Name _____ Class _____ Date _____

Practice

Form G

Rational Exponents and Radicals

What is the value of each expression?

1. $\sqrt[3]{64}$ 4
2. $\sqrt[3]{125}$ 5
3. $\sqrt[5]{32}$ 2
4. $\sqrt{100}$ 10
5. $\sqrt[4]{1}$ 1
6. $\sqrt{225}$ 15
7. $\sqrt[3]{729}$ 9
8. $\sqrt{289}$ 17
9. $\sqrt[3]{243}$ $3\sqrt[3]{3^2}$

Write each expression in radical form.

10. $b^{\frac{3}{2}}$ $\sqrt[2]{b^3}$
11. $(36x)^{\frac{1}{2}}$ $6\sqrt{x}$
12. $25y^{\frac{1}{2}}$ $25\sqrt{y}$
13. $81s^{\frac{2}{3}}$ $81\sqrt[3]{s^2}$
14. $(72b)^{\frac{1}{2}}$ $6\sqrt{2b}$
15. $(125a)^{\frac{2}{3}}$ $25\sqrt[3]{a^2}$
16. $(40x)^{\frac{1}{3}}$ $2\sqrt[3]{5x}$
17. $36t^{\frac{1}{4}}$ $36\sqrt[4]{t}$
18. $(99r)^{\frac{1}{2}}$ $3\sqrt{11r}$

Write each expression in exponential form.

19. $\sqrt[3]{b^4}$ $b^{\frac{4}{3}}$
20. $\sqrt{(3x)^4}$ $9x^2$
21. $\sqrt[3]{125d^4}$ $5d^{\frac{4}{3}}$
22. $\sqrt{49a}$ $7a^{\frac{1}{2}}$
23. $\sqrt[3]{(64b)^2}$ $16b^{\frac{2}{3}}$
24. $\sqrt[4]{256b^5}$ $4b^{\frac{5}{4}}$
25. $\sqrt{144d^4}$ $12d^2$
26. $\sqrt[3]{(27x)^2}$ $9x^{\frac{2}{3}}$
27. $\sqrt{625a^5}$ $25a^{\frac{5}{2}}$
28. You can use the formula $S = 10m^{\frac{2}{3}}$ to approximate the surface area S, in square centimeters, of a horse with mass m, in grams. What is the surface area of a horse with a mass of 4.5×10^5 grams? Round your answer to the nearest whole square centimeter. about 58,723 sq cm

Name _____ Class _____ Date _____

Practice (continued) *Form G*

Rational Exponents and Radicals

Simplify each expression using the properties of exponents, and then write the expression in radical form.

29. $\left(a^{\frac{2}{3}}\right)\left(a^{\frac{2}{3}}\right)$ $\sqrt[3]{a^4}$

30. $b^{\frac{1}{3}}(ab)^{\frac{1}{2}}$ $\sqrt{a}\,\sqrt[6]{b^5}$

31. $(2x^3)\left(4x^{\frac{1}{3}}\right)$ $8\sqrt[3]{x^{10}}$

32. $(27y)^{\frac{1}{3}}(64y)^{\frac{1}{3}}$ $12\sqrt[3]{y^2}$

33. $(25x)^{\frac{1}{2}}\left(x^{\frac{1}{2}}\right)$ $5x$

34. $(81s)^{\frac{1}{3}}s^{\frac{5}{6}}$ $3\sqrt[3]{3}\sqrt[6]{s^7}$

Write each expression in exponential form. Simplify when possible.

35. $\sqrt[3]{a^5} + \sqrt[3]{a}$ $a^{\frac{5}{3}} + a^{\frac{1}{3}}$

36. $5\sqrt[3]{b^4} - \sqrt[3]{b^4}$ $4b^{\frac{4}{3}}$

37. $\sqrt[4]{81d^3} - \sqrt[3]{125d^4}$ $3d^{\frac{3}{4}} - 5d^{\frac{4}{3}}$

38. $\sqrt[3]{(27x)^2} + \sqrt[4]{256x^2}$ $9x^{\frac{2}{3}} + 4x^{\frac{1}{2}}$

39. To estimate the age of an organism, archaeologists measure the amount of carbon-14 left in its remains. The approximate amount of carbon-14 remaining after 5000 years can be found using the formula $A = A_0\,(2.7)^{-\frac{3}{5}}$, where A_0 is the initial amount of carbon-14 in the sample that is tested. How much carbon-14 is left in a sample that is 5000 years old and originally contained 5.0×10^{-3} grams of carbon-14? Write your answer in scientific notation. about 2.8×10^{-3} grams

40. Remember that the radius r of a sphere that has volume V is $r = \sqrt[3]{\frac{3V}{4\pi}}$. A ping-pong ball has a volume of about 2.045 in.^3. What is the approximate radius of a ping-pong ball? Use 3.14 for π. Round your answer to the nearest tenth. about 0.8 in.

41. Reasoning Show that $\sqrt[4]{a^2} = \sqrt{a}$ by rewriting $\sqrt[4]{a^2}$ in exponential form.
$\sqrt[4]{a^2} = (a^2)^{\frac{1}{4}} = a^{\frac{2}{4}} = a^{\frac{1}{2}} = \sqrt{a}$