3月第1週　新高2　数Ⅱ

21 次の分数式を約分して，既約分数式にせよ．

(1) $\dfrac{20a^3b^8}{15a^4b^5}$

(2) $\dfrac{7x^5y^3z}{21x^2y^4z^3}$

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

(4) $\dfrac{x^2+8x+15}{x^2+3x-10}$

(5) $\dfrac{2x^2-7x+3}{4x^2+8x-5}$

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

(7) $\dfrac{3x^2+10xy+8y^2}{x^2-4xy-12y^2}$

(8) $\dfrac{a^2-(b-c)^2}{(a-b)^2-c^2}$

26 次の式を計算せよ．

(1) $\dfrac{x^2-3x-10}{x^2-8x+16}\times\dfrac{x-4}{x+2}$

(2) $\dfrac{x^2-1}{x^2-5x+6}\times\dfrac{2x^2-3x-9}{x^2+5x-6}$

(3) $\dfrac{2x+1}{x+3}\div\dfrac{2x^2+9x+4}{x^2-3x-18}$

(4) $\dfrac{x^2-7xy+12y^2}{x^2-6xy-16y^2}\div\dfrac{x^2+5xy-36y^2}{x^2+6xy+8y^2}$

(5) $\dfrac{6x^2-7x-20}{x^2-4}\times\dfrac{x^2-x-2}{4x-10}\div\dfrac{3x+4}{x+2}$

(6) $\dfrac{x^3-9x}{x^3+8}\div\dfrac{x^2-3x+2}{4x^2-8x+16}\times\dfrac{x^2-4}{2x^2-6x}$

22 次の各組の分数式を通分せよ．

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

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

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

(4) $\dfrac{x}{4x^2-y^2}$，$\dfrac{y}{6x^2-xy-2y^2}$

23 次の式を計算せよ．

(1) $\dfrac{1}{x-1}-\dfrac{1}{x+5}$

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

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

(4) $\dfrac{x+4}{x^2-4}-\dfrac{x-8}{x^2-8x+12}$

(5) $\dfrac{x+4}{2x^2+6x+4}-\dfrac{7}{3x^2+5x-2}$

(6) $\dfrac{x-7y}{x^2+xy-6y^2}+\dfrac{x+11y}{x^2+2xy-3y^2}$

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

(8) $\dfrac{c-a}{(a+b)(b+c)}-\dfrac{a-b}{(b+c)(c+a)}-\dfrac{b-c}{(c+a)(a+b)}$

問21　解答

(1)　$\dfrac{4b^3}{3a}$　　(2)　$\dfrac{x^3}{3yz^2}$　　(3)　与式$=\dfrac{x-1}{(x+1)(x-1)}=\dfrac{1}{x+1}$　　(4)　与式$=\dfrac{(x+3)(x+5)}{(x+5)(x-2)}=\dfrac{x+3}{x-2}$

(5)　与式$=\dfrac{(2x-1)(x-3)}{(2x+5)(2x-1)}=\dfrac{x-3}{2x+5}$　　(6)　与式$=\dfrac{(x+2)(x-2)}{(x+2)(x^2-2x+4)}=\dfrac{x-2}{x^2-2x+4}$

(7)　与式$=\dfrac{(3x+4y)(x+2y)}{(x-6y)(x+2y)}=\dfrac{3x+4y}{x-6y}$

(8)　与式$=\dfrac{a^2-X^2}{Y^2-c^2}=\dfrac{(a+X)(a-X)}{(Y+c)(Y-c)}=\dfrac{(a+(b-c))(a-(b-c))}{((a-b)+c)((a-b)-c)}=\dfrac{(a+b-c)(a-b+c)}{(a-b+c)(a-b-c)}=\dfrac{a+b-c}{a-b-c}$

問26　解答

(1)　与式$=\dfrac{(x-5)(x+2)}{(x-4)^2}\times\dfrac{x-4}{x+2}=\dfrac{x-5}{x-4}$　　(2)　与式$\dfrac{(x+1)(x-1)}{(x-2)(x-3)}\times\dfrac{(2x+3)(x-3)}{(x+6)(x-1)}=\dfrac{(x+1)(2x+3)}{(x-2)(x+6)}$

(3)　与式$=\dfrac{2x+1}{x+3}\times\dfrac{x^2-3x-18}{2x^2+9x+4}=\dfrac{2x+1}{x+3}\times\dfrac{(x-6)(x+3)}{(2x+1)(x+4)}=\dfrac{x-6}{x+4}$

