Name _____ Date _____

5.2 Notetaking with Vocabulary (continued)

In Exercises 6–8, use the properties of radicals to simplify the expression.

6. $\sqrt[6]{25} \cdot \sqrt[6]{625}$

$5 \cdot 5 \quad 5 \cdot 125 \quad 5 \cdot 25 \quad 5 \cdot 5$

5

7. $\frac{\sqrt{343}}{\sqrt{7}} = \sqrt{\frac{343}{7}}$

$\sqrt{49} = 7$

8. $\frac{\sqrt[3]{25} \cdot \sqrt[3]{10}}{\sqrt[3]{2}}$

$\frac{\sqrt[3]{5 \cdot 5 \cdot 5 \cdot 2}\ (\sqrt[3]{2 \cdot 2})}{\sqrt[3]{2}\ (\sqrt[3]{2 \cdot 2})}$

$\frac{5 \cdot 2}{2} = \frac{10}{2} = 5$

In Exercises 9–12, write the expression in simplest form.

9. $\sqrt[7]{384}$

$2 \cdot 192 \quad 2 \cdot 96 \quad 2 \cdot 48 \quad 2 \cdot 24 \quad 2 \cdot 12 \quad 2 \cdot 6 \quad 2 \cdot 3$

$2\sqrt[7]{3}$

10. $\sqrt[3]{\frac{5}{9}}$

$\frac{\sqrt[3]{5}}{\sqrt[3]{9}} \quad \frac{\sqrt[3]{3}}{(\sqrt[3]{3})} = \frac{\sqrt[3]{15}}{3}$

11. $\frac{1}{4 - \sqrt{5}} \quad (4+\sqrt{5})$

$\frac{4+\sqrt{5}}{16-5} = \frac{4+\sqrt{5}}{11}$

12. $\frac{\sqrt{2}}{1+\sqrt{6}} \quad (1-\sqrt{6})$

$\frac{\sqrt{2} - \sqrt{12}}{1-6} = -\frac{\sqrt{2} - 2\sqrt{3}}{5}$

In Exercises 13–16, write the expression in simplest form. Assume all variables are positive.

13. $-2\sqrt[3]{5} + 40\sqrt[3]{5}$

$38\sqrt[3]{5}$

14. $2(1250)^{1/4} - 5(32)^{1/4}$

$2\sqrt[4]{1250} - 5\sqrt[4]{32}$

$2 \cdot 625 \quad 5 \cdot 125 \quad 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$

$2 \cdot 16 \quad 4 \cdot 4 \quad 2 \cdot 2 \cdot 2 \cdot 2$

$10\sqrt[4]{2} - 10\sqrt[4]{2}$

0

15. $\frac{\sqrt[4]{x} \cdot \sqrt[4]{81x}}{\sqrt[4]{16x^{36}}}$

$\sqrt[4]{x} \cdot 3\sqrt[4]{x}$

$\frac{3\sqrt[4]{x^2}}{2\sqrt[4]{x^{36}}} = \frac{3\sqrt[4]{x^2}}{2x^9}$

16. $\frac{21\left(x^{-3/2}\right)\left(\sqrt{y}\right)\left(z^{5/2}\right)}{7^{-1}\sqrt{x}\left(y^{-1/2}\right)z}$

$\frac{21 \cdot 7\ y^{1/2} \cdot y^{1/2}\ z^{5/2}}{x^{3/2}\ x^{1/2}\ z^{2/2}} = \frac{142\ y\ z^{5/2}}{x^{4/2}\ z^{2/2}} = \frac{142 y z^{3/2}}{x^2}$ OR

$\frac{142\ y \sqrt{z^3}}{x^2} = \frac{142 y z \sqrt{z}}{x^2}$

Name_____ Date_____

5.2 Practice A

In Exercises 1–6, use the properties of rational exponents to simplify the expression.

