10/02-10/04   **Objectives**
- Review Homework Questions
- Section 10.1 Rational Expressions, Functions, and Models
- Section 10.2 Rational Numbers as Exponents
- Section 10.3 Multiplying Radical Expressions
- Section 10.4 Dividing Radical Expressions
- Homework:
  - Concept Review
    - Pg. 705 # 1-8
    - Pg. 714 # 1-8
    - Pg. 721 # 1-6
    - Pg. 728 # 1-8
  - Mixed Review
    - Pg. 738 # 1-13

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#34

$$\frac{1}{x^2 - 25} - \frac{x-5}{x^2 - 4x - 5}$$

$(x-5)(x+5)$ $(x-5)(x+1)$

LCM =
$(x-5)(x+5)(x+1)$

$$1(x+1) - (x-5)(x+5)$$

Top $x+1 - (x^2 - 25)$

$x+1 - x^2 - 25$

$-x^2 + x - 24$

Ans

$$\frac{-x^2 + x - 24}{(x-5)(x+5)(x+1)}$$

Pg 687 #17

$$M + W + C = 56.7$$

$$W = 3.9 + M$$

$$C = 43.3 + (M + W)$$

Radical Expressions

$$\sqrt{25} = 5$$

$$-\sqrt{64} = -8$$

$$\sqrt{-64} = \text{no solution}$$

$$\sqrt{36x^2} = |6x|$$

$x = -3$

$$\sqrt{36(-3)^2} \qquad 6(-3)$$

$$\sqrt{324} \qquad |-18|$$

$$18 \quad = \quad 18$$

$$\sqrt{(x-1)^2} = |x-1|$$

$$\sqrt{x^2 - 8x + 16} = |x-4|$$
$$(x-4)(x-4)$$
$$(x-4)^2$$

$$\sqrt{x^2 - 4x - 5} \quad \leftarrow \text{Answer}$$
$$(x+1)(x-5)$$

$$\sqrt{x^2 + 9} \quad \leftarrow \text{Can't simplify}$$
$$\cancel{x + 3}$$

$$\sqrt[3]{-8x^3} = -2x \qquad \sqrt[5]{32} = 2$$

$$\sqrt[9]{(x+5)^9} = x+5$$

Old Rules you should know

1) $x^a \cdot x^b = x^{a+b}$

2) $x^a / x^b = x^{a-b}$

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

4) $(xy)^m = x^m y^m$

5) $x^0 = 1$

6) $x^{-m} = \dfrac{1}{x^m}$

Rule 1 of the night

$$a^{m/n} = \sqrt[n]{a^m}$$

$$8^{1/3} = \sqrt[3]{8}$$

$$\left(25x^{16}\right)^{1/2} = \sqrt{25x^{16}} = 5x^8$$

$$25^{1/2}x^8$$

$$\sqrt[5]{7ab} = (7ab)^{1/5}$$

$$\sqrt[7]{\frac{x^3 y}{4}} = \left(\frac{x^3 y}{4}\right)^{1/7}$$

$$\sqrt{(5x)^3} = (5x)^{3/2}$$

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

$$\sqrt[5]{3} \cdot \sqrt[5]{3^3} = \sqrt[5]{3^4}$$

$$\left(\sqrt[3]{ab^2c}\right)^{12} = \left((ab^2c)^{1/3}\right)^{12}$$

$$= (ab^2c)^4$$

$$\sqrt{\sqrt[3]{x}} = \sqrt{(x)^{1/3}} \quad \left(x^{1/3}\right)^{1/2} = x^{1/6}$$

$$\sqrt[3]{\sqrt[4]{xy}} = \sqrt[3]{(xy)^{1/4}} = \left((xy)^{1/4}\right)^{1/3}$$

