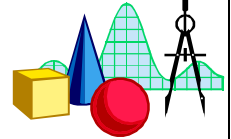




MATH DEPT. SOLUTION TO TUTORIAL 2



Solution 2: Fractions: addition, subtraction, multiplication and division, rational expressions, least common denominators, algebraic manipulations.

$$1. \quad \frac{3x-6}{5x} \cdot \frac{x^2-x-6}{x^2-4} = \frac{3(x-2)}{5x} \cdot \frac{(x-3)(x+2)}{(x-2)(x+2)} = \frac{3(x-3)}{5x}$$

$$2. \quad \frac{6}{x^2+x} \cdot \frac{x^2-1}{2x-2} = \frac{6}{x(x+1)} \cdot \frac{(x-1)(x+1)}{2(x-1)} = \frac{3}{x}$$

$$3. \quad \frac{x}{3} + \frac{5}{3} = \frac{x+5}{3}$$

$$4. \quad \frac{x}{2x-4} - \frac{4}{x-2} = \frac{x}{2(x-2)} - \frac{4}{x-2} = \frac{x}{2(x-2)} - \frac{8}{2(x-2)} = \frac{x-8}{2(x-2)}$$

$$5. \quad \frac{6}{x-1} + \frac{x}{1-x} = \frac{6}{x-1} - \frac{x}{x-1} = \frac{6-x}{x-1}$$

$$6. \quad \frac{4}{x-1} + \frac{1}{x+2} = \frac{4(x+2)}{(x-1)(x+2)} + \frac{x-1}{(x-1)(x+2)} = \frac{4(x+2)+(x-1)}{(x-1)(x+2)} = \frac{5x+7}{(x-1)(x+2)}$$

$$7. \quad \frac{x-2}{x+2} - \frac{x+2}{x-2} = \frac{(x-2)^2}{(x+2)(x-2)} - \frac{(x+2)^2}{(x-2)(x+2)} = \frac{(x-2)^2 - (x+2)^2}{(x-2)(x+2)} = \frac{-8x}{(x-2)(x+2)}$$

$$8. \quad \frac{4}{x^2-4} - \frac{2}{x^2+x-6} = \frac{4}{(x-2)(x+2)} - \frac{2}{(x+3)(x-2)} = \frac{4(x+3)}{(x-2)(x+2)(x+3)} - \frac{2(x+2)}{(x-2)(x+2)(x+3)} = \frac{4x+12-2x-4}{4x+12-2x-4} = \frac{2x+8}{(x-2)(x+2)(x+3)}$$

$$9. \quad \frac{x-2}{x-1} - \frac{x-4}{x^2-2x+1} = \frac{x-2}{x-1} - \frac{x-4}{(x-1)^2} = \frac{(x-2)(x-1)-(x-4)}{(x-1)^2} = \frac{x^2-4x+6}{(x-1)^2}$$

$$10. \quad \frac{1}{x} - \frac{2}{x^2+x} + \frac{3}{x^3+x^2} = \frac{1}{x} - \frac{2}{x(x+1)} + \frac{3}{x^2(x+1)} = \frac{x(x+1)}{x^2(x+1)} - \frac{2x}{x^2(x+1)} + \frac{3}{x^2(x+1)} = \frac{x(x+1)-2x+3}{x^2(x+1)} = \frac{x^2-x+3}{x^2(x+1)}$$

$$11. \quad 1 + \frac{1}{x} = \frac{x+1}{x} = \frac{x+1}{x} \cdot \frac{x}{x-1} = \frac{x+1}{x-1}$$

$$12. \quad \frac{x^2+8x-9}{x^2+3x-10} \cdot \frac{x^2+7x+10}{x^2+7x-18} \cdot \frac{x^2-11x+18}{x^2+4x-5} - \frac{x-1}{x+5} = \frac{(x+9)(x-1)}{(x+5)(x-2)} \cdot \frac{(x+5)(x+2)}{(x+9)(x-2)} \cdot \frac{(x-9)(x-2)}{(x+5)(x-1)} - \frac{x-1}{x+5} = \frac{(x+2)(x-9)}{(x+5)(x-2)} - \frac{x-1}{x+5} = \frac{(x+2)(x-9)}{(x+5)(x-2)} - \frac{(x-1)(x-2)}{(x+5)(x-2)} = \frac{x^2-7x-18-x^2+3x-2}{(x+5)(x-2)} = \frac{-4x-20}{(x+5)(x-2)} = \frac{-4(x+5)}{(x+5)(x-2)} = \frac{-4}{x-2}$$