Name_____ Date_____ Period_____

RADICALS AND RATIONAL EXPONENTS WORKSHEET

REVIEW: n^{th} Root: If $b^n = a$, then *b* is the n^{th} root of *a*. This is written $\sqrt[n]{a} = b$. *n* is called the **index** of the radical. *a* is called the **radicand**. Roots as Rational Exponents: The n^{th} root, $\sqrt[n]{a}$, can be written as an exponent $a^{\frac{1}{n}}$. $a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m$ - Notice the placement of the *m* and *n*. The root index is the denominator and the exponent is the numerator.

Write without rational exponents.

1. $3^{1/2}$ **2.** $x^{3/5}$ **3.** $(2y)^{2/3}$

4. $27^{1/3}$

Write with rational exponents.

5. $\sqrt{a^3x^2y}$ **6.** $\sqrt[3]{16a^2b^5}$ **7.** $\left(\sqrt[3]{5ab^2c}\right)^4$

Use the properties of exponents to simplify.

8. $5^{1/3} \cdot 5^{4/5}$ **9.** $\dfrac{2^{11/6}}{2^{5/6}}$

Use rational exponents to simplify.

10. $\sqrt[6]{a^3}$ **11.** $\sqrt[8]{4}$ **12.** $\sqrt[9]{27}$ **13.** $\sqrt[3]{64x^6y^{12}}$

Write as a single radical expression.

14. $\sqrt[4]{5} \cdot \sqrt{2}$ **15.** $\sqrt[3]{2x} \cdot \sqrt[4]{4x^2}$ **16.** $\dfrac{\sqrt{(2x+y)^7}}{\sqrt[3]{2x+y}}$

17. $a^{1/2}b^{2/3}c^{-1/5}$ **18.** $\dfrac{x^{3/5}y^{1/4}}{x^{-2/5}y^{4/3}}$ **19.** $\dfrac{\left(4w^3h^{2/5}\right)^2}{-3w^{1/2}h^2}$