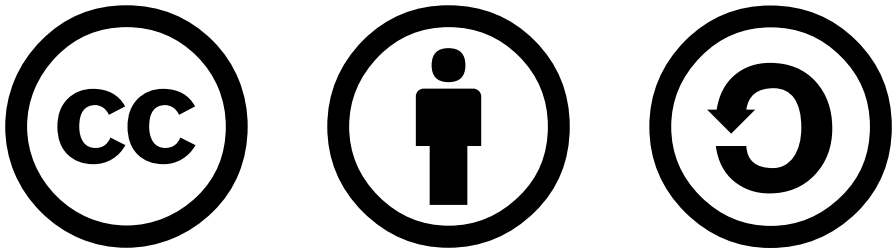

Algebra Lecture 17

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December 19, 2016

Topics

Last Time

- Rational Functions
- Domains of Rational Functions
- Multiplying and Dividing Rational Expressions

Topics for Today

- Adding and Subtracting Rational Expressions
- Solving Rational Equations

Adding and Subtracting Rational Expressions

Compute the following

$$\frac{7}{\heartsuit} + \frac{2}{\heartsuit}$$

Compute the following

$$\frac{7}{\heartsuit} + \frac{2}{\heartsuit}$$

$$= \frac{7+2}{\heartsuit}$$

Compute the following

$$\frac{7}{\heartsuit} + \frac{2}{\heartsuit}$$

$$= \frac{7+2}{\heartsuit}$$

$$= \frac{9}{\heartsuit}$$

Compute the following

$$\frac{7}{\heartsuit} + \frac{2}{\heartsuit}$$

$$= \frac{7+2}{\heartsuit}$$

$$= \frac{9}{\heartsuit}$$

$$= \boxed{\frac{9}{\heartsuit} \text{ or } 9\heartsuit^{-1}}$$

Compute the following

$$\frac{6\clubsuit - 9}{\clubsuit^2 - 4} - \frac{5\clubsuit - 7}{\clubsuit^2 - 4}$$

Compute the following

$$\frac{6\clubsuit - 9}{\clubsuit^2 - 4} - \frac{5\clubsuit - 7}{\clubsuit^2 - 4}$$

$$= \frac{6\clubsuit - 9 - (5\clubsuit - 7)}{\clubsuit^2 - 4}$$

Compute the following

$$\frac{6\clubsuit - 9}{\clubsuit^2 - 4} - \frac{5\clubsuit - 7}{\clubsuit^2 - 4}$$

$$= \frac{6\clubsuit - 9 - (5\clubsuit - 7)}{\clubsuit^2 - 4}$$

$$= \frac{6\clubsuit - 9 - 5\clubsuit + 7}{\clubsuit^2 - 4}$$

Compute the following

$$\frac{6\clubsuit - 9}{\clubsuit^2 - 4} - \frac{5\clubsuit - 7}{\clubsuit^2 - 4}$$

