10/11/12 - Sec 7.3 cont.
Sec 7.4

Math 1010

#24

$$\frac{(s-r)rs}{\left(\frac{1}{r}-\frac{1}{s}\right)rs}$$

LCD : rs

$$\frac{\cancel{(s-r)}rs}{\cancel{(s-r)}}$$

rs

#18

$$\frac{\frac{4t^2-9s^2}{st}}{\frac{2\cdot t}{s\cdot t}-\frac{3\cdot s}{t\cdot s}}$$

← LCD : st

$$\frac{\frac{4t^2-9s^2}{st}}{\frac{2t-3s}{st}}$$

$$\frac{(4t^2-9s^2)\cdot \cancel{st}}{\cancel{st}\cdot(2t-3s)}$$

$$\frac{(4t^2-9s^2)}{(2t-3s)}=\frac{\cancel{(2t-3s)}(2t+3s)}{\cancel{(2t-3s)}}:\boxed{2t+3s}$$

Sec 7.3 cont.

\# 35 $\dfrac{1}{\boxed{x^{-2}} + y^{-2}}$

LCD: x^2y^2 $\dfrac{x^2y^2 \quad 1}{x^2y^2\left(\frac{1}{x^2} + \frac{1}{y^2}\right)}$

$$\frac{x^2y^2}{y^2+x^2}$$

$$\frac{x^2y^2}{x^2+y^2}$$

$$\frac{3x^{-2}y^{-2}}{z^{-5}}$$

$$\boxed{\frac{3z^5}{x^2y^2}}$$

Ex: $\dfrac{a^{-2}+b^{-1}}{a^{-1}-5b^{-3}} = \dfrac{\left(\frac{1}{a^2} + \frac{1}{b}\right)a^2b^3}{\left(\frac{1}{a} - \frac{5}{b^3}\right)a^2b^3}$ LCD: a^2b^3

$$\boxed{\frac{b^3+a^2b^2}{ab^3-5a^2}} \text{ or } \boxed{\frac{b^2(b+a^2)}{a(b^3-5a)}}$$

$$\frac{3x^{-1}+4y^{-2}}{2+5x^{-1}} = \frac{3y^2+4x}{y^2(2x+5)}$$

$$\frac{\left(\frac{3}{x}+\frac{4}{y^2}\right)xy^2}{\left(2+\frac{5}{x}\right)xy^2}$$

LCD: xy^2

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

$$\frac{3y^2+4x}{2xy^2+5y^2} = \boxed{\frac{3y^2+4x}{y^2(2x+5)}}$$

Sec 7.4 Equations with Rational Expressions and Graphs

Ex: $\frac{1}{3x} - \frac{4}{5} = \frac{1}{5x}$

Domain: set of all possible inputs

D: $\{x \mid x \neq 0\}$

or

D: $x \neq 0$

$$\frac{2}{x^2-4} + \frac{1}{x+2} = \frac{3}{x-2}$$

$(x+2)(x-2)$

D: $x \neq 2, -2$

Extraneous Solution is a solution to a Resulting version of the Equation that Not a solution of the original Equation

How to Solve a Rational Equation

1st Determine the Domain

2nd Find the LCD of all the fractions

3rd Multiply both sides of the Equation by the LCD to clear all the fractions.

4th Solve the Resulting Eq:

5th Check to see if each proposed solution is allowed using the domain

$$15x\left(\frac{1}{3x} - \frac{4}{5}\right) = \left(\frac{1}{5x}\right)15x$$

Domain: $x \neq 0$

LCD: $15x$

$$\frac{1}{\cancel{3x}} \cdot \overset{5}{\cancel{15x}} - \frac{4}{\cancel{5}} \cdot \overset{3}{\cancel{15}}x = \frac{1}{\cancel{5x}} \cdot \overset{3}{\cancel{15x}}$$

$$5 - 12x = 3$$
$$-5 \qquad -5$$

$$\frac{-12x}{-12} = \frac{-2}{-12}$$

$$\boxed{x = \frac{1}{6}}$$

Ex: $\frac{2}{x^2-4} + \frac{1}{x+2} = \frac{3}{x-2}$

D: $x \neq 2, -2$

LCD: $(x+2)(x-2)$

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

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

$$2 + (x-2) = 3(x+2)$$

$$2 + x - 2 = 3x + 6$$

$$x = 3x + 6$$
$$-3x \qquad -3x$$

$$\frac{-2x}{-2} = \frac{6}{-2} \qquad \boxed{x = -3}$$

Ex: $$\frac{1}{t-7} + \frac{2}{t+7} = \frac{14}{t^2-49}$$

$$\frac{1}{t-7} + \frac{2}{t+7} = \frac{14}{(t-7)(t+7)}$$ D: $t \neq 7, -7$

LCD: $(t-7)(t+7)$

$$\frac{1\cancel{(t-7)}(t+7)}{\cancel{(t-7)}} + \frac{2(t-7)\cancel{(t+7)}}{\cancel{(t+7)}} = \frac{14\cancel{(t-7)}\cancel{(t+7)}}{\cancel{(t-7)}\cancel{(t+7)}}$$

$$(t+7) + 2(t-7) = 14$$

$$t+7+2t-14 = 14$$

$$3t - 7 = 14$$
$$\quad +7 \quad +7$$

$$\frac{3t}{3} = \frac{21}{3}$$

$$\cancel{t = 7}$$

No solution: $\emptyset$