Math3 (814013) – Spring 2007

Worksheet 8

Question (1) : Reduce each rational expression to lowest terms:

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

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

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

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

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

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

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

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

(9) $\dfrac{12x^2y^3}{2xy^2+6xy}$

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

Question (2) : Perform the indicated operations and reduce to lowest terms:

(1) $\dfrac{12x^2y^3}{2xy^2+6xy}\cdot\dfrac{y^2+6y+9}{3y^3+9y^2}$

(2) $(4-x)\div\dfrac{x^2-16}{5}$

(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) $\dfrac{x^2+7x+12}{8x}\div\dfrac{x^2-x-20}{6x^4}$

(6) $\dfrac{x^2-5x+4}{2x+6}\div\dfrac{2x^2-x-1}{x^2+5x+6}$

(7) $\dfrac{x^3-125}{2x^3-10x^2}\cdot\dfrac{7x}{x^3+25x^2+25}$

(8) $\dfrac{2x^3-2x^2y+2xy^2}{x^3y-xy^3}\div\dfrac{x^3+y^3}{x^2+2xy+y^2}$

(9) $\dfrac{6}{7a^2-14a}\cdot\dfrac{18-9a}{2a^2+8a}$

(10) $\left(2x^2+5xy-3y^2\right)\div\dfrac{x+3y}{2x-y}$

(11) $\dfrac{45a^3b^2}{28c^4d^3}\div\dfrac{-75a^4b}{8c^2d^4}$

(12) $\left(\dfrac{6mn^{-2}}{3m^{-1}n^2}\right)^{-3}\div\left(\dfrac{m^{-3}n^2}{mn^{-1}}\right)^2$

(13) $\left(\dfrac{x^3-y^3}{y^3}\cdot\dfrac{3y}{x-y}\right)\div\left(\dfrac{x^2+xy+y^2}{6y^2}\right)$

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

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

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

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

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

(1) Prove that $\dfrac{d}{c}$ is the multiplicative inverse of $\dfrac{c}{d}\,(c,d\neq 0)$.

(2) Use part (1) to prove that $\dfrac{a}{b}\div\dfrac{c}{d}=\dfrac{a}{b}\cdot\dfrac{d}{c}$ $\quad b,c,d\neq 0$.

Question (5) : Circle the correct answer.

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

(A) $x-1$ (B) $x+1$ (C) $x-4$ (D) None

(2) $\dfrac{x^2-9}{x+3}=$

(A) $x-3$ (B) $x+3$ (C) $3-x$ (D) None

(3) $\dfrac{x-2}{x^2-4}\cdot\dfrac{x+2}{5x}=$

(A) $\dfrac{1}{5}$ (B) $\dfrac{1}{x}$ (C) $\dfrac{1}{5x}$ (D) None