Section 6-4
Rational Exponents

Students will be able to simplify expressions with rational exponents.

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$\sqrt{25}$ can be written as $25^{\frac{1}{2}}$

How would you write $\sqrt[4]{16}$ as a rational exponent?

$16^{1/4}$

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We can also write expressions that have rational exponents in radical form to simplify them.

$8^{\frac{2}{3}}$ can be written in two different ways

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

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

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Simplify:

$7^{\frac{1}{2}} \cdot 7^{\frac{1}{2}}$

$\sqrt{7} \cdot \sqrt{7} = \sqrt{49}$

$7^1 = 7$

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Simplify:

$5^{\frac{1}{4}} \cdot 125^{\frac{1}{4}}$

$5^{1/4} \cdot 5^{3/4} = 5^1 = 5$

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Write the following in radical form.

$5x^{\frac{1}{3}} = 5\sqrt[3]{x}$

$(54y)^{\frac{2}{3}}$ $\sqrt[3]{(54y)^2} = \sqrt[3]{2916y^2} = 3\sqrt[3]{108y^2} = 9\sqrt[3]{4y^2}$

$y^{-3.5} = y^{-7/2} = \frac{1}{y^{7/2}} = \frac{1}{y^3\sqrt{y}}$ $\frac{\sqrt{y}}{y^4}$

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Converting to Exponential Form

Write in exponential form:

$\sqrt[5]{b^3}$ $b^{3/5}$

$\sqrt[3]{27d^5}$ $(27d^5)^{1/3} = 3d^{5/3}$

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Simplify:

$\sqrt{3}\ \sqrt[4]{3} = 3^{1/2} \cdot 3^{1/4} = 3^{3/4} = \sqrt[4]{27}$

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

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What is each number in simplest form?

$32^{-\frac{3}{5}} = \dfrac{1}{32^{3/5}} = \dfrac{1}{(2^5)^{3/5}} = \dfrac{1}{2^3} = \dfrac{1}{8}$

$16^{\frac{3}{4}} = (2^4)^{3/4} = 2^{12/4} = 2^3 = 8$

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To write an expression with rational exponents in simplest form, write every exponent as a positive number.

Write in simplest form:

$(8x^{15})^{-\frac{1}{3}}$ $\dfrac{1}{(8x^{15})^{1/3}}$ $\dfrac{1}{8^{1/3}x^5} = \dfrac{1}{2x^5}$

$(9x\sqrt[4]{y})^{\frac{3}{2}}$

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Hwk: pg. 386-387
#10 - 64 (4th), 70, 76,
80 - 86 evens

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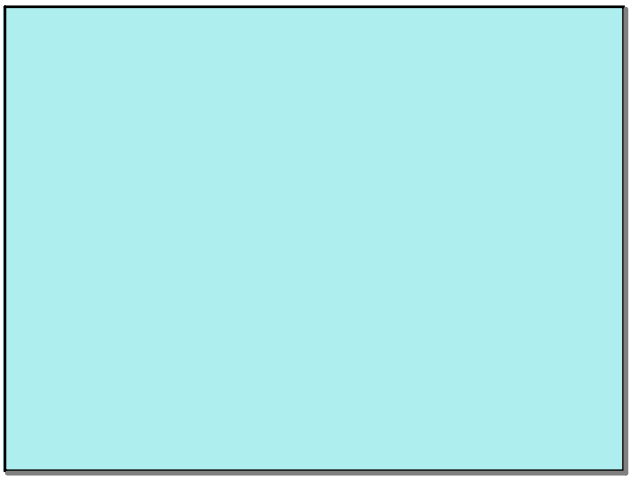

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