$$= \frac{6\clubsuit - 9 - (5\clubsuit - 7)}{\clubsuit^2 - 4}$$

$$= \frac{6\clubsuit - 9 - 5\clubsuit + 7}{\clubsuit^2 - 4}$$

$$= \frac{\clubsuit - 2}{\clubsuit^2 - 4}$$

Compute the following

$$= \frac{\clubsuit - 2}{\clubsuit^2 - 4}$$

Compute the following

$$= \frac{\clubsuit - 2}{\clubsuit^2 - 4}$$

$$= \frac{\clubsuit - 2}{(\clubsuit^2 - 2^2)}$$

Compute the following

$$= \frac{\clubsuit - 2}{\clubsuit^2 - 4}$$

$$= \frac{\clubsuit - 2}{(\clubsuit^2 - 2^2)}$$

$$= \frac{\clubsuit - 2}{(\clubsuit - 2)(\clubsuit + 2)}$$

Compute the following

$$= \frac{\clubsuit - 2}{(\clubsuit - 2)(\clubsuit + 2)}$$

Compute the following

$$= \frac{\clubsuit - 2}{(\clubsuit - 2)(\clubsuit + 2)}$$

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

Compute the following

$$= \frac{\clubsuit - 2}{(\clubsuit - 2)(\clubsuit + 2)}$$

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

$$= \boxed{\frac{1}{(\clubsuit + 2)}}$$

Compute the following

$$\frac{3x}{x^2 - 16} + \frac{x}{x - 4}$$

Compute the following

$$\frac{3x}{x^2-16}+\frac{x}{x-4}$$

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

Compute the following

$$\frac{3x}{x^2-16}+\frac{x}{x-4}$$

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

$$=\frac{3x}{(x+4)(x-4)}+\frac{x}{x-4}$$

Compute the following

$$= \frac{3x}{(x+4)(x-4)} + \frac{x}{x-4}$$

Compute the following

$$= \frac{3x}{(x+4)(x-4)} + \frac{x}{x-4}$$

$$= \frac{3x}{(x+4)(x-4)} + \frac{x}{(x-4)}\left(\frac{x+4}{x+4}\right)$$

Compute the following

$$= \frac{3x}{(x+4)(x-4)} + \frac{x}{x-4}$$

$$= \frac{3x}{(x+4)(x-4)} + \frac{x}{(x-4)}\left(\frac{x+4}{x+4}\right)$$

$$= \frac{3x + x(x+4)}{(x+4)(x-4)}$$

Compute the following

$$= \frac{3x + x(x+4)}{(x+4)(x-4)}$$

Compute the following

$$= \frac{3x + x(x+4)}{(x+4)(x-4)}$$

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

Compute the following

$$= \frac{3x + x(x+4)}{(x+4)(x-4)}$$

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

$$= \frac{7x + x^2}{(x+4)(x-4)}$$

Compute the following

$$= \frac{7x + x^2}{(x+4)(x-4)}$$

Compute the following

$$= \frac{7x + x^2}{(x+4)(x-4)}$$

$$= \boxed{\frac{x(7+x)}{(x+4)(x-4)}}$$

Compute the following

$$= \frac{-5x}{x - \diamondsuit} - \frac{3x - \diamondsuit}{3x - 3\diamondsuit}$$

Compute the following

$$= \frac{-5x}{x - \diamondsuit} - \frac{3x - \diamondsuit}{3x - 3\diamondsuit}$$

$$= \frac{-5x}{x - \diamondsuit} - \frac{3x - \diamondsuit}{3(x - \diamondsuit)}$$

Compute the following

$$= \frac{-5x}{x - \diamondsuit} - \frac{3x - \diamondsuit}{3x - 3\diamondsuit}$$

$$= \frac{-5x}{x - \diamondsuit} - \frac{3x - \diamondsuit}{3(x - \diamondsuit)}$$

$$= \left(\frac{3}{3}\right)\frac{-5x}{(x - \diamondsuit)} - \frac{3x - \diamondsuit}{3(x - \diamondsuit)}$$

Compute the following

$$= \frac{-15x - (3x - \diamondsuit)}{3(x - \diamondsuit)}$$

Compute the following

$$= \frac{-15x - (3x - \diamondsuit)}{3(x - \diamondsuit)}$$

$$= \frac{-15x - 3x + \diamondsuit}{3(x - \diamondsuit)}$$

Compute the following

$$= \frac{-15x - (3x - \diamondsuit)}{3(x - \diamondsuit)}$$

$$= \frac{-15x - 3x + \diamondsuit}{3(x - \diamondsuit)}$$

$$= \boxed{\frac{-18x + \diamondsuit}{3(x - \diamondsuit)}}$$

Compute the following

$$\frac{2}{\spadesuit^2 - 2\spadesuit + 1} + \frac{3}{\spadesuit^2 - 3\spadesuit + 2}$$

Compute the following

$$\frac{2}{\spadesuit^2 - 2\spadesuit + 1} + \frac{3}{\spadesuit^2 - 3\spadesuit + 2}$$

$$= \frac{2}{(\spadesuit - 1)(\spadesuit - 1)} + \frac{3}{\spadesuit^2 - 3\spadesuit + 2}$$

