Name Key Class _____ Date _____

7.1 – 7.4 Review

Simplify each radical expression.

1. $\sqrt{400x^2y^6}$

$20xy^3$

2. $\sqrt[3]{-125a^9}$

$-5a^3$

3. $\sqrt[4]{81x^5y^9}$

$3xy^2\sqrt[4]{xy}$

4. $\sqrt[3]{64a^6b^2}$

$4a^2\sqrt[3]{b^2}$

5. $\sqrt{50s^2t^4}$

$\sqrt{25\cdot 2s^2t^4}$

$5st^2\sqrt{2}$

6. $\sqrt[4]{256x^{16}y^{28}}$

$4x^4y^7$

Simplify each expression. Rationalize all denominators. Assume that all variables are positive.

7. $\dfrac{\sqrt{200x^3y}}{\sqrt{2xy^5}} = \sqrt{\dfrac{200x^3y}{2xy^5}}$

$= \sqrt{\dfrac{100x^2}{y^4}} = \dfrac{\sqrt{100x^2}}{\sqrt{y^4}}$

$= \dfrac{10x}{y^2}$

8. $(8-3\sqrt{2})(8+3\sqrt{2})$

$64+24\sqrt{2}-24\sqrt{2}-9\sqrt{4}$

$64-9\cdot 2$

$64-18$

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9. $\dfrac{1}{(\sqrt{3}+5)(\sqrt{3}-5)}\dfrac{(\sqrt{3}-5)}{}$

$= \dfrac{\sqrt{3}-5}{\sqrt{9}-5\sqrt{3}+5\sqrt{3}-25}$

$= \dfrac{\sqrt{3}-5}{3-25}$

$= \dfrac{\sqrt{3}-5}{-22}$

10. $\sqrt{8x^3}\cdot\sqrt{2x^5}$

$= \sqrt{16x^8}$

$= 4x^4$

11. $\sqrt{63}+2\sqrt{28}-5\sqrt{7}$

$\sqrt{9\cdot 7}+2\sqrt{4\cdot 7}-5\sqrt{7}$

$3\sqrt{7}+2\cdot 2\sqrt{7}-5\sqrt{7}$

$3\sqrt{7}+4\sqrt{7}-5\sqrt{7}$

$2\sqrt{7}$

12. $\dfrac{(\sqrt[3]{2}+1)(\sqrt[3]{2})}{(\sqrt[3]{4})(\sqrt[3]{2})}$

$= \dfrac{\sqrt[3]{4}+\sqrt[3]{2}}{\sqrt[3]{8}}$

$= \dfrac{\sqrt[3]{4}+\sqrt[3]{2}}{2}$

13. $\dfrac{2}{(1+\sqrt{2})}\dfrac{(1-\sqrt{2})}{(1-\sqrt{2})}$

$= \dfrac{2-2\sqrt{2}}{1-\sqrt{2}+\sqrt{2}-\sqrt{4}}$

$= \dfrac{2-2\sqrt{2}}{1-2} = \dfrac{2-2\sqrt{2}}{-1}$

$= -2+2\sqrt{2}$

14. $\dfrac{(\sqrt[4]{5})(\sqrt[4]{4})}{(\sqrt[4]{4})(\sqrt[4]{4})}$

$= \dfrac{\sqrt[4]{20}}{\sqrt[4]{16}}$

$= \dfrac{\sqrt[4]{20}}{2}$

15. $(\sqrt{x}-\sqrt{5})^2$

$= (\sqrt{x}-\sqrt{5})(\sqrt{x}-\sqrt{5})$

$= \sqrt{x^2}-\sqrt{5x}-\sqrt{5x}+\sqrt{25}$

$= x-2\sqrt{5x}+5$

Simplify each expression. Assume that all variables are positive.

16. $\left(\frac{16x^5y^{10}}{81xy^2}\right)^{\frac{3}{4}}$

$=\left(\frac{16x^4y^8}{81}\right)^{\frac{3}{4}} = \left(\sqrt[4]{\frac{16x^4y^8}{81}}\right)^3$

$=\left(\frac{2xy^2}{3}\right)^3 = \boxed{\frac{8x^3y^6}{27}}$

17. $(-64)^{-\frac{2}{3}}$

$= \frac{1}{(-64)^{\frac{2}{3}}} = \frac{1}{\left(\sqrt[3]{-64}\right)^2}$

$= \frac{1}{(-4)^2} = \boxed{\frac{1}{16}}$

18. $a^{\frac{2}{3}} \cdot a^{\frac{1}{2}}$

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

$= a^{\frac{7}{6}} = \sqrt[6]{a^7}$

$= \boxed{a\sqrt[6]{a}}$

19. $\left(4x^{-2}y^4\right)^{-\frac{1}{2}}$

$= 4^{-\frac{1}{2}}x^{1}y^{-2}$

$= \frac{x}{4^{\frac{1}{2}}y^2} = \frac{x}{\sqrt{4}y^2}$

$= \boxed{\frac{x}{2y^2}}$

20. $\left(8ab^2\right)^{-\frac{1}{2}}\left(8ab^2\right)^{\frac{1}{2}}$

$= (8ab^2)^{-\frac{1}{2}+\frac{1}{2}}$

$= (8ab^2)^0$

$= \boxed{1}$

OR

$= \frac{(8ab^2)^{\frac{1}{2}}}{(8ab^2)^{\frac{1}{2}}}$

$= \frac{\sqrt{8ab^2}}{\sqrt{8ab^2}}$

$= \boxed{1}$

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

$= s^{\frac{2}{5}+\frac{1}{2}} \cdot t^{\frac{1}{3}+\left(-\frac{1}{2}\right)}$

$= s^{\frac{4}{10}+\frac{5}{10}} \cdot t^{\frac{2}{6}-\frac{3}{6}}$

$= s^{\frac{9}{10}} \cdot t^{-\frac{1}{6}}$

$= \frac{s^{\frac{9}{10}}}{t^{\frac{1}{6}}} = \boxed{\frac{\sqrt[10]{s^9}}{\sqrt[6]{t}}}$

Simplify each expression. Rationalize all denominators. Assume that all variables are positive.

22. $\sqrt{50}+2\sqrt{8}-\sqrt{2}$

$= \sqrt{25\cdot 2}+2\sqrt{4\cdot 2}-\sqrt{2}$

$= 5\sqrt{2}+2\cdot 2\sqrt{2}-\sqrt{2}$

$= 5\sqrt{2}+4\sqrt{2}-\sqrt{2}$

$= \boxed{8\sqrt{2}}$

23. $\sqrt[3]{32}-\sqrt[3]{108}$

$= \sqrt[3]{8\cdot 4}-\sqrt[3]{27\cdot 4}$

$= 2\sqrt[3]{4}-3\sqrt[3]{4}$

$= \boxed{-\sqrt[3]{4}}$

24. $\sqrt[3]{\frac{5}{3x^2y}}$

$= \frac{\sqrt[3]{5}}{\sqrt[3]{3x^2y}}$

$= \frac{\left(\sqrt[3]{5}\right)\left(\sqrt[3]{9xy^2}\right)}{\left(\sqrt[3]{3x^2y}\right)\left(\sqrt[3]{9xy^2}\right)}$

$= \frac{\sqrt[3]{45xy^2}}{\sqrt[3]{27x^3y^3}}$

$= \boxed{\frac{\sqrt[3]{45xy^2}}{3xy}}$