第1章　式の計算

1　多項式の計算

p2

例1

①$6x^2-8xy$　　②$-20a^2-12ab^2$

解説

① $2x(3x-4y)$ → $=6x^2-8xy$

② $(5a-3b^2)\times(-4a)$ → $=-20a^2-12ab^2$

練習1

①$20x^2+15x^2y$　②$-6a^2b+12ab^2$　③$\frac{2}{3}x^2y-2xy$

④$-8a^2b-18ab^2$　⑤$-6x^2y^2+18x^2y^3$　⑥$-\frac{1}{6}a^4b+\frac{1}{4}a^3b^2$

例2

①$\frac{5}{2}x^2-y$　　②$6+\frac{3b^2}{2a}$

解説

① $(15x^2y-6y^2)\div 6y$

$=15x^2y\div 6y-6y^2\div 6y$

$=\frac{15x^2y}{6y}-\frac{6y^2}{6y}$

$=\frac{5}{2}x^2-y$

② $(4a+b^2)\div\frac{2}{3}a$

$=4a\times\frac{3}{2a}+b^2\times\frac{3}{2a}$

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

練習2

①$3x-2y$　　②$\frac{3a^2}{2b}-1$　　③$\frac{8xy}{3}-\frac{12y}{x}$

p3

例3

①$8xy$　　②$3x^2-23xy+6y^2$

解説

① $6x^2-2x(3x-4y)$

$=6x^2-6x^2+8xy$

$=8xy$

② $3x(x-5y)-2y(4x-3y)$

$=3x^2-15xy-8xy+6y^2$

$=3x^2-23xy+6y^2$

練習3

①$-x^2+5xy$　　②$12x^2+14xy+21y^2$

③$21x^2-14xy$　　④$-6x^2-7xy-20y^2$

例4

①$6ac+15ad-8bc-20bd$　②$4x^2-21xy+5y^2$

③$2x^2+7xy-8x-15y^2+38y-24$

解説

① $(3a-4b)(2c+5d)$

$=6ac+15ad-8bc-20bd$

② $(x-5y)(4x-y)$

$=4x^2-xy-20xy+5y^2$

$=4x^2-21xy+5y^2$

③ $(2x-3y+4)(x+5y-6)$

$=2x^2+10xy-12x-3xy-15y^2+18y+4x+20y-24$

$=2x^2+7xy-8x-15y^2+38y-24$

練習4

①$2ac+5ad-8bc-20bd$

②$6ab-21a-8b+28$　　③$x^2+10x+24$

④$6x^2-x-15$　　⑤$4x^2-25$　　⑥$9a^2-6a-8$

⑦$x^2-7xy+12y^2$　　⑧$2a^2+7ab+5b^2$　　⑨$12x^2+7xy-10y^2$

p4

⑩$x^3-10x+3$　　⑪a^3+8

⑫$2a^3+a^2-5a-4$　　⑬$3x^3+x^2+11x+20$

⑭$ax-ay+az+bx-by+bz-cx+cy-cz$

⑮$x^2+xy-x-6y^2-23y-20$

⑯$a^2+8ab-3a+16b^2-12b-10$

⑰$x^2-2xy+y^2-64$

例5

①$2a^2+45a-28$　　②$10x^2-40x-120$

解説

① $(3a-1)(2a+4)-(a-8)(4a-3)$

$=6a^2+12a-2a-4-(4a^2-3a-32a+24)$

$=6a^2+12a-2a-4-4a^2+3a+32a-24$

$=2a^2+45a-28$

② $5(2x+4)(x-6)$

$=5(2x^2-12x+4x-24)$

$=5(2x^2-8x-24)$

$=10x^2-40x-120$

練習5

①$10x^2-2x-7$　　②$a^2+27ab-7b^2$

③$24x^2+66x-63$　　④$-6x^2+10xy+4y^2$

確認問題A

p5