1. $(7^2)^{1/4}$ $7^{2\cdot\frac{1}{4}} = 7^{\frac{2}{4}} = 7^{1/2}$

2. $(14^3)^{1/2}$ $14^{3/2}$

3. $\frac{5^{1/5}}{5^{3/5}}$ $5^{-4/5} = \frac{1}{5^{4/5}}$

4. $\frac{10^{4/4}}{10^{1/4}} = 10^{3/4}$

5. $\left(\frac{6^5}{9^5}\right)^{-1/5}$ $\frac{(6^{-5})^{-1/5}}{(9^5)^{-1/5}} = \frac{9}{6} = \frac{3}{2}$

6. $\left(7^{-3/4} \cdot 7^{1/4}\right)^{-1}$ $\left(\frac{1}{7^{3/4} \cdot 7^{1/4}}\right)^{-1}$ $7^{3/4} \cdot \frac{1}{7^{1/4}} = \frac{7^{3/4}}{7^{1/4}}$ $7^{2/4} = 7^{1/2}$

In Exercises 7–12, use the properties of radicals to simplify the expression.

7. $\sqrt{3} \cdot \sqrt{75}$ $\sqrt{225} = 15$

8. $\sqrt[3]{81} \cdot \sqrt[3]{9}$ $\sqrt[3]{729} = 9$

9. $\sqrt[4]{12} \cdot \sqrt[4]{8}$ $2\sqrt[4]{6}$

10. $\sqrt[4]{9} \cdot \sqrt[4]{9} = \sqrt[4]{81}$ 3

11. $\frac{\sqrt[5]{128}}{\sqrt[5]{4}}$ $\sqrt[5]{32} = 2$

12. $\frac{\sqrt{5}}{\sqrt{80}} = \frac{\sqrt{1}}{\sqrt{16}} = \frac{1}{4}$

In Exercises 13–18, write the expression in simplest form.

13. $\sqrt[4]{208}$ $2\sqrt[4]{13}$

14. $\frac{\sqrt[3]{9}}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}}$ $\frac{\sqrt[3]{18}}{2}$

15. $\sqrt{\frac{5}{27}} = \frac{\sqrt{5}}{3\sqrt{3}} \cdot \frac{(\sqrt{3})}{(\sqrt{3})} = \frac{\sqrt{15}}{9}$

16. $\frac{(2-\sqrt{3})1}{2+\sqrt{3}}$ $\frac{2-\sqrt{3}}{1}$ $2-\sqrt{3}$ $(2-\sqrt{3})$

17. $\frac{6}{4-\sqrt{5}} \cdot \frac{(4+\sqrt{5})}{(4+\sqrt{5})}$ $\frac{24+6\sqrt{5}}{11}$ $(16-5)=11$

18. $\frac{8}{\sqrt{2}+\sqrt{5}} \cdot \frac{(\sqrt{2}-\sqrt{5})}{(\sqrt{2}-\sqrt{5})}$ $\frac{8\sqrt{2}-8\sqrt{5}}{2-5}$ $\frac{-8\sqrt{2}+8\sqrt{5}}{3}$

In Exercises 19–24, simplify the expression.

19. $8\sqrt[4]{2} + 5\sqrt[4]{2}$ $13\sqrt[4]{2}$

20. $7\sqrt[5]{13} - 17\sqrt[5]{13}$ $-10\sqrt[5]{13}$

21. $4\left(9^{1/4}\right) + 7\left(9^{1/4}\right)$ $11\left(9^{1/4}\right)$

22. $4\sqrt{18} - 15\sqrt{2}$ $12\sqrt{2} - 15\sqrt{2} = -3\sqrt{2}$

23. $8\sqrt{7} + 12\sqrt{63}$ $8\sqrt{7} + 36\sqrt{7} = 44\sqrt{7}$

24. $\sqrt[4]{405} + 2\sqrt[4]{5}$ $3\sqrt[4]{5} + 2\sqrt[4]{5} = 5\sqrt[4]{5}$

25. The volume of a cube is 80 cubic centimeters.

   a. Use exponents to solve the formula for the volume V of a cube with side length s, $V = s^3$, for s. $s = V^{1/3}$

   b. Substitute the expression for s from part (a) into the formula for the surface area of a cube, $S = 6s^2$. $S = 6V^{2/3}$

   c. Substitute the volume of the given cube into the formula found in part (b) to find the surface area, S. Simplify, if possible. $24(10^{2/3})\text{ cm}^2$