Laws of Exponent Worksheet

Name Key

Date _____

Assignment # _____

Rational Exponents: Rewrite each with a rational exponent

(1) $\sqrt[3]{y^6}$ $\quad y^{\frac{6}{3}} = y^2$

(2) $\sqrt{x^3}$ $\quad x^{\frac{3}{2}}$

(3) $\sqrt[4]{a^2}$ $\quad a^{\frac{2}{4}} = a^{\frac{1}{2}}$

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

(5) $\left(\sqrt[3]{x^2} \cdot \sqrt{x^3}\right)$ $\quad x^{\frac{2}{3}} \cdot x^{\frac{3}{2}}$ $\quad x^{\frac{13}{6}}$

(6) $\sqrt[4]{x} \cdot \sqrt[3]{x^2}$ $\quad x^{\frac{1}{4}} \cdot x^{\frac{2}{3}}$ $\quad x^{\frac{11}{12}}$

(7) $\dfrac{\sqrt[3]{5^2}}{\sqrt[4]{5^5}} = \dfrac{5^{\frac{2}{3}}}{5^{\frac{5}{4}}} = 5^{\frac{-7}{12}}$ $\quad \dfrac{1}{5^{\frac{7}{12}}}$

(8) $\left(\sqrt[2]{x^3} \cdot \sqrt[4]{x^2}\right)^3$ $\quad \left(x^{\frac{3}{2}} \cdot x^{\frac{2}{4}}\right)^3$ $\quad \left(x^2\right)^3$ $\quad x^6$

(9) $\left(\dfrac{\sqrt{y^3}}{\sqrt{y}}\right)^4 = \left(\dfrac{y^{\frac{3}{2}}}{y^{\frac{1}{2}}}\right)^4 = \left(y^1\right)^4$ $\quad y^4$

Simplify Each Expression

(10) $12^{\frac{1}{8}} \cdot 12^{\frac{5}{6}}$ $\quad 12^{\frac{23}{24}}$

(11) $(-4a^2)(2a^{-3})^{-4}$

$-4a^2 \cdot 2^{-4} a^{12}$

$\dfrac{-4a^{14}}{2^4}$

$\dfrac{-4a^{14}}{16}$

$\dfrac{-a^{14}}{4}$

(BACK)

(12) $(-8a^5b^7)^0$

$-8^0 a^{5 \cdot 0} b^{7 \cdot 0}$

$1 \cdot 1 \cdot 1$

1

(13) $\left(\frac{4x^{-3}y^{4}}{5z^{-5}}\right)^{3}$

$\Rightarrow \left(\frac{4y^{4}z^{5}}{5x^{3}}\right)^{3}$

$\Rightarrow \frac{4^{3}y^{12}z^{15}}{5^{3}x^{9}}$

$\Rightarrow \frac{64y^{12}z^{15}}{125x^{9}}$

(14) $\sqrt[3]{24x^{5}y^{6}z^{10}} = \left(24x^{5}y^{6}z^{10}\right)^{\frac{1}{3}}$

$24^{\frac{1}{3}}x^{\frac{5}{3}}y^{2}z^{\frac{10}{3}}$

(15) $\frac{n^{5}}{(-2n^{4})^{3}}$

$\frac{n^{5}}{-8n^{12}} = \frac{1}{-8}n^{-7}$

$= \frac{1}{-8n^{7}}$

(16) $(3x^{-2}y^{4})^{-2}$

$3^{-2}x^{4}y^{-8}$

$\frac{x^{4}}{3^{2}y^{8}}$

$\frac{x^{4}}{9y^{8}}$

(17) $(ba^{-5})^{2}$

$b^{2}a^{-10}$

$\frac{b^{2}}{a^{10}}$

(18) $\left(\sqrt[3]{p^{5}}\right)^{4}$

$\left(p^{\frac{5}{3}}\right)^{4}$

$p^{\frac{20}{3}}$

(19) $\left(\sqrt[4]{x^{7}}\right)^{5}$

$\left(x^{\frac{7}{4}}\right)^{5}$

$x^{\frac{35}{4}}$

(20) $\left(\frac{2x^{-3}y^{2}\cdot x^{-2}y^{2}}{xy^{-3}}\right)^{3}$

$\Rightarrow \frac{2^{3}x^{-9}y^{6}\cdot x^{-6}y^{6}}{x^{3}y^{-9}}$

$\Rightarrow \frac{2^{3}x^{-15}y^{12}}{x^{3}y^{-9}}$

$\Rightarrow 2^{3}x^{-18}y^{21}$

$\Rightarrow \frac{8y^{21}}{x^{18}}$