1 ①$6x^3-12x^2y$　②$-6a^2b-8a^2b^2$　③$\frac{3}{2}x^2y^2-\frac{9}{2}xy$

2 ①$3x-2y^2$　②$\frac{2a^2}{b}-\frac{3}{2}$　③$3xy-\frac{9y^2}{2}$

3 ①$-x^3+5xy$　②$12x^2+14xy+21y^2$

4 ①$3ax+4bx-3ay-4by$

②$6ab-14a-15b+35$　③$x^2+10x+16$

④$15x^2-2x-8$　⑤$x^2-5xy+6y^2$　⑥$6a^2+27ab+12b^2$

⑦x^3-x^2+2x+8　⑧a^3-27

⑨$2a^2+3ab+ac-2b^2+7bc-3c^2$

5 ①$13x^2+3x-11$

②$-a^2+26ab+3b^2$

③$24x^2-2x-126$

確認問題B

p6

1 ①$-4x^3+5x^2y^2$　②$-a^2b^2+6a^2b^3$　③$\frac{10}{3}xy^2-\frac{5}{2}y^3$

2 ①$2x^2-\frac{3}{2}xy$　②$\frac{a^2}{4b}-1$　③$\frac{16}{3}x^2-8xy$

3 ①$-xy$　②$-2x^2+10xy+3y^2$

4 ①$2ax+10bx-ay-5by$

②$12ab-3a-20b+5$　③x^2-36

④$12x^2-11x-15$　⑤$4x^2-8xy+3y^2$　⑥$2a^2+11ab+15b^2$

⑦x^2+8　⑧$a^2+a^2-10a+8$

⑨$9a^2-4b^2+4bc-c^2$

5 ①$22x^2+x-11$

②$-a^2+6ab-18b^2$

③$-47x+46$

2　乗法公式

p7

例1

① $x^2+2x-24$　② $x^2+10xy+16y^2$
③ $9x^2-27x+20$　④ $16x^2-4xy-6y^2$

解説

① $(x-4)(x+6)$
$=x^2+2x-24$
（−4と＋6をたす）（−4と＋6をかける）

② $(x+2y)(x+8y)$
$=x^2+10xy+16y^2$
（2yと8yをたす）（2yと8yをかける）

③ $(3x-5)(3x-4)$
$=9x^2-27x+20$
（−5と−4をたして3xとかける）（−5と−4をかける）

④ $(4x+2y)(4x-3y)$
$=16x^2-4xy-6y^2$
（2yと−3yをたして4xとかける）（2yと−3yをかける）

練習1-1

① $x^2+7x+10$　② $x^2-13x+36$　③ $x^2-2x-35$
④ $x^2-2x-63$　⑤ x^2+x-42　⑥ $x^2-4x-21$
⑦ $x^2-15x+54$　⑧ x^2+4x+3　⑨ $x^2-17x+72$
⑩ x^2-4x-5　⑪ $x^2-12x+32$　⑫ $x^2+7x+10$

練習1-2

① $x^2+7xy+12y^2$　② $x^2+xy-6y^2$　③ $x^2-4xy+3y^2$
④ $x^2-12xy+27y^2$　⑤ $x^2-5xy-6y^2$　⑥ $x^2+2xy-48y^2$
⑦ $x^2+10xy+9y^2$　⑧ $x^2-4xy-32y^2$　⑨ $x^2-10xy+16y^2$

p8

練習1-3

① $4x^2+14x+10$　② $9x^2-39x+36$　③ $25x^2-10x-35$
④ $9x^2-6x-63$　⑤ $4x^2+2x-42$　⑥ $16x^2-16x-21$
⑦ $4x^2-30x+54$　⑧ $16x^2+16x+3$　⑨ $9x^2-51x+72$
⑩ $4x^2-8x-5$　⑪ $16x^2-48x+32$　⑫ $9x^2+21x+10$

練習1-4

① $25x^2+35xy+12y^2$　② $9x^2+3xy-6y^2$　③ $25x^2-20xy+3y^2$
④ $4x^2-24xy+27y^2$　⑤ $4x^2-10xy-6y^2$　⑥ $16x^2+8xy-48y^2$
⑦ $9x^2+30xy+9y^2$　⑧ $25x^2-20xy-32y^2$　⑨ $4x^2-20xy+16y^2$

