]{24a^7b^{-1}}}{\sqrt[3]{-81a^{-2}b^2}} = \frac{(\sqrt[3]{8})(\sqrt[3]{3})(\sqrt[3]{a^7})(\sqrt[3]{b^{-1}})}{(\sqrt[3]{27})(\sqrt[3]{3})(\sqrt[3]{a^{-2}})(\sqrt[3]{b^2})} = \frac{(2)(\sqrt[3]{a})^7(\sqrt[3]{b})^{-1}}{(3)(\sqrt[3]{a})^{-2}(\sqrt[3]{b})^2}$$

$$= \frac{2(\sqrt[3]{a})^7(\sqrt[3]{a})^2}{3(\sqrt[3]{b})^2(\sqrt[3]{b})} = \frac{2(\sqrt[3]{a})^9}{3(\sqrt[3]{b})^3} = \underline{\underline{\frac{2a^3}{3b}}}$$

$$256) \frac{\sqrt{72a^3b^6}}{\sqrt{3ab^3}} = \sqrt{\frac{72a^3b^6}{3ab^3}} = \sqrt{\frac{24a^2b^3}{1}} = \sqrt{24a^2b^3}$$

$$= \sqrt{4a^2b^2} \sqrt{6b} = \underline{\underline{2ab\sqrt{6b}}}$$

$$258) \frac{\sqrt[3]{162x^{-3}y^6}}{\sqrt[3]{2x^3y^{-2}}} = \frac{(\sqrt[3]{81})(\sqrt[3]{2})(\sqrt[3]{x^{-3}})(\sqrt[3]{y^6})}{(\sqrt[3]{2})(\sqrt[3]{x^3})(\sqrt[3]{y^{-2}})}$$

$$= \frac{(\sqrt[3]{27})(\sqrt[3]{3})(x^{-1})(y^2)}{(x)(\sqrt[3]{y})^{-2}} = \frac{(3)(\sqrt[3]{3})(y^2)(\sqrt[3]{y})^2}{(x)(x)}$$

$$= \frac{3y^2(\sqrt[3]{3})(\sqrt[3]{y^2})}{x^2} = \underline{\underline{\frac{3y^2(\sqrt[3]{3y^2})}{x^2}}}$$

$$260-a) \frac{8}{\sqrt{3}} = \frac{8}{\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}} \right) = \frac{8\sqrt{3}}{\underline{\underline{3}}}$$

$$260-b) \sqrt{\frac{4}{27}} = \frac{\sqrt{4}}{\sqrt{27}} = \frac{2}{\sqrt{9}\sqrt{3}} = \frac{2}{3\sqrt{3}} = \frac{2}{3\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}} \right) = \frac{2\sqrt{3}}{3(3)} = \frac{2\sqrt{3}}{\underline{\underline{9}}}$$

$$260-c) \frac{8}{\sqrt{2y}} = \frac{8}{\sqrt{2y}} \left(\frac{\sqrt{2y}}{\sqrt{2y}} \right) = \frac{8\sqrt{2y}}{2y} = \frac{4\sqrt{2y}}{\underline{\underline{y}}}$$

$$262-a) \frac{4}{\sqrt{5}} = \frac{4}{\sqrt{5}} \left(\frac{\sqrt{5}}{\sqrt{5}} \right) = \frac{4\sqrt{5}}{\underline{\underline{5}}}$$

$$262-b) \sqrt{\frac{27}{80}} = \frac{\sqrt{27}}{\sqrt{80}} = \frac{\sqrt{9}\sqrt{3}}{\sqrt{16}\sqrt{5}} = \frac{3\sqrt{3}}{4\sqrt{5}} = \frac{3\sqrt{3}}{4\sqrt{5}} \left(\frac{\sqrt{5}}{\sqrt{5}} \right) = \frac{3(\sqrt{3})(\sqrt{5})}{4(5)} = \frac{3\sqrt{15}}{\underline{\underline{20}}}$$