$$(xy)^{1/12}$$

Multiplication

$$\sqrt{100} = 10$$

$$\sqrt{4} = 2$$

$$\sqrt{25} = 5$$

$$\frac{\sqrt{4} \cdot \sqrt{25}}{\sqrt{100}} = 10$$

$$\sqrt{4 \cdot 25} = 10$$

Rule #2

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$$

$$\sqrt{3} \cdot \sqrt{5} = \sqrt{15}$$

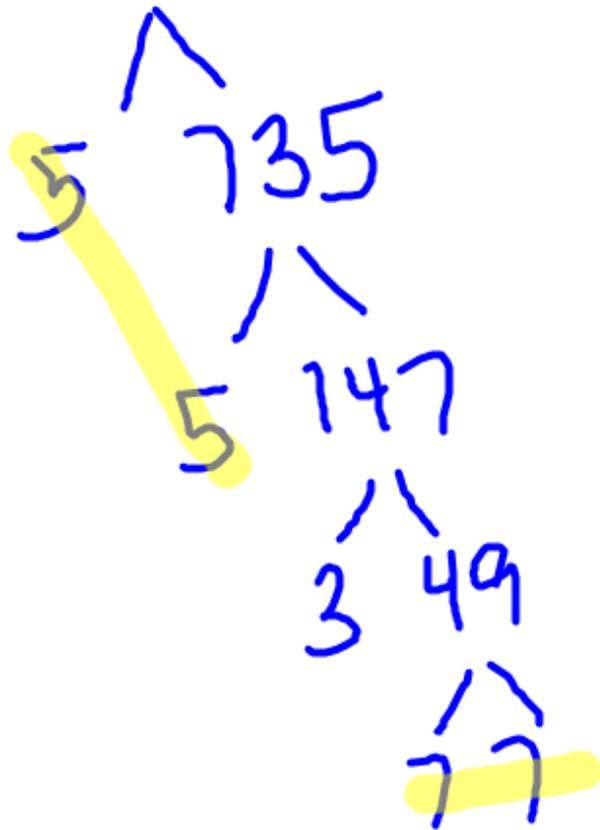$$\sqrt{x+3} \cdot \sqrt{x-3} = \sqrt{(x+3)(x-3)}$$

$$= \sqrt{x^2-9}$$

$$\sqrt{200} = \sqrt{100 \cdot 2} = \sqrt{100} \cdot \sqrt{2}$$
$$= 10\sqrt{2}$$

$$
\begin{array}{c}
\wedge \\
2 \quad 100 \\
\quad \quad \wedge \\
\quad \quad 10 \quad 10 \\
\quad \quad \wedge \quad \wedge \\
\quad 2 \; 5 \; 5 \; 2
\end{array}
$$

$$= 2 \cdot 5 \sqrt{2}$$

$$\sqrt{3675} = 5 \cdot 7 \sqrt{3}$$

$$35\sqrt{3}$$

5   735

5   147

3   49

7   7

$$\sqrt{18x^2y} = \sqrt{18}\sqrt{x^2}\sqrt{y}$$

$$9 \quad 2$$

$$3 \quad 3$$

$$3\sqrt{2}$$

$$x$$

$$\sqrt{y}$$

$$3x\sqrt{2y}$$

$$\sqrt{25(x+2)} = \sqrt{25} \ \sqrt{x+2}$$

$$5\sqrt{x+2}$$

$$\sqrt{15} \cdot \sqrt{6} = \sqrt{90} = 3\sqrt{10}$$

15: 5 3

6: 2 3

90: 9 10

9: 3 3

10: 5 2

$$3\sqrt[3]{25} \cdot 2\sqrt[3]{5} = 3 \cdot 2 \cdot 5 = 30$$

$$\underset{5 \quad 5}{\quad} \qquad \underset{5}{\quad}$$

$$\sqrt[4]{8x^3y^5} \cdot \sqrt[4]{4x^2y^3} = 2xy^2\sqrt[4]{2x}$$

$$\underset{4 \quad 2}{\quad} \qquad \underset{2 \quad 2}{\quad}$$

$$\underset{2 \quad 2}{\quad}$$

$$\begin{array}{ccc} xxxx & yyyy \\ x & yyyy \end{array}$$

Rule #3

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\sqrt[3]{\frac{27}{125}} = \frac{\sqrt[3]{27}}{\sqrt[3]{125}} = \frac{3}{5}$$

$$\frac{\sqrt{80}}{\sqrt{5}} = \sqrt{\frac{80}{5}} = \sqrt{16} = 4$$

$$\frac{4\sqrt{5}}{\sqrt{5}}$$

$$\frac{\sqrt[4]{18a^9b^5}}{\sqrt[4]{3b}} = \sqrt[4]{\frac{18a^9b^5}{3b}}$$

$$= \sqrt[4]{6a^9b^4} = a^2b\sqrt[4]{6a}$$

$$\overset{\curvearrowright}{23}$$

aaaa

aaaa

a

bbbb

$$\frac{1}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$$

$$\sqrt{\frac{7}{3}} = \frac{\sqrt{7}}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{\sqrt{21}}{3}}$$

$$\sqrt[3]{\dfrac{5}{x}} = \dfrac{\sqrt[3]{5}\ \sqrt[3]{x}\ \sqrt[3]{x}}{\sqrt[3]{x}\ \sqrt[3]{x}\ \sqrt[3]{x}} = \dfrac{\sqrt[3]{5x^2}}{x}$$

$$\sqrt[3]{x^3}$$

$$\frac{\sqrt[5]{3}}{\sqrt[5]{2}} \frac{\sqrt[5]{2}\sqrt[5]{2}\sqrt[5]{2}\sqrt[5]{2}}{\sqrt[5]{2}\sqrt[5]{2}\sqrt[5]{2}\sqrt[5]{2}} = \frac{\sqrt[5]{48}}{2}$$