Compute the following

$$\frac{2}{\spadesuit^2 - 2\spadesuit + 1} + \frac{3}{\spadesuit^2 - 3\spadesuit + 2}$$

$$= \frac{2}{(\spadesuit - 1)(\spadesuit - 1)} + \frac{3}{\spadesuit^2 - 3\spadesuit + 2}$$

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

Compute the following

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

Compute the following

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

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

Compute the following

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

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

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

Compute the following

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

Compute the following

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

$$= \frac{2\spadesuit - 4 + 3\spadesuit - 3}{(\spadesuit - 1)(\spadesuit - 1)(\spadesuit - 2)}$$

Compute the following

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

$$= \frac{2\spadesuit - 4 + 3\spadesuit - 3}{(\spadesuit - 1)(\spadesuit - 1)(\spadesuit - 2)}$$

$$= \boxed{\frac{5\spadesuit - 7}{(\spadesuit - 1)(\spadesuit - 1)(\spadesuit - 2)}}$$

Compute the following

$$\frac{5\heartsuit}{\heartsuit^2 - 1} + \frac{-2\heartsuit}{-1 + \heartsuit} - \frac{7}{\heartsuit - 1}$$

Compute the following

$$\frac{5\heartsuit}{\heartsuit^2-1}+\frac{-2\heartsuit}{-1+\heartsuit}-\frac{7}{\heartsuit-1}$$

$$=\boxed{\frac{-2\heartsuit^2-4\heartsuit-7}{(\heartsuit+1)(\heartsuit-1)}}$$

Compute the following

$$\frac{\star - 2}{\star + 8} + \frac{\star + 2}{\star - 8}$$

Compute the following

$$\frac{\star - 2}{\star + 8} + \frac{\star + 2}{\star - 8}$$

$$= \boxed{\frac{2(\star^2 + 16)}{(\star + 8)(\star - 8)}}$$

Solving Rational Equations

Solve the following Rational Equation

$$\frac{7}{5\heartsuit} + \frac{1}{\heartsuit} = 1$$

Solve the following Rational Equation

$$\frac{7}{5\heartsuit} + \frac{1}{\heartsuit} = 1$$

$$\frac{7}{5\heartsuit} + \frac{1}{\heartsuit}\left(\frac{5}{5}\right) = 1$$

Solve the following Rational Equation

$$\frac{7}{5\heartsuit} + \frac{1}{\heartsuit} = 1$$

$$\frac{7}{5\heartsuit} + \frac{1}{\heartsuit}\left(\frac{5}{5}\right) = 1$$

$$\frac{7+5}{5\heartsuit} = 1$$

Solve the following Rational Equation

$$\frac{7+5}{5\heartsuit} = 1$$

Solve the following Rational Equation

$$\frac{7+5}{5\heartsuit} = 1$$

$$\frac{12}{5\heartsuit} = 1$$

Solve the following Rational Equation

$$\frac{7+5}{5\heartsuit} = 1$$

$$\frac{12}{5\heartsuit} = 1$$

$$12 = 5\heartsuit$$

Solve the following Rational Equation

$$\frac{7+5}{5\heartsuit} = 1$$

$$\frac{12}{5\heartsuit} = 1$$

$$12 = 5\heartsuit$$

$$\boxed{\frac{12}{5} = \heartsuit}$$

Solve the following Rational Equation

$$\frac{7}{x+7} = \frac{6}{x-6}$$

Solve the following Rational Equation

$$\frac{7}{x+7} = \frac{6}{x-6}$$

$$\frac{7}{(x+7)}\left(\frac{x-6}{x-6}\right) = \frac{6}{(x-6)}\left(\frac{x+7}{x+7}\right)$$

