多項式の計算②（解答と解説）

1 解答 (1) $6x-2y$ (2) $-5a-10b$ (3) $6x-3y+15$

(1) $2(3x-y)=2\times 3x+2\times(-y)$
$=6x-2y$

(2) $-5(a+2b)=(-5)\times a+(-5)\times 2b$
$=-5a-10b$

(3) $3(2x-y+5)=3\times 2x+3\times(-y)+3\times 5$
$=6x-3y+15$

2 解答 (1) $14x-35y$ (2) $-24x+3y$ (3) $10a-5b+5$ (4) $2x-y$
(5) $-2x^2+x-5$

(1) $7(2x-5y)=7\times 2x+7\times(-5y)$
$=14x-35y$

(2) $(8x-y)\times(-3)=8x\times(-3)+(-y)\times(-3)$
$=-24x+3y$

(3) $5(2a-b+1)=5\times 2a+5\times(-b)+5\times 1$
$=10a-5b+5$

(4) $\frac{1}{3}(6x-3y)=\frac{1}{3}\times 6x+\frac{1}{3}\times(-3y)$
$=2x-y$

(5) $(4x^2-2x+10)\times\left(-\frac{1}{2}\right)=4x^2\times\left(-\frac{1}{2}\right)+(-2x)\times\left(-\frac{1}{2}\right)+10\times\left(-\frac{1}{2}\right)$
$=-2x^2+x-5$

3 解答 (1) $2x+3y$ (2) $-3a+2b-1$

(1) $(4x+6y)\div 2=(4x+6y)\times\frac{1}{2}$
$=4x\times\frac{1}{2}+6y\times\frac{1}{2}$
$=2x+3y$

(2) $(15a-10b+5)\div(-5)=(15a-10b+5)\times\left(-\frac{1}{5}\right)$
$=15a\times\left(-\frac{1}{5}\right)-10b\times\left(-\frac{1}{5}\right)+5\times\left(-\frac{1}{5}\right)$
$=-3a+2b-1$

4 解答 (1) $3x-y$ (2) $-3a+5b$ (3) $x+3y-4$ (4) $-2x^2+x+4$
(5) $2a-\frac{3}{2}b$

(1) $(12x-4y)\div 4=(12x-4y)\times\frac{1}{4}$
$=3x-y$

(2) $(9a-15b)\div(-3)=(9a-15b)\times\left(-\frac{1}{3}\right)$
$=-3a+5b$

(3) $(2x+6y-8)\div 2=(2x+6y-8)\times\frac{1}{2}$
$=x+3y-4$

(4) $(10x^2-5x-20)\div(-5)=(10x^2-5x-20)\times\left(-\frac{1}{5}\right)$
$=-2x^2+x+4$

(5) $\left(\frac{6}{7}a-\frac{9}{14}b\right)\div\frac{3}{7}=\left(\frac{6}{7}a-\frac{9}{14}b\right)\times\frac{7}{3}$
$=2a-\frac{3}{2}b$

5 解答 (1) $6x-5y$ (2) $8a-2b$ (3) $-a+b$ (4) $-6x-3y$

(1) $(3x+y)+3(x-2y)=3x+y+3x-6y$
$=3x+3x+y-6y$
$=6x-5y$

(2) $4(a-2b)+2(2a+3b)=4a-8b+4a+6b$
$=4a+4a-8b+6b$
$=8a-2b$

(3) $4(2a+b)-3(3a+b)=8a+4b-9a-3b$
$=8a-9a+4b-3b$
$=-a+b$

(4) $6(x-2y)-3(4x-3y)=6x-12y-12x+9y$
$=6x-12x-12y+9y$
$=-6x-3y$

6 解答 (1) $4x-7y$ (2) $6m+5n$ (3) $8a-4b+16$
(4) $-9a^2-15a-1$ (5) $7x-6y-13$ (6) $3a^2+a+2$

