MATH3 (814013) – SPRING 2007

WORKSHEET 9

Question (1) : Perform the indicated operations and reduce to lowest terms:

(1) $\dfrac{x}{4x^2-1}+\dfrac{2}{4x-2}-\dfrac{3x+1}{1-2x}$

(2) $\left(1+\dfrac{1}{x+2}\right)\cdot\dfrac{4}{3x+9}$

(3) $\dfrac{m^3+n^3}{2m^2+mn-n^2}\div\dfrac{m^3n-m^2n^2+mn^3}{2m^3n^2-m^2n^3}$

(4) $\dfrac{4a+12}{2a-10}\div\dfrac{a^2-9}{a^2-a-20}$

(5) $\dfrac{5}{28}-\dfrac{1}{10}+\dfrac{6}{35}$

(6) $\dfrac{1}{4x^2}-\dfrac{2x+1}{3x^3}+\dfrac{3}{12x}$

(7) $\dfrac{y-3}{y^2-4}-\dfrac{y+2}{y^2-4y+4}-\dfrac{2}{2-y}$

(8) $\dfrac{5}{x^2+x-6}+\dfrac{1}{x^2-3x+2}+\dfrac{2(x+1)}{x^2+2x-3}$

(9) $\dfrac{5}{9x^2}-\dfrac{1}{6x}$

(10) $\dfrac{5}{x^2+x-6}+\dfrac{1}{x^2-3x+2}+\dfrac{2x+2}{x^2+2x-3}$

(11) $\dfrac{3t}{2t-5}+\dfrac{5}{2x+5}$

(12) $\dfrac{x}{x^2-6x+9}\dfrac{4}{2x+6}-\dfrac{1}{3-x}$

(13) $\dfrac{x}{x^2+3x-18}+\dfrac{1}{x^2+6x}-\dfrac{1}{x^2-3x}$

(14) $\dfrac{x}{x^2-7x+12}-\dfrac{3}{3-x}-\dfrac{1}{x-4}$

(15) $\left(\dfrac{x^2+4}{x^3-2x^2}-\dfrac{x-1}{x^2}\right)\div\left(\dfrac{2x+1}{x^3-x^2}-\dfrac{2}{x^2-3x+2}\right)$

Question (2) : Simplify each of the following as much as possible:

(1) $\dfrac{1+\dfrac{1}{x}}{x-\dfrac{1}{x}}$

(2) $\dfrac{\dfrac{a}{b}-\dfrac{b}{a}}{\dfrac{a}{b}+2+\dfrac{b}{a}}$

(3) $\dfrac{1+\dfrac{2}{x}-\dfrac{15}{x^2}}{1+\dfrac{4}{x}-\dfrac{5}{x^2}}$

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

(5) $\dfrac{1+2x^{-1}-15x^{-2}}{1+4x^{-1}-5x^{-2}}$

(6) $\dfrac{x^{-2}-y^{-2}}{x^{-1}+y^{-1}}$

(7) $\dfrac{x+2-\dfrac{15}{x}}{x-7+\dfrac{12}{x}}$

(8) $\dfrac{\dfrac{1}{x+2}-\dfrac{3}{x^2-4}}{\dfrac{3}{x-2}}$

(9) $\dfrac{\dfrac{a+b}{b}}{\dfrac{b-a}{ab^3}}$

(10) $\dfrac{x^{-2}-y^{-2}}{x^{-3}+y^{-3}}$

(11) $\dfrac{1-\dfrac{1}{1+\dfrac{x}{y}}}{1-\dfrac{1}{1-\dfrac{x}{y}}}$

(12) $1-\dfrac{1}{1-\dfrac{1}{1-\dfrac{1}{x}}}$

(13) $\dfrac{y-\dfrac{y^2}{y-x}}{1+\dfrac{x^2}{y^2-x^2}}$

(14) $2-\dfrac{1}{1-\dfrac{2}{a+2}}$

Question (3) : Is the solution correct? If no, where is the wrong?

(1) $\dfrac{2}{x-1}-\dfrac{x+3}{x^2-1}=\dfrac{2x+2-x-3}{x^2-1}=\dfrac{1}{x+1}$

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

Question (4) : let a, b and c are real numbers.

Prove that $\dfrac{a}{b}+\dfrac{c}{b}=\dfrac{a+c}{b}$ $\quad b\neq 0$.