$$262-c) \frac{18}{\sqrt{6a}} = \frac{18}{\sqrt{6a}} \left(\frac{\sqrt{6a}}{\sqrt{6a}} \right) = \frac{18\sqrt{6a}}{6a} = \frac{3\sqrt{6a}}{\underline{\underline{a}}}$$

$$264-a) \frac{1}{\sqrt[3]{3}} = \frac{1}{\sqrt[3]{3}} \left(\frac{(\sqrt[3]{3})^2}{(\sqrt[3]{3})^2} \right) = \frac{(\sqrt[3]{3})^2}{3} = \frac{\sqrt[3]{(3)^2}}{3} = \frac{\sqrt[3]{9}}{\underline{\underline{3}}}$$

$$\begin{aligned} 264-b) \sqrt[3]{\frac{5}{32}} &= \frac{\sqrt[3]{5}}{\sqrt[3]{32}} = \frac{\sqrt[3]{5}}{\sqrt[3]{(2)^5}} = \frac{\sqrt[3]{5}}{\sqrt[3]{(2)^3} \sqrt[3]{(2)^2}} = \frac{\sqrt[3]{5}}{2(\sqrt[3]{2})^2} \\ &= \frac{\sqrt[3]{5}}{2(\sqrt[3]{2})^2} \left(\frac{\sqrt[3]{2}}{\sqrt[3]{2}} \right) = \frac{(\sqrt[3]{5})(\sqrt[3]{2})}{2(2)} = \frac{\sqrt[3]{10}}{\underline{\underline{4}}} \end{aligned}$$

$$\begin{aligned} 264-c) \frac{7}{\sqrt[3]{49b}} &= \frac{7}{(\sqrt[3]{(7)^2})(\sqrt[3]{b})} = \frac{7}{(\sqrt[3]{7})^2(\sqrt[3]{b})} = \frac{7}{(\sqrt[3]{7})^2(\sqrt[3]{b})} \left(\frac{(\sqrt[3]{7})(\sqrt[3]{b})^2}{(\sqrt[3]{7})(\sqrt[3]{b})^2} \right) \\ &= \frac{\cancel{7}(\sqrt[3]{7})(\sqrt[3]{b^2})}{(\cancel{7})b} = \frac{\sqrt[3]{7b^2}}{\underline{\underline{b}}} \end{aligned}$$

$$266-a) \frac{1}{\sqrt[3]{13}} = \frac{1}{\sqrt[3]{13}} \left(\frac{(\sqrt[3]{13})^2}{(\sqrt[3]{13})^2} \right) = \frac{\sqrt[3]{(13)^2}}{13} = \frac{\sqrt[3]{169}}{\underline{\underline{13}}}$$

$$266-b) \sqrt[3]{\frac{3}{128}} = \frac{\sqrt[3]{3}}{\sqrt[3]{128}} = \frac{\sqrt[3]{3}}{\sqrt[3]{(2)^7}} = \frac{\sqrt[3]{3}}{(\sqrt[3]{(2)^6})(\sqrt[3]{2})} = \frac{\sqrt[3]{3}}{(2)^2(\sqrt[3]{2})}$$

$$= \frac{\sqrt[3]{3}}{2(\sqrt[3]{2})} \left(\frac{(\sqrt[3]{2})^2}{(\sqrt[3]{2})^2} \right) = \frac{(\sqrt[3]{3})(\sqrt[3]{(2)^2})}{2(2)} = \frac{\sqrt[3]{12}}{\underline{\underline{4}}}$$

$$266-c) \frac{3}{\sqrt[3]{6y^2}} = \frac{3}{(\sqrt[3]{6})(\sqrt[3]{y^2})} = \frac{3}{(\sqrt[3]{6})(\sqrt[3]{y})^2} = \frac{3}{(\sqrt[3]{6})(\sqrt[3]{y})^2} \left(\frac{(\sqrt[3]{6})^2(\sqrt[3]{y})}{(\sqrt[3]{6})^2(\sqrt[3]{y})} \right)$$

