Algebra II

10-1

Laws of Exponents

Laws of Exponents

$x^m \cdot x^n =$ x^{m+n}

$x^m + x^n =$ Can't do, leave as is.

$(x^m)^n =$ x^{mn}

$x^{-m} =$ $\frac{1}{x^m}$

Don't Bring in

$(x+y)^2 =$ $(x+y)(x+y)$ $x^2+2xy+y^2$

$\frac{x^m}{x^n} =$ x^{m-n}

$x^0 =$ 1

$x^1 =$ x

$(x^{12})^{\frac{1}{2}}$ x^6

$3^{-2} =$ $\frac{1}{9}$

$(x^m \cdot y^n)^k =$ $x^{mk} \cdot y^{nk}$

$(x^2)^{\frac{1}{2}}$ x

$x^{\frac{1}{2}} = \sqrt{x}$

$\sqrt[4]{x^{12}}$ $x^{\frac{12}{4}} = x^3$

$x^{\frac{3}{4}} = \sqrt[4]{x^3}$

Definition of Rational Exponents -

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

Simplify. (pg 458.)

1) $81^{\frac{1}{2}} = \sqrt{81} = 9$

13) $-8^{\frac{2}{3}}$

$\sqrt[3]{-8^2}$

$-\sqrt[3]{8^2} = -\sqrt[3]{64}$

$= -4$

Write in exponential form.

21) $\sqrt{x^3y^5}$ $x^{\frac{3}{2}}y^{\frac{5}{2}}$

Express in simplest radical form.

31) $\frac{\sqrt[3]{4}}{\sqrt[6]{2}} = \frac{4^{\frac{1}{3}}}{2^{\frac{1}{6}}} = \frac{(2^2)^{\frac{1}{3}}}{2^{\frac{1}{6}}} = \frac{2^{\frac{2}{3}}}{2^{\frac{1}{6}}} = 2^{\frac{2}{3}-\frac{1}{6}} = 2^{\frac{1}{2}} = \sqrt{2}$

Simplify each expression. Give answers in exponential form.

37) $\sqrt{x} \cdot \sqrt[3]{x} \cdot \sqrt[6]{x}$

$x^{\frac{1}{2}} \cdot x^{\frac{1}{3}} \cdot x^{\frac{1}{6}}$

$x^{\frac{1}{2}\cdot 3 + \frac{1}{3}\cdot 2 + \frac{1}{6}}$

$x^{\frac{3+2+1}{6}}$

$x^{\frac{6}{6}} = x^1 = x$

Solve each equation.

43a) $a^{\frac{3}{4}} = 8$

$(a^{\frac{3}{4}})^{\frac{4}{3}} = 8^{4/3}$

$a = \sqrt[3]{8^4} = 2^4$

$a = 16$

$\{16\}$

43b) $(3x + 1)^{\frac{3}{4}} = 8$

$\left[(3x+1)^{\frac{3}{4}}\right]^{\frac{4}{3}} = 8^{4/3}$

$3x + 1 = 16$

$3x = 15$

$x = 5$

$\{5\}$

Pg. 458

Oral Exercises

9-16 all

Written Exercises

2 - 50 even