Name: _____ Hour: _____ Date: _____

Rational Exponents Notes Day 2

Recall: $\sqrt[n]{x^m} = x^{\frac{m}{n}}$

REMEMBER: If n is not given on the radical then it is equal to 2!

Also Important:

* $\sqrt[n]{x^m} = (\sqrt[n]{x})^m$

Rewrite the expression in radical form, and simplify if possible.

1) $9^{\frac{1}{2}} = \sqrt{9} = \pm 3$

2) $8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$
$= (\sqrt[3]{8})^2 = (2)^2 = 4$

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

Rewrite the expression in Rational Exponent Notation.

1) $\sqrt[5]{13} = 13^{1/5}$

2) $\sqrt[3]{5^2} = 5^{2/3}$

3) $(\sqrt{7})^5 = 7^{5/2}$

Use the product rule to simplify the expressions with rational exponents. Write final answers in radical form.

* need common denom.

1) $x^{\frac{1}{5}} \cdot x^{\frac{3}{5}}$
$x^{1/5+3/5}$
$x^{4/5}$
$\sqrt[5]{x^4}$

2) $\sqrt[4]{x} \cdot \sqrt[3]{x^2}$
$x^{1/4} \cdot x^{2/3}$
$x^{1/4+2/3}$
$x^{3/12+8/12}$
$= x^{11/12} = \sqrt[12]{x^{11}}$

Use the quotient rule to simplify the expressions with rational exponents. Write final answers in radical form.

* need common denom

1) $\frac{x^{\frac{7}{10}}}{x^{\frac{6}{10}}}$
$= x^{7/10-6/10}$
$= x^{1/10}$
$= \sqrt[10]{x}$

2) $\frac{\sqrt[6]{x^5}}{\sqrt[6]{x^2}} = \frac{x^{5/6}}{x^{2/6}}$
$= x^{5/6-2/6} = x^{3/6}$
$= x^{1/2} = \sqrt{x}$

Use the power rule to simplify the expressions. multiply fractions straight across

1) $\left(x^{\frac{3}{5}}\right)^{\frac{1}{2}}$
$= x^{3/10}$
$= \sqrt[10]{x^3}$

2) $\left(x^{\frac{3}{4}}\right)^{\frac{2}{3}}$
$= x^{6/12} = x^{1/2}$
$= \sqrt{x}$

3) $(25b^6)^{\frac{3}{2}}$
$25^{3/2} b^{18/2}$
$25^{3/2} b^9$
$\sqrt{25^3} b^9$
$5^3 b^9$
$125b^9$

4) $(64m^6)^{\frac{2}{3}}$
$64^{2/3} m^{12/3}$
$64^{2/3} m^4$
$\sqrt[3]{64^2} m^4$
$4^2 m^4$
$16m^4$