



Name _____ Date _____ Period _____

RADICALS AND RATIONAL EXPONENTS WORKSHEET #2

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 $a^{\frac{1}{n}}$. $a^{\frac{m}{n}} = (\sqrt[n]{a})^m$. Notice the placement of the m and n . The root index is the denominator and the exponent is the numerator.

Simplify.

1) $-\sqrt{121x^4}$

2) $\sqrt{\frac{81}{144}}$

3) $\sqrt[3]{-27a^{12}}$

4) If $f(x) = \sqrt{-4x+1}$,

a) Find $f(-2)$

b) Find the domain of $f(x)$

Evaluate.

5) $(-27)^{\frac{1}{3}}$

6) $(-16)^{\frac{1}{4}}$

7) $16^{-\frac{3}{4}}$

Write in exponential form.

8) $\sqrt[5]{a^2}$

9) $(\sqrt[6]{a})^5$

Write as a radical expression with a smaller index.

10) $\sqrt[4]{49}$

11) $\sqrt[14]{x^7}$

Simplify.

12) $\sqrt[4]{x} \cdot \sqrt{x}$

13) $\frac{\sqrt[3]{x^2}}{\sqrt[4]{x}}$

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

Use laws of exponents, reduce fractions, and write answers in simplified radical form.

13) $x^{\frac{4}{3}} \cdot x^{\frac{5}{3}}$

14) $x^{\frac{5}{4}} \cdot x^{\frac{1}{4}}$

15) $x^3 \cdot x^{\frac{1}{2}}$

Use laws of exponents, reduce fractions, and write answers in simplified radical form.

$$16) \left(4y^{\frac{7}{8}}\right)\left(3y^{\frac{9}{8}}\right)$$

$$17) \left(y^{\frac{3}{5}}\right)^{10}$$

$$18) \left(-3y^{\frac{1}{3}}\right)^3$$

$$19) \left(2y^{\frac{5}{6}}\right)^4$$

$$20) z^{-\frac{1}{2}}$$

$$21) z^{\frac{4}{3}}$$

$$22) \frac{a^{\frac{9}{4}}}{a^7}$$

$$23) \frac{16a^{\frac{2}{4}}}{6a^{\frac{3}{4}}}$$

$$24) \frac{a^{\frac{5}{3}}}{a^{\frac{1}{2}}}$$

$$25) x^{\frac{2}{3}} \cdot x^{\frac{1}{4}}$$

$$26) x^{\frac{1}{5}} \cdot x^{-\frac{1}{3}}$$

Simplify.

$$27) \sqrt[10]{2^5}$$

$$28) \sqrt[9]{a^3}$$

$$29) \sqrt[14]{y^7}$$

$$30) \sqrt[4]{16x^8}$$

$$31) \sqrt[8]{81}$$

$$32) \sqrt[6]{25x^4}$$

$$33) \sqrt[3]{27x^6}$$