$$= \frac{\cancel{3} (\sqrt[3]{(6)^2})(\sqrt[3]{y})}{\cancel{6} y} = \frac{\sqrt[3]{36y}}{\underline{\underline{2y}}}$$

$$268-a) \frac{1}{\sqrt[4]{4}} = \frac{1}{\sqrt[4]{(2)^2}} = \frac{1}{(\sqrt[4]{2})^2} \left(\frac{(\sqrt[4]{2})^2}{(\sqrt[4]{2})^2} \right) = \frac{\sqrt[4]{(2)^2}}{2} = \frac{\sqrt[4]{4}}{\underline{\underline{2}}}$$

$$268-b) \sqrt[4]{\frac{9}{32}} = \frac{\sqrt[4]{9}}{\sqrt[4]{32}} = \frac{\sqrt[4]{9}}{\sqrt[4]{(2)^5}} = \frac{\sqrt[4]{9}}{\sqrt[4]{(2)^4} \sqrt[4]{2}} = \frac{\sqrt[4]{9}}{2 \sqrt[4]{2}}$$

$$= \frac{\sqrt[4]{9}}{2 \sqrt[4]{2}} \left(\frac{(\sqrt[4]{2})^3}{(\sqrt[4]{2})^3} \right) = \frac{(\sqrt[4]{9})(\sqrt[4]{(2)^3})}{2(2)} = \frac{\sqrt[4]{72}}{\underline{\underline{4}}}$$

$$268-c) \frac{6}{\sqrt[4]{9x^3}} = \frac{6}{(\sqrt[4]{(3)^2})(\sqrt[4]{x^3})} = \frac{6}{(\sqrt[4]{3})^2(\sqrt[4]{x})^3} =$$

$$= \frac{6}{(\sqrt[4]{3})^2(\sqrt[4]{x})^3} \left(\frac{(\sqrt[4]{3})^2(\sqrt[4]{x})}{(\sqrt[4]{3})^2(\sqrt[4]{x})} \right) = \frac{\cancel{6} (\sqrt[4]{(3)^2})(\sqrt[4]{x})}{\cancel{3} x}$$

$$= \frac{2 \sqrt[4]{9x}}{\underline{\underline{x}}}$$

$$270-a) \frac{1}{\sqrt[4]{8}} = \frac{1}{\sqrt[4]{(2)^3}} = \frac{1}{(\sqrt[4]{2})^3} \left(\frac{\sqrt[4]{2}}{\sqrt[4]{2}} \right) = \frac{\sqrt[4]{2}}{\underline{\underline{2}}}$$

$$\begin{aligned} 270-b) \sqrt[4]{\frac{27}{128}} &= \frac{\sqrt[4]{27}}{\sqrt[4]{128}} = \frac{\sqrt[4]{27}}{\sqrt[4]{(2)^7}} = \frac{\sqrt[4]{27}}{(\sqrt[4]{(2)^4})(\sqrt[4]{(2)^3})} = \frac{\sqrt[4]{27}}{2(\sqrt[4]{2})^3} \\ &= \frac{\sqrt[4]{27}}{2(\sqrt[4]{2})^3} \left(\frac{\sqrt[4]{2}}{\sqrt[4]{2}} \right) = \frac{(\sqrt[4]{27})(\sqrt[4]{2})}{2(2)} = \frac{\sqrt[4]{54}}{\underline{\underline{4}}} \end{aligned}$$

$$\begin{aligned} 270-c) \frac{16}{\sqrt[4]{64b^2}} &= \frac{16}{(\sqrt[4]{(2)^6})(\sqrt[4]{b^2})} = \frac{16}{(\sqrt[4]{(2)^4})(\sqrt[4]{2})^2(\sqrt[4]{b})^2} \\ &= \frac{\cancel{16}^8}{\cancel{2}^1(\sqrt[4]{2})^2(\sqrt[4]{b})^2} \left(\frac{(\sqrt[4]{2})^2(\sqrt[4]{b})^2}{(\sqrt[4]{2})^2(\sqrt[4]{b})^2} \right) = \frac{\cancel{8}^4(\sqrt[4]{2})^2(\sqrt[4]{b})^2}{\cancel{2}^1b} \\ &= \frac{\sqrt[4]{4b^2}}{\underline{\underline{b}}} \end{aligned}$$