Solve the following Rational Equation

$$\frac{7}{x+7} = \frac{6}{x-6}$$

$$\frac{7}{(x+7)}\left(\frac{x-6}{x-6}\right) = \frac{6}{(x-6)}\left(\frac{x+7}{x+7}\right)$$

$$7(x-6) = 6(x+7)$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

$$7x - 42 = 6x + 42$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

$$7x - 42 = 6x + 42$$

$$7x = 6x + 42 + 42$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

$$7x - 42 = 6x + 42$$

$$7x = 6x + 42 + 42$$

$$7x = 6x + 84$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

$$7x - 42 = 6x + 42$$

$$7x = 6x + 42 + 42$$

$$7x = 6x + 84$$

$$7x - 6x = 84$$

Solve the following Rational Equation

$$7(x-6) = 6(x+7)$$

$$7x - 42 = 6x + 42$$

$$7x = 6x + 42 + 42$$

$$7x = 6x + 84$$

$$7x - 6x = 84$$

$$\boxed{x = 84}$$

Solve the following Rational Equation

$$\frac{10}{x} - \frac{10}{x-7} = \frac{6}{x}$$

Solve the following Rational Equation

$$\frac{10}{x} - \frac{10}{x-7} = \frac{6}{x}$$

$$\left(\frac{x(x-7)}{x(x-7)}\right)\left[\frac{10}{x} - \frac{10}{x-7} = \frac{6}{x}\right]$$

Solve the following Rational Equation

$$\frac{10}{x} - \frac{10}{x-7} = \frac{6}{x}$$

$$\left(\frac{x(x-7)}{x(x-7)}\right)\left[\frac{10}{x} - \frac{10}{x-7} = \frac{6}{x}\right]$$

$$\frac{10x(x-7)}{xx(x-7)} - \frac{10x(x-7)}{(x-7)x(x-7)} = \frac{6x(x-7)}{xx(x-7)}$$

Solve the following Rational Equation

$$\frac{10x(x-7)}{xx(x-7)} - \frac{10x(x-7)}{(x-7)x(x-7)} = \frac{6x(x-7)}{xx(x-7)}$$

Solve the following Rational Equation

$$\frac{10x(x-7)}{xx(x-7)} - \frac{10x(x-7)}{(x-7)x(x-7)} = \frac{6x(x-7)}{xx(x-7)}$$

$$\frac{10\cancel{x}(x-7)}{\cancel{x}x(x-7)} - \frac{10x\cancel{(x-7)}}{\cancel{(x-7)}x(x-7)} = \frac{6\cancel{x}(x-7)}{\cancel{x}x(x-7)}$$

Solve the following Rational Equation

$$\frac{10x(x-7)}{xx(x-7)} - \frac{10x(x-7)}{(x-7)x(x-7)} = \frac{6x(x-7)}{xx(x-7)}$$

$$\frac{10\cancel{x}(x-7)}{\cancel{x}x(x-7)} - \frac{10x\cancel{(x-7)}}{\cancel{(x-7)}x(x-7)} = \frac{6\cancel{x}(x-7)}{\cancel{x}x(x-7)}$$

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

$$10x - 70 - 10x = 6x - 42$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

$$10x - 70 - 10x = 6x - 42$$

$$-70 = 6x - 42$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

$$10x - 70 - 10x = 6x - 42$$

$$-70 = 6x - 42$$

$$-70+42 = 6x$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

$$10x - 70 - 10x = 6x - 42$$

$$-70 = 6x - 42$$

$$-70+42 = 6x$$

$$-28 = 6x$$

Solve the following Rational Equation

$$\frac{10(x-7)}{x(x-7)} - \frac{10x}{x(x-7)} = \frac{6(x-7)}{x(x-7)}$$

$$10(x-7) - 10x = 6(x-7)$$

$$10x - 70 - 10x = 6x - 42$$

$$-70 = 6x - 42$$

$$-70+42 = 6x$$

$$-28 = 6x$$

$$\boxed{\frac{-14}{3} = x}$$

Solve the following Rational Equation

$$\frac{1}{2\blacklozenge^2 - 8} + \frac{8}{\blacklozenge - 2} = \frac{9}{\blacklozenge + 2}$$

Solve the following Rational Equation

$$\frac{1}{2\blacklozenge^2 - 8} + \frac{8}{\blacklozenge - 2} = \frac{9}{\blacklozenge + 2}$$

$$\boxed{\blacklozenge = \frac{69}{2}}$$

Next Time

Simplifying Complex Fractions