Today's Plan:

Learning Target (standard): I will convert from rational exponents to radical form and from radical form to exponential form.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Rational Exponents Practice

1) $\sqrt{216x^3}$

2) $\dfrac{1}{\sqrt[3]{6x}}$

3) $\dfrac{1}{\sqrt[3]{k}}$

4) $\sqrt[5]{4a^2}$

5) $(5p)^{\frac{5}{3}}$

6) $(2n)^{\frac{5}{6}}$

7) $(10m)^{\frac{5}{6}}$

8) $(7b)^{\frac{5}{3}}$

9) $\dfrac{n^5}{4}$

10) p^7

11) $\dfrac{1}{x}$

12) n^6

13) $\dfrac{1}{16y^{12}}$

14) $2x$

Simplify.

$$81^{-\frac{1}{4}} = \frac{1}{81^{\frac{1}{4}}} = \frac{1}{\sqrt[4]{81}}$$

81

9 9

3 3 3 3

$$= \frac{1}{\sqrt[4]{3\cdot 3\cdot 3\cdot 3}} = \frac{1}{3}$$

Simplify.

$$\left(a^{16}\right)^{-\frac{5}{8}} = a^{-10}$$

$16 \cdot -\frac{5}{8}$

$$= \frac{1}{a^{10}}$$

$$\left(x^4\right)^3 = x^{12}$$

Rewrite the exponential expression as a radical expression:

$3^{1}x^{\frac{3}{4}}$ ← power ↖ root $= 3\sqrt[4]{x^3}$

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

Rewrite the radical expression as an exponential expression:

$\sqrt[2]{x^5} = x^{\frac{5}{2}}$

Simplify.

$$\sqrt[4]{81a^8b^{12}} = \sqrt[4]{3\cdot3\cdot3\cdot3\cdot a^4\cdot a^4\cdot b^4\cdot b^4\cdot b^4}$$

9 9

3 3 3 3

$$= 3a^2b^3$$

$$= 3a^2b^3$$

Simplify.

$$\sqrt[5]{-64a^8b^{17}} = \sqrt[5]{2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot aaaaaaaa\ bbbbbbbbbbbbbbbbb}$$

8 8

4 2 2 4

2 2 2 2

$$= -2ab^3\sqrt[5]{2a^3b^2}$$

Simplify.

$$\sqrt{18a^3b^9}$$

$$= \sqrt{2 \cdot 3 \cdot 3 \cdot a^2 \cdot a \cdot b^2 \cdot b^2 \cdot b^2 \cdot b^2 \cdot b}$$

$$= 3ab^4\sqrt{2ab}$$

18 → 9, 2; 9 → 3, 3

Simplify.

$$\sqrt{54} + \sqrt{24}$$

$$= \sqrt{2 \cdot 3 \cdot 3 \cdot 3} + \sqrt{2 \cdot 2 \cdot 2 \cdot 3}$$

$$= 3\sqrt{6} + 2\sqrt{6}$$

$$= 5\sqrt{6}$$

54 → 9, 6; 9 → 3, 3; 6 → 2, 3

24 → 8, 3; 8 → 2, 4; 4 → 2, 2

Simplify.

$$\sqrt{50a^4b^3} - ab\sqrt{18a^2b}$$

50: 2 25; 25: 5 5

18: 9 2; 9: 3 3

$= \sqrt{2 \cdot 5 \cdot 5 \cdot aaaa\,\boxed{bb}\,b} - ab\sqrt{2 \cdot 3 \cdot 3 \cdot aab}$

$= 5a^2b\sqrt{2b} - 3a^2b\sqrt{2b}$

$= 2a^2b\sqrt{2b}$

Simplify.

$$\sqrt[3]{16x^4y} \cdot \sqrt[3]{4xy^5}$$

16: 8 2; 8: 4 2; 4: 2 2

4: 2 2

$= \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2\, xxxxx\, yyyyyy}$

$= 4xy^2\sqrt[3]{x^2}$

Simplify.

$$(5-\sqrt{6})^2 = (5-\sqrt{6})(5-\sqrt{6})$$

$$= 25-5\sqrt{6}-5\sqrt{6}+\sqrt{6\cdot 6}$$

$$= 25-10\sqrt{6}+6$$

$$= 31-10\sqrt{6}$$

Simplify.

$$\frac{\sqrt{\cancel{125}^{25}x^3}}{\sqrt{\cancel{5x^3}}} = \sqrt{25x^3}$$

$$25 \to 5\ 5$$

$$= \sqrt{5\cdot 5\cdot x\cdot x\cdot x}$$

$$= 5x\sqrt{x}$$

Simplify.

$$\frac{12}{\sqrt{x}-\sqrt{7}} \cdot \frac{\sqrt{x}+\sqrt{7}}{\sqrt{x}+\sqrt{7}} = \frac{12\sqrt{x}+12\sqrt{7}}{x-7}$$

Conjugate

Simplify.

$$\frac{\sqrt{x}+\sqrt{y}}{\sqrt{x}-\sqrt{y}} \cdot \frac{\sqrt{x}+\sqrt{y}}{\sqrt{x}+\sqrt{y}} = \frac{(\sqrt{x}+\sqrt{y})(\sqrt{x}+\sqrt{y})}{(\sqrt{x}-\sqrt{y})(\sqrt{x}+\sqrt{y})}$$

Conjugate

$$= \frac{\sqrt{x \cdot x}+\sqrt{xy}+\sqrt{xy}+\sqrt{y \cdot y}}{\sqrt{x \cdot x}-\sqrt{y \cdot y}}$$

$$= \frac{x+2\sqrt{xy}+y}{x-y}$$

Assignment:

Radicals & Rational Exponents Practice
#1-18

* QUIZ tomorrow! *