$$\begin{aligned} 272) \frac{7}{2-\sqrt{6}} &= \frac{7}{(2-\sqrt{6})} \left(\frac{(2+\sqrt{6})}{(2+\sqrt{6})} \right) = \frac{7(2+\sqrt{6})}{4-6} = \frac{14+7\sqrt{6}}{-2} \\ &= \frac{14+7\sqrt{6}}{-2} = \frac{-(14+7\sqrt{6})}{2} = \frac{-14-7\sqrt{6}}{\underline{\underline{2}}} \end{aligned}$$

$$274) \frac{5}{4-\sqrt{11}} = \frac{5}{(4-\sqrt{11})} \left(\frac{(4+\sqrt{11})}{(4+\sqrt{11})} \right) = \frac{5(4+\sqrt{11})}{16-11} = \frac{\cancel{5}^1(4+\sqrt{11})}{\cancel{5}^1} = \underline{\underline{4+\sqrt{11}}}$$

$$276) \frac{\sqrt{5}}{\sqrt{n}-\sqrt{7}} = \frac{\sqrt{5}}{(\sqrt{n}-\sqrt{7})} \left(\frac{(\sqrt{n}+\sqrt{7})}{(\sqrt{n}+\sqrt{7})} \right) = \frac{(\sqrt{5})(\sqrt{n}) + (\sqrt{5})(\sqrt{7})}{n-7} = \frac{\sqrt{5n} + \sqrt{35}}{\underline{\underline{n-7}}}$$

$$\begin{aligned}
 278) \frac{\sqrt{7}}{\sqrt{y} + \sqrt{3}} &= \frac{\sqrt{7}}{(\sqrt{y} + \sqrt{3})} \left(\frac{(\sqrt{y} - \sqrt{3})}{(\sqrt{y} - \sqrt{3})} \right) = \frac{(\sqrt{7})(\sqrt{y}) - (\sqrt{7})(\sqrt{3})}{y - 3} \\
 &= \frac{\sqrt{7y} - \sqrt{21}}{y - 3}
 \end{aligned}$$

$$\begin{aligned}
 280) \frac{\sqrt{2} - \sqrt{6}}{\sqrt{2} + \sqrt{6}} &= \frac{(\sqrt{2} - \sqrt{6})}{(\sqrt{2} + \sqrt{6})} \left(\frac{(\sqrt{2} - \sqrt{6})}{(\sqrt{2} - \sqrt{6})} \right) = \frac{2 - (\sqrt{2})(\sqrt{6}) - (\sqrt{6})(\sqrt{2}) + 6}{2 - 6} \\
 &= \frac{2 - \sqrt{6}2 - \sqrt{6}2 + 6}{2 - 6} = \frac{2 - 2\sqrt{6}2 + 6}{2 - 6}
 \end{aligned}$$

$$\begin{aligned}
 282) \frac{\sqrt{m} - \sqrt{3}}{\sqrt{m} + \sqrt{3}} &= \frac{(\sqrt{m} - \sqrt{3})}{(\sqrt{m} + \sqrt{3})} \left(\frac{(\sqrt{m} - \sqrt{3})}{(\sqrt{m} - \sqrt{3})} \right) = \frac{m - (\sqrt{m})(\sqrt{3}) - (\sqrt{3})(\sqrt{m}) + 3}{m - 3} \\
 &= \frac{m - \sqrt{3m} - \sqrt{3m} + 3}{m - 3} = \frac{m - 2\sqrt{3m} + 3}{m - 3}
 \end{aligned}$$