Name: _____   Date: _____

Learning Goal 0.2	Expectations for algebra from previous years.

Recall all the exponent laws

$x^a \times x^b$ $\dfrac{x^a}{x^b}$ $(x^a)^b$ x^{-a} $x^{a/b}$ ← REGULAR EXP.

$= x^{a+b}$ $= x^{a-b}$ $= x^{a \times b}$ $= \dfrac{1}{x^a}$ $= \sqrt[b]{x^a}$ ↖ INDEX OF RADICAL

Example Simplify the following expressions.

a. $(64p^5q^9)^{4/3}$

$$\sqrt[3]{(64p^5q^9)^4}$$

$= 64^{4/3}\, p^{20/3}\, q^{36/3}$

$= 2^{24/3}\, p^{20/3}\, q^{12}$

$= 2^8\, p^{20/3}\, q^{12}$

$= 2^8\, q^{12}\, p^6\, \sqrt[3]{p^2}$

$$\left(\sqrt[3]{64p^5q^9}\right)^4$$

$= \left(4pq^3 \sqrt[3]{p^2}\right)^4$

$= 256 p^4 q^{12} \sqrt[3]{p^8}$

$= 256 p^6 q^{12} \sqrt[3]{p^2}$

b. $\dfrac{(9a^3b^6)^{-1/2}}{(3a^3b^6)^{-2}} = \dfrac{(3a^3b^6)^2}{(9a^3b^6)^{1/2}}$

$= \dfrac{9a^6 b^{12} b^9}{3a^{3/2} b^3}$

$= \dfrac{3a^6 b^9}{a^{3/2}}$

$= 3a^{9/2} b^9$

$= 3a^4 b^9 \sqrt{a}$

Example Rationalize the following expressions.   ← REMOVE ALL RADICALS FROM THE DENOMINATOR

a. $\left(\dfrac{5\sqrt{8} - 2\sqrt{5}}{\sqrt{6}}\right) \times \dfrac{\sqrt{6}}{\sqrt{6}}$

$\Rightarrow = \dfrac{5\sqrt{48} - 2\sqrt{30}}{6}$

$= \dfrac{10\sqrt{12} - 2\sqrt{30}}{6}$

$= \dfrac{20\sqrt{3} - 2\sqrt{30}}{6}$

$= \dfrac{10\sqrt{3} - \sqrt{30}}{3}$

48
/\
4 12
   /\
   4 3

30
/\
3 10
   /\
   5 2

b. $\dfrac{1+\sqrt{7}}{2-\sqrt{7}} \times \dfrac{2+\sqrt{7}}{2+\sqrt{7}}$ conjugate (CREATING a DIFFERENCE of SQUARES)

$= \dfrac{2 + \sqrt{7} + 2\sqrt{7} + 7}{4 - 7}$

$= \dfrac{9 + 3\sqrt{7}}{-3}$

$= -3 - \sqrt{7}$

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implies Rationalize the Numerator.

c. $\dfrac{\sqrt{5}}{\sqrt{5}}\dfrac{1}{\sqrt{5}} - \dfrac{1}{\sqrt{3}}\dfrac{\sqrt{3}}{\sqrt{3}}$

$= \dfrac{3\sqrt{5}}{3\ \ 5} - \dfrac{\sqrt{3}}{3}\dfrac{5}{5}$

$= \dfrac{3\sqrt{5} - 5\sqrt{3}}{15}$

d. $\dfrac{\sqrt{x+2} - \sqrt{x+1}}{1} \times \dfrac{\sqrt{x+2} + \sqrt{x+1}}{\sqrt{x+2} + \sqrt{x+1}}$

$= \dfrac{(x+2) - (x+1)}{\sqrt{x+2} + \sqrt{x+1}}$

$= \dfrac{1}{\sqrt{x+2} + \sqrt{x+1}}$

Example Simplify the following radical expressions.

c. $\dfrac{\sqrt[3]{56x^9}}{\sqrt[3]{-7x^3}}$ $= \sqrt[3]{-8z^6}$

$= -2x^2$

NPV: $x \neq 0$

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