(4)　与式$=\dfrac{x^2-7xy+12y^2}{x^2-6xy-16y^2}\times\dfrac{x^2+6xy+8y^2}{x^2+5xy-36y^2}=\dfrac{(x-4y)(x-3y)}{(x-8y)(x+2y)}\times\dfrac{(x+2y)(x+4y)}{(x+9y)(x-4y)}=\dfrac{(x-3y)(x+4y)}{(x-8y)(x+9y)}$

(5)　与式$=\dfrac{(3x+4)(2x-5)}{(x+2)(x-2)}\times\dfrac{(x+1)(x-2)}{2(2x-5)}\times\dfrac{x+2}{3x+4}=\dfrac{x+1}{2}$

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

問22　解答

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

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

(4)　$\begin{cases}\dfrac{x}{4x^2-y^2}=\dfrac{x}{(2x+y)(2x-y)}=\dfrac{x(3x-2y)}{(2x+y)(2x-y)(3x-2y)}\\ \dfrac{y}{6x^2-xy-2y^2}=\dfrac{y}{(2x+y)(3x-2y)}=\dfrac{y(2x-y)}{(2x+y)(2x-y)(3x-2y)}\end{cases}$

問23 解答

(1) 与式$=\dfrac{x+5}{(x-1)(x+5)}-\dfrac{x-1}{(x-1)(x+5)}=\dfrac{(x+5)-(x-1)}{(x-1)(x+5)}=\dfrac{6}{(x-1)(x+5)}$

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

(3) 与式$=\dfrac{2}{x(x+2)}+\dfrac{1}{(x+2)(x+3)}=\dfrac{2(x+3)}{x(x+2)(x+3)}+\dfrac{x}{x(x+2)(x+3)}=\dfrac{3x+6}{x(x+2)(x+3)}=\dfrac{3(x+2)}{x(x+2)(x+3)}=\dfrac{3}{x(x+3)}$

(4) 与式$=\dfrac{x+4}{(x+2)(x-2)}-\dfrac{x-8}{(x-6)(x-2)}=\dfrac{(x+4)(x-6)}{(x+2)(x-2)(x-6)}-\dfrac{(x-8)(x+2)}{(x+2)(x-2)(x-6)}=\dfrac{(x^2-2x-24)-(x^2-6x-16)}{(x+2)(x-2)(x-6)}$

$=\dfrac{4x-8}{(x+2)(x-2)(x-6)}=\dfrac{4(x-2)}{(x+2)(x-2)(x-6)}=\dfrac{4}{(x+2)(x-6)}$

(5) 与式$=\dfrac{x+4}{2(x+1)(x+2)}-\dfrac{7}{(x+2)(3x-1)}=\dfrac{(x+4)(3x-1)-7\times2(x+1)}{2(x+1)(x+2)(3x-1)}=\dfrac{(3x^2+11x-4)-14x-14}{2(x+1)(x+2)(3x-1)}=\dfrac{3x^2-3x-18}{2(x+1)(x+2)(3x-1)}$

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

(6) 与式$=\dfrac{x-7y}{(x+3y)(x-2y)}+\dfrac{x+11y}{(x+3y)(x-y)}=\dfrac{2x^2+xy-15y^2}{(x+3y)(x-2y)(x-y)}=\dfrac{(2x-5y)(x+3y)}{(x+3y)(x-2y)(x-y)}=\dfrac{2x-5y}{(x-2y)(x-y)}$

(7) $x^4-1=(x^2)^2-1^2=(x^2+1)(x^2-1)=(x^2+1)(x+1)(x-1)$ なので,

与式$=\dfrac{(x+3)(x-1)}{(x+1)(x-1)(x^2+1)}-\dfrac{2(x+1)}{(x+1)(x-1)(x^2+1)}+\dfrac{6}{(x+1)(x-1)(x^2+1)}=\dfrac{x^2+1}{(x+1)(x-1)(x^2+1)}=\dfrac{1}{(x+1)(x-1)}$

(8) 与式$=\dfrac{(c-a)(c+a)-(a-b)(a+b)-(b-c)(b+c)}{(a+b)(b+c)(c+a)}=\dfrac{2c^2-2a^2}{(a+b)(b+c)(c+a)}=\dfrac{2(c+a)(c-a)}{(a+b)(b+c)(c+a)}=\dfrac{2(c-a)}{(a+b)(b+c)}$