Name_____ Date_____ Period_____

RATIONAL EXPONENTS WORKSHEET

Properties:

Product of Powers: $a^m \cdot a^n = a^{m+n}$

Power of a Power: $\left(a^m\right)^n = a^{mn}$

Power of a Product: $(ab)^m = a^m b^m$

Negative Exponents: $a^{-m} = \frac{1}{a^m}$

Quotient of Powers: $\frac{a^m}{a^n} = a^{m-n}$

Power of a Quotient: $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$

Rational Exponents: $a^{\frac{m}{n}} = \left(a^{\frac{1}{n}}\right)^m = \left(\sqrt[n]{a}\right)^m$

$a^{-\frac{m}{n}} = \frac{1}{a^{\frac{m}{n}}} = \frac{1}{\left(a^{\frac{1}{n}}\right)^m} = \frac{1}{\left(\sqrt[n]{a}\right)^m}$

Rewrite the expression using radical notation.

1. $x^{\frac{2}{3}}$ 2. $(xy^2)^{\frac{1}{3}}$ 3. $14^{-\frac{2}{3}}$ 4. $5^{\frac{1}{4}}$

Rewrite the expression using rational exponent notation.

5. $\sqrt[4]{x^6}$ 6. $\sqrt[3]{10^7}$ 7. $3\sqrt[3]{xy}$ 8. $\sqrt{4x^2y}$

Evaluate the expression without using a calculator.

9. $(-243)^{\frac{1}{5}}$ 10. $\left(\sqrt[3]{8}\right)^{-2}$ 11. $\left(\sqrt[4]{16}\right)^{-7}$ 12. $\frac{1}{81^{\frac{-3}{4}}}$

Simplify each expression using only positive exponents.

13. $(-4x)^{-2}$ 14. $\frac{8^{-\frac{2}{3}}8^{\frac{2}{3}}}{8^{\frac{1}{3}}}$ 15. $(x-y)^0[(x-y)^4]^{-\frac{1}{2}}$

16. $\frac{6xy^{3/4}}{3x^{1/2}y^{1/2}}$

17. $(y^4)^{\frac{1}{6}}$

18. $\frac{(64)^{\frac{5}{9}}(64)^{\frac{2}{9}}}{4^{\frac{3}{4}}}$

19. $\frac{3^{-1}x^2y^{-4}}{2^{-2}x^{-3}y^3}$

20. $3y^{\frac{2}{3}} \cdot y^{\frac{4}{3}}$

21. $\frac{(x+y)^{\frac{2}{3}}(x+y)^{-\frac{1}{6}}}{\{(x+y)^2\}^{\frac{1}{4}}}$

22. $-3(3x)^0 \cdot 25^{\frac{1}{2}}$

23. $\frac{3^{\frac{1}{2}}3^{-\frac{2}{3}}}{3^{-\frac{1}{2}}3^{\frac{1}{3}}}$