(1) $5(2x-5y)-6(x-3y)=10x-25y-6x+18y$
$=10x-6x-25y+18y$
$=4x-7y$

(2) $-8(m+2n)+7(2m+3n)=-8m-16n+14m+21n$
$=-8m+14m-16n+21n$
$=6m+5n$

(3) $2(2a+4b)+4(a-3b+4)=4a+8b+4a-12b+16$
$=4a+4a+8b-12b+16$
$=8a-4b+16$

(4) $5(a^2-3a+4)-7(2a^2+3)=5a^2-15a+20-14a^2-21$
$=5a^2-14a^2-15a+20-21$
$=-9a^2-15a-1$

(5) $3(x-4y-5)+2(2x+3y+1)=3x-12y-15+4x+6y+2$
$=3x+4x-12y+6y-15+2$
$=7x-6y-13$

(6) $4(2a^2+4a-2)-5(a^2+3a-2)=8a^2+16a-8-5a^2-15a+10$
$=8a^2-5a^2+16a-15a-8+10$
$=3a^2+a+2$

7 解答 (1) $16x-25y$ (2) $-b$ (3) $-4y-36$ (4) $-6a+11b$

(1) $5(2x+y)+6(x-5y)=10x+5y+6x-30y$
$=16x-25y$

(2) $3(8a-3b)-4(6a-2b)=24a-9b-24a+8b$
$=-b$

(3) $6(x-3y-2)-2(3x-7y+12)=6x-18y-12-6x+14y-24$
$=-4y-36$

(4) $\frac{1}{3}(9a+15b)-\frac{3}{4}(12a-8b)=3a+5b-9a+6b$
$=-6a+11b$

8 解答 (1) $\frac{3x+2y}{4}$ (2) $\frac{7}{6}b$ (3) $\frac{5x-5y}{6}$

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

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

$=\frac{x-4y+2x+6y}{4}$

$=\frac{3x+2y}{4}$

(2) $\frac{a+2b}{3}-\frac{2a-3b}{6}=\frac{2(a+2b)}{6}-\frac{2a-3b}{6}$

$=\frac{2(a+2b)-(2a-3b)}{6}$

$=\frac{2a+4b-2a+3b}{6}$

$=\frac{7}{6}b$

(3) $\frac{x-3y}{2}+\frac{x+2y}{3}=\frac{3(x-3y)}{6}+\frac{2(x+2y)}{6}$

$=\frac{3(x-3y)+2(x+2y)}{6}$

$=\frac{3x-9y+2x+4y}{6}$

$=\frac{5x-5y}{6}$

9 解答 (1) $\frac{8x+3y}{8}$ (2) $\frac{6a-11b}{12}$ (3) $\frac{-4x+8y}{3}$

(1) $\frac{3x+5y}{4}+\frac{2x-7y}{8}=\frac{2(3x+5y)}{8}+\frac{2x-7y}{8}$

$=\frac{2(3x+5y)+(2x-7y)}{8}$

$=\frac{6x+10y+2x-7y}{8}$

$=\frac{8x+3y}{8}$

(2) $\frac{3a-2b}{3}-\frac{2a+b}{4}=\frac{4(3a-2b)}{12}-\frac{3(2a+b)}{12}$

$=\frac{4(3a-2b)-3(2a+b)}{12}$

$=\frac{12a-8b-6a-3b}{12}$

$=\frac{6a-11b}{12}$

(3) $\frac{2x+5y}{3}-(2x-y)=\frac{2x+5y}{3}-\frac{3(2x-y)}{3}$

$=\frac{2x+5y-3(2x-y)}{3}$

$=\frac{2x+5y-6x+3y}{3}$

$=\frac{-4x+8y}{3}$

10 解答 (1) $\dfrac{4x-7y}{4}$ (2) $\dfrac{5x+8y}{6}$ (3) $\dfrac{-3x-2y}{9}$ (4) $\dfrac{-a+5b}{2}$

