

多項式の乗除法 2

氏名 _____ 得点 _____ / 50

1 次の整式 A, B について, A を B で割った商と余りを求めよ。 (各 4 点)

(1) $A = a^2 + 7a + 10, B = a + 2$ (2) $A = 1 - 2a + 6a^2 + 4a^3, B = 1 + 2a$

(1) 商 $a+5$ 余り 0 (2) 商 $2a^2+2a-2$ 余り 3

(3) $A = 2x^3 - 5x^2 + 4x - 1, B = x^2 - x + 1$

(3) 商 $2x-3$ 余り $-x+2$

2 $x^2 - 2x - 1$ で割ると, 商が $2x - 3$, 余りが $-2x$ である整式を求めよ。(各 4 点)

$2x^3 - 7x^2 - 2x + 3$

3 次のような整式 B を, それぞれ求めよ。(各 4 点)

(1) $x^3 - x^2 + 3x + 1$ を B で割ると, 商が $x + 1$, 余りが $3x - 1$

(2) $x^4 - 6x^2 + 2x + 8$ を B で割ると, 商が B と一致し, 余りが $2x - 1$

(1) $B = x^2 - 2x + 2$ (2) $B = x^2 - 3, -x^2 + 3$

4 次の式を計算せよ。(1)~(4)各 4 点 (5)~(6)各 5 点

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

(1) $\frac{x-2}{x-3}$

(2) $\frac{a^2 - (b-c)^2}{(a+b)^2 - c^2}$

(2) $\frac{a-b+c}{a+b+c}$

(3) $\frac{(7a^2b)^2}{21x^3y^3} \times \frac{3x^2y}{35(ab^2)^2}$

(3) $\frac{a^2}{5b^2xy^2}$

(4) $\frac{a^2 - 11a + 24}{a^2 - 6a - 16} \times \frac{a^2 + 2a}{a^2 - 6a + 9}$

(4) $\frac{a}{a-3}$

(5) $\frac{3}{x(3-x)} + \frac{x}{3(x-3)} = \frac{3(3-x) + x^2}{3x(3-x)} = \frac{9 - 3x + x^2}{3x(3-x)} = \frac{x^2 - 3x + 9}{3x(3-x)}$
 (6) $\frac{x+1}{x} - \frac{x+2}{x+1} - \frac{x-4}{x-3} + \frac{x-5}{x-4} = \frac{(x+1)(x-3)(x-4) - (x+2)(x-3)(x-4) - (x-4)(x-3)(x-4) + (x-5)(x-3)(x-4)}{x(x+1)(x-3)(x-4)}$

(1) (1) $1 \ 7 \ 10 \ | \ -2 \ -10$
 $1 \ 5 \ 10$
 $4 \ 6 \ -2 \ | \ -\frac{1}{2}$
 $4 \ 4 \ -4 \ | \ \text{余り}$
 $\Rightarrow (4a^2 + 4a - 4) \times \frac{1}{2} = 2a^2 + 2a - 2$

(2) $2a^2 + 2a - 2$
 $2a \ | \ 4a^3 + 6a^2 - 2a + 1$
 $4a^2 + 2a$
 $4a^2 - 2a$
 $4a^2 + 2a$
 $-4a + 1$
 $-4a - 2$
 3

(3) $2x - 3$
 $x^2 - x + 1 \ | \ 2x^3 - 5x^2 + 4x - 1$
 $2x^3 - 2x^2 + 2x$
 $-3x^2 + 2x - 1$
 $-3x^2 + 3x - 3$
 $-x + 2$

2 $(x^2 - 2x - 1)(2x - 3) + (-2x)$
 $= 2x^3 - 3x^2 - 4x^2 + 6x - 2x + 3 - 2x$
 $= 2x^3 - 7x^2 + 2x + 3$

3 (1) $x^3 - x^2 + 3x + 1 = B(2x - 1) + (3x - 1)$
 $B = \frac{1}{2}(x^3 - x^2 + 3x + 1) - \frac{1}{2}(3x - 1)$
 $= \frac{1}{2}(x^3 - x^2 + 2)$
 $1 \ -1 \ 0 \ 2 \ | \ -1$
 $-1 \ 2 \ -2$
 $1 \ -2 \ 2 \ | \ 0 \ \therefore B = x^2 - 2x + 2$

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

(2) $\frac{a^2 - (b-c)^2}{(a+b)^2 - c^2} = \frac{(a+b-c)(a-b+c)}{(a+b+c)(a+b-c)} = \frac{a-b+c}{a+b+c}$

(2) $x^4 - 6x^2 + 2x + 8 = B^2 + (2x - 1)$
 $B^2 = (x^4 - 6x^2 + 2x + 8) - (2x - 1)$
 $= x^4 - 6x^2 + 9$
 $= (x^2 - 3)^2$
 $\therefore B = \pm(x^2 - 3)$

(3) 5式
 $\frac{1}{21 \times 35} a^{4-2} b^{2-4} x^{-3+2} y^{-3+1} = \frac{1}{5} a^2 b^{-2} x^{-1} y^{-2} = \frac{1}{5} \frac{a^2}{b^2 x y^2}$

(4) 5式
 $\frac{(a-3)(a+3) \cdot a(a+3)}{(a-3)(a+3)(a-3)^2} = \frac{a}{a-3}$

(6) 5式
 $\frac{x+1}{x} - \frac{x+1}{x+1} - \frac{x-1}{x-3} + \frac{x-4}{x-4} = 1 + \frac{1}{x} - 1 - \frac{1}{x+1} - 1 + \frac{1}{x-3} + 1 - \frac{1}{x-4}$
 $= \frac{x+1-x}{x(x+1)} + \frac{x-1-(x-3)}{(x-3)(x-4)}$
 $= \frac{1}{x(x+1)} - \frac{2}{(x-3)(x-4)}$
 $= \frac{(x-3)(x-4) - 2x(x+1)}{x(x+1)(x-3)(x-4)}$
 $= \frac{x^2 - 7x + 12 - 2x^2 - 2x}{x(x+1)(x-3)(x-4)}$
 $= \frac{-x^2 - 9x + 12}{x(x+1)(x-3)(x-4)}$