

Algebra 2
7.4 and 7.5 practice

Name:

Simplify the following expressions completely:

$$1. \sqrt[5]{64x^3y^9}$$

$$2 \cdot \sqrt[5]{x^3 \cdot y^5 \cdot y^4}$$

$$\boxed{2y \sqrt[5]{x^3 y^4}}$$

$$2. \sqrt[4]{81x^{25}y^{37}}$$

$$3 \cdot \sqrt[4]{x^{24} \cdot x \cdot y^{36} \cdot y}$$

$$\boxed{3x^6 y^9 \cdot \sqrt[4]{xy}}$$

$$3. -2\sqrt[3]{81x^{52}y^{17}}$$

$$-2 \cdot \sqrt[3]{27 \cdot 3 \cdot x^{51} \cdot x \cdot y^{15} \cdot y^2}$$

$$-2 \cdot 3x^{17} y^5 \cdot \sqrt[3]{3xy^2}$$

$$\boxed{-6x^{17} y^5 \cdot \sqrt[3]{3xy^2}}$$

$$4. \sqrt{54x^3y^9}$$

$$\sqrt{9 \cdot 6 \cdot x^2 \cdot x \cdot y^8 \cdot y}$$

$$\boxed{3xy^4 \sqrt{6xy}}$$

$$5. 2\sqrt{26} \cdot \sqrt{52}$$

$$2\sqrt{26} \cdot \sqrt{2 \cdot 26}$$

$$2\sqrt{2 \cdot 26 \cdot 26}$$

$$2 \cdot 26\sqrt{2}$$

$$\boxed{52\sqrt{2}}$$

$$6. -2\sqrt{12} \cdot 6\sqrt{18}$$

$$-2\sqrt{2 \cdot 6} \cdot 6\sqrt{3 \cdot 6}$$

$$-12\sqrt{2 \cdot 3 \cdot 6 \cdot 6}$$

$$-12 \cdot 6\sqrt{6}$$

$$\boxed{-72\sqrt{6}}$$

$$7. \sqrt{18} + 5\sqrt[4]{64} - 5\sqrt{72} - 3\sqrt[4]{324}$$

$$\sqrt{2 \cdot 9} + 5\sqrt[4]{4 \cdot 16} - 5\sqrt{2 \cdot 36} - 3\sqrt[4]{4 \cdot 81}$$

$$3\sqrt{2} + 5 \cdot 2 \cdot \sqrt[4]{4} - 5 \cdot 6\sqrt{2} - 3 \cdot 3 \cdot \sqrt[4]{4}$$

$$3\sqrt{2} + 10 \cdot \sqrt[4]{4} - 30\sqrt{2} - 9 \cdot \sqrt[4]{4}$$

$$\boxed{-27\sqrt{2} + \sqrt[4]{4}}$$

$$8. (6-i\sqrt{2})(5+i\sqrt{2})$$

$$30 + 6i\sqrt{2} - 5i\sqrt{2} - i^2 \cdot 2$$

$$30 + i\sqrt{2} - (-1) \cdot 2$$

$$30 + i\sqrt{2} + 2$$

$$\boxed{32 + i\sqrt{2}}$$

$$9. (3-2\sqrt{7})^2$$

$$(3-2\sqrt{7})(3-2\sqrt{7})$$

$$9 - 6\sqrt{7} - 6\sqrt{7} + 4 \cdot 7$$

$$9 - 12\sqrt{7} + 28$$

$$\boxed{37 - 12\sqrt{7}}$$

$$10. \frac{8+\sqrt{6}}{2-\sqrt{6}} \cdot \frac{(2+\sqrt{6})}{(2+\sqrt{6})}$$

$$= \frac{16+8\sqrt{6}+2\sqrt{6}+6}{4-6}$$

$$= \frac{22+10\sqrt{6}}{-2} = \boxed{-11-5\sqrt{6}}$$

$$2(11+5\sqrt{6}) \quad 11+5\sqrt{6}$$

$$\frac{2(11 + 5\sqrt{6})}{-2} = \frac{11 + 5\sqrt{6}}{-1}$$

$$11. \frac{2 + \sqrt{5}(\sqrt{5} - 4)}{(\sqrt{5} + 4)(\sqrt{5} - 4)}$$

$$= \frac{2\sqrt{5} - 8 + 5 - 4\sqrt{5}}{5 - 16}$$

$$= \boxed{\frac{-2\sqrt{5} - 3}{-11}}$$

$$12. \sqrt{\frac{17}{64}} = \frac{\sqrt{17}}{\sqrt{64}} = \boxed{\frac{\sqrt{17}}{8}}$$

$$13. \sqrt{\frac{5}{72}} = \frac{\sqrt{5}}{\sqrt{72}} = \frac{\sqrt{5}}{\sqrt{2 \cdot 36}} = \frac{\sqrt{5}}{6\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{10}}{6 \cdot 2} = \boxed{\frac{\sqrt{10}}{12}}$$

$$14. \sqrt{\frac{15}{36x}} = \frac{\sqrt{15}}{\sqrt{36x}} = \frac{\sqrt{15}}{6\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}} = \boxed{\frac{\sqrt{15x}}{6x}}$$

$$15. \sqrt{\frac{8a}{7y}} = \frac{\sqrt{4 \cdot 2a}}{\sqrt{7y}} = \frac{2\sqrt{2a}}{\sqrt{7y}} \cdot \frac{\sqrt{7y}}{\sqrt{7y}} = \boxed{\frac{2\sqrt{14ay}}{7y}}$$

$$16. \sqrt{\frac{9w^{10}}{y^{13}}} = \frac{\sqrt{9w^{10}}}{\sqrt{y^{13}}}$$

$$= \frac{3w^5}{\sqrt{y^{12} \cdot y}} = \frac{3w^5}{y^6 \sqrt{y}} \cdot \frac{\sqrt{y}}{\sqrt{y}} = \frac{3w^5 \sqrt{y}}{y^6 \cdot y} = \boxed{\frac{3w^5 \sqrt{y}}{y^7}}$$

$$17. \sqrt[3]{\frac{5}{4}} = \frac{\sqrt[3]{5}}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}}$$

$$= \frac{\sqrt[3]{5 \cdot 4 \cdot 4}}{4} = \frac{\sqrt[3]{80}}{4}$$

$$18. \sqrt[3]{\frac{5}{9x}} = \frac{\sqrt[3]{5}}{\sqrt[3]{9x}} \cdot \frac{\sqrt[3]{9x}}{\sqrt[3]{9x}} \cdot \frac{\sqrt[3]{9x}}{\sqrt[3]{9x}}$$

$$= \frac{\sqrt[3]{5 \cdot 9x \cdot 9x}}{27} = \frac{\sqrt[3]{5 \cdot 81 \cdot x^2}}{27}$$

$$\begin{aligned}\frac{\sqrt{5 \cdot 4 \cdot 4}}{4} &= \frac{\sqrt[3]{80}}{4} \\ &= \frac{\sqrt[3]{8 \cdot 10}}{4} \\ &= \frac{2\sqrt[3]{10}}{4} = \left[\frac{\sqrt[3]{10}}{2} \right]\end{aligned}$$

$$\begin{aligned}&= \frac{\sqrt[3]{5 \cdot 9x \cdot 9x}}{9x} = \frac{\sqrt[3]{5 \cdot 81 \cdot x^2}}{9x} \\ &= \frac{\sqrt[3]{5 \cdot 27 \cdot 3 \cdot x^2}}{9x} \\ &= \frac{\sqrt[3]{15x^2}}{9x}\end{aligned}$$