(5) $\dfrac{21a-23b}{10}$ (6) $\dfrac{27a+b}{12}$ (7) $\dfrac{-11a+27b}{12}$

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

$=\dfrac{2x+y+2x-8y}{4}$

$=\dfrac{4x-7y}{4}$

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

$=\dfrac{4x+6y+x+2y}{6}$

$=\dfrac{5x+8y}{6}$

(3) $\dfrac{3x-5y}{9}-\dfrac{2x-y}{3}=\dfrac{3x-5y}{9}-\dfrac{3(2x-y)}{9}$

$=\dfrac{3x-5y-6x+3y}{9}$

$=\dfrac{-3x-2y}{9}$

(4) $a+3b-\dfrac{3a+b}{2}=\dfrac{2(a+3b)}{2}-\dfrac{3a+b}{2}$

$=\dfrac{2a+6b-3a-b}{2}$

$=\dfrac{-a+5b}{2}$

(5) $\dfrac{5a-b}{2}-\dfrac{2a+9b}{5}=\dfrac{5(5a-b)}{10}-\dfrac{2(2a+9b)}{10}$

$=\dfrac{25a-5b-4a-18b}{10}$

$=\dfrac{21a-23b}{10}$

(6) $\dfrac{5a-b}{4}+\dfrac{3a+b}{3}=\dfrac{3(5a-b)}{12}+\dfrac{4(3a+b)}{12}$

$=\dfrac{15a-3b+12a+4b}{12}$

$=\dfrac{27a+b}{12}$

(7) $\dfrac{2a+9b}{6}-\dfrac{5a-3b}{4}=\dfrac{2(2a+9b)}{12}-\dfrac{3(5a-3b)}{12}$

$=\dfrac{4a+18b-15a+9b}{12}$

$=\dfrac{-11a+27b}{12}$

11 解答 (1) $\dfrac{5a+5b}{6}$ (2) $\dfrac{x-5y}{6}$ (3) $\dfrac{19a+2b}{20}$ (4) $\dfrac{2x-27y}{12}$

(5) $\dfrac{3a+b}{4}$ (6) $\dfrac{x+2y}{4}$

(1) $\dfrac{a+3b}{2}+\dfrac{a-2b}{3}=\dfrac{3(a+3b)}{6}+\dfrac{2(a-2b)}{6}$

$=\dfrac{3(a+3b)+2(a-2b)}{6}$

$=\dfrac{3a+9b+2a-4b}{6}$

$=\dfrac{5a+5b}{6}$

(2) $\dfrac{5x-3y}{6}-\dfrac{2x+y}{3}=\dfrac{5x-3y}{6}-\dfrac{2(2x+y)}{6}$

$=\dfrac{(5x-3y)-2(2x+y)}{6}$

$=\dfrac{5x-3y-4x-2y}{6}$

$=\dfrac{x-5y}{6}$

(3) $\dfrac{3a+2b}{4}+\dfrac{a-2b}{5}=\dfrac{5(3a+2b)}{20}+\dfrac{4(a-2b)}{20}$

$=\dfrac{5(3a+2b)+4(a-2b)}{20}$

$=\dfrac{15a+10b+4a-8b}{20}$

$=\dfrac{19a+2b}{20}$

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

$=\dfrac{3(2x-3y)-2(2x+9y)}{12}$

$=\dfrac{6x-9y-4x-18y}{12}$

$=\dfrac{2x-27y}{12}$

(5) $\dfrac{2a-b}{2}-\dfrac{a-3b}{4}=\dfrac{2(2a-b)}{4}-\dfrac{a-3b}{4}$

$=\dfrac{2(2a-b)-(a-3b)}{4}$

$=\dfrac{4a-2b-a+3b}{4}$

$=\dfrac{3a+b}{4}$

(6) $\dfrac{3x+2y}{6}-\dfrac{3x-2y}{12}=\dfrac{2(3x+2y)}{12}-\dfrac{3x-2y}{12}$

$=\dfrac{2(3x+2y)-(3x-2y)}{12}$

$=\dfrac{6x+4y-3x+2y}{12}$

$=\dfrac{3x+6y}{12}$

$=\dfrac{x+2y}{4}$