10/9/2012 - Sec 7.2

Math 1010

#65

$$\frac{(-3mn)^2 \cdot 64(m^2n)^3}{16m^2n^4(mn^2)^3} \div \frac{24(m^3n^2)^4}{(3m^2n^3)^2}$$

$$\frac{(-3)^2 m^2 n^2 \cdot 64 m^6 n^3}{16 m^2 n^4 m^3 n^6} \div \frac{24 m^8 n^8}{(3)^2 m^4 n^6}$$

$$\frac{9 m^8 n^5 \cdot 64^4}{16 m^5 n^{10}} \div \frac{24 m^8 n^8}{9 m^4 n^6}$$

$$\frac{9 m^3 \cdot 4}{n^5} \div \frac{8 m^4 n^2}{3}$$

$$\frac{36 m^3}{n^5} \div \frac{8 m^4 n^2}{3}$$

$$\frac{36 m^3}{n^5} \cdot \frac{3}{8 m^4 n^2}$$

$$\boxed{\frac{27}{2 m n^7}}$$

#45 $$\frac{a^3+b^3}{a+b}$$

$$\frac{(a+b)(a^2-ab+b^2)}{(a+b)}$$

$$\boxed{a^2-ab+b^2}$$

#95 $$\left(\frac{6k^2-13k-5}{k^2+7k} \div \frac{2k-5}{k^3+6k^2-7k}\right) \cdot \frac{k^2-5k+6}{3k^2-8k-3}$$

$$\left(\frac{6k^2-13k-5}{k^2+7k} \cdot \frac{k^3+6k^2-7k}{2k-5}\right) \cdot \frac{k^2-5k+6}{3k^2-8k-3}$$

$$\left(\frac{(2k-5)(3k+1)\,k(k+7)(k-1)}{k(k+7)\,(2k-5)}\right) \cdot \frac{(k-2)(k-3)}{(k-3)(3k+1)}$$

$$\frac{(3k+1)(k-1)\cdot(k-2)(k-3)}{1\cdot(k-3)(3k+1)}$$

$$\boxed{(k-1)(k-2)}$$

Sec 7.2 Adding and Subtracting Rational Expressions

Recall our Adding/Subtracting Rules for fractions

1. Make sure each fraction has a common denominator
2. Add/Subtract the Numerator
3. Simplify our Resulting fraction

$$\frac{7\cdot 4}{7\cdot 5}+\frac{3\cdot 5}{7\cdot 5}$$

LCD: $5\cdot 7 = 35$

$$\frac{28}{35}+\frac{15}{35}$$

$$\frac{28+15}{35}$$

$$\boxed{\frac{43}{35}}$$

Ex:

$$\frac{7x}{9}+\frac{x}{9}$$

$$\frac{7x+x}{9}$$

$$\frac{8x}{9}$$

Ex: $\dfrac{x^2}{x-3}-\dfrac{9}{x-3}$ ← same →

$$\frac{x^2-9}{x-3}$$

$$\frac{x^2-9}{(x-3)}$$

$$\frac{(x-3)(x+3)}{(x-3)}$$

$$\boxed{x+3}$$

$x+3$

How to find the LCD

1st Factor Each Denominator

2nd Determine LCD by finding the product of all the different factors from Each Denominator

Ex: Suppose my Denominators are

- $5xy^2$, $2x^3y$

  LCD: $25x^3y^2 = 10x^3y^2$

- z, $(z+6)$

  LCD: $z(z+6)$

- x^2-2x+1, x^2-4x+3

  $(x-1)(x-1)$, $(x-3)(x-1)$

  LCD: $(x-1)^2(x-3)$

  $(x-1)(x-1)(x-3)$

12, 18

$2 \cdot 6$ $3 \cdot 6$

$2 \cdot 3 \cdot 6$

Add / Subtract

Ex: $\frac{4 \cdot 6}{4 \cdot m} + \frac{1}{4m}$ LCD: $4m$

$$\frac{24}{4m} + \frac{1}{4m}$$

$$\frac{24 + 1}{4m}$$

$$\boxed{\frac{25}{4m}}$$

Ex: $\frac{6}{(r-3) \cdot r} - \frac{5 \cdot r}{(r-3) \cdot r}$ LCD: $r(r-3)$

$$\frac{6(r-3)}{r(r-3)} - \frac{5r}{r(r-3)}$$

$$\frac{6(r-3) - 5r}{r(r-3)}$$

$$\frac{6r - 18 - 5r}{r(r-3)}$$

$$\boxed{\frac{r - 18}{r(r-3)}}$$

Ex: $\frac{2}{x-3} + \frac{1}{3-x}$

$\frac{2}{x-3} + \frac{-1 \cdot 1}{-1(x-3)}$

$\frac{2}{x-3} + \frac{-1}{x-3}$

$\frac{2+-1}{x-3}$

$\frac{1}{x-3}$

LCD: $-1(x-3)$

$\frac{-1 \cdot 2}{-1(x-3)} + \frac{1}{-1(x-3)}$

$\frac{-2}{-1(x-3)} + \frac{1}{-1(x-3)}$

$\frac{-2+1}{-1(x-3)}$

$\frac{-1}{-1(x-3)} = \frac{1}{x-3}$

Ex: $\dfrac{m+4}{m^2-2m-3} - \dfrac{2m-3}{m^2-5m+6}$ $(m-6)(m+1)$

$\dfrac{(m-2)(m+4)}{(m-2)\cdot(m-3)(m+1)} - \dfrac{(2m-3)(m+1)}{(m-3)(m-2)(m+1)}$ 1st Factor the entire denominator

2nd Decide the LCD

LCD: $(m-3)(m+1)(m-2)$

$\dfrac{(m-2)(m+4) - (2m-3)(m+1)}{(m-3)(m+1)(m-2)}$ 3rd Create new fractions with my LCD

$\dfrac{(m^2-2m+4m-8) - (2m^2+2m-3m-3)}{(m-3)(m+1)(m-2)}$ 4th Combine the Numerator

$\dfrac{(m^2+2m-8) - (2m^2-m-3)}{(m-3)(m+1)(m-2)}$

$\dfrac{m^2+2m-8-2m^2+m+3}{(m-3)(m+1)(m-2)}$

5th Write in Lowest factor

$$\boxed{\dfrac{-m^2+3m-5}{(m-3)(m+1)(m-2)}}$$