練習1-5

① $x^2+7x+12$　② $x^2-11x+24$　③ $25x^2-10x-24$
④ x^2+x-72　⑤ $4x^2-2x-30$　⑥ $x^2-6x-16$
⑦ $4x^2-30x+50$　⑧ x^2+6x+8　⑨ $9x^2-18x+8$
⑩ $4x^2+4x-3$　⑪ $16x^2-20x+4$　⑫ $x^2+8x+12$

練習1-6

① $x^2+9xy+20y^2$　② $9x^2+3xy-2y^2$　③ $x^2-6xy+8y^2$
④ $4x^2-20xy+9y^2$　⑤ $x^2-5xy-14y^2$　⑥ $16x^2-4xy-42y^2$
⑦ $25x^2+50xy+9y^2$　⑧ $x^2+2xy-48y^2$　⑨ $4x^2-16xy+7y^2$

p9

例2

① $x^2+8x+16$　② $x^2-10x+25$　③ $x^2+x+\frac{1}{4}$
④ $9x^2+24x+16$　⑤ $9x^2-30xy+25y^2$　⑥ $4x^2-xy+\frac{1}{16}y^2$

解説

① $(x+4)^2$
$=x^2+8x+16$
（$x\times4\times2$）

② $(x-5)^2$
$=x^2-10x+25$
（$x\times(-5)\times2$）

③ $\left(x+\frac{1}{2}\right)^2$
$=x^2+x+\frac{1}{4}$
（$x\times\frac{1}{2}\times2$）

④ $(3x+4)^2$
$=9x^2+24x+16$
（$3x\times4\times2$）

⑤ $(3x-5y)^2$
$=9x^2-30xy+25y^2$
（$3x\times(-5y)\times2$）

⑥ $\left(2x-\frac{1}{4}y\right)^2$
$=4x^2-xy+\frac{1}{16}y^2$
（$2x\times\left(-\frac{1}{4}y\right)\times2$）

練習2-1

① x^2+6x+9　② $x^2-14x+49$　③ x^2+2x+1
④ $x^2-8x+16$　⑤ $x^2+10x+25$　⑥ $x^2-16x+64$
⑦ $x^2+12x+36$　⑧ x^2+4x+4　⑨ x^2-2x+1
⑩ $x^2-10x+25$　⑪ $x^2-18x+81$　⑫ x^2+6x+9
⑬ $x^2+14x+49$　⑭ x^2-4x+4　⑮ $x^2+18x+81$
⑯ $x^2+20x+100$　⑰ $x^2+24x+144$　⑱ $x^2-22x+121$

練習2-2

① $x^2-x+\frac{1}{4}$　② $x^2+\frac{2}{3}x+\frac{1}{9}$　③ $x^2-\frac{3}{2}x+\frac{9}{16}$
④ $x^2+\frac{1}{3}x+\frac{1}{36}$　⑤ $x^2-\frac{4}{5}x+\frac{4}{25}$　⑥ $x^2+\frac{5}{4}x+\frac{25}{64}$

p10

練習2-3

① $16x^2+24x+9$　② $4x^2-28x+49$　③ $16x^2+8x+1$
④ $9x^2-24x+16$　⑤ $4x^2+20x+25$　⑥ $25x^2-80x+64$
⑦ $16x^2+48x+36$　⑧ $9x^2+12x+4$　⑨ $9x^2-6x+1$
⑩ $9x^2-30x+25$　⑪ $4x^2-36x+81$　⑫ $4x^2+12x+9$

練習2-4

① $9x^2+6xy+y^2$　② $x^2-4xy+4y^2$　③ $x^2+16xy+64y^2$
④ $4x^2+12xy+9y^2$　⑤ $16x^2+8xy+y^2$　⑥ $x^2-18xy+81y^2$
⑦ $9x^2-24xy+16y^2$　⑧ $4x^2+20xy+25y^2$　⑨ $25x^2-10xy+y^2$

練習2-5

① $x^2+10x+25$　② $4x^2-12x+9$　③ $x^2+8xy+16y^2$
④ $x^2-6xy+9y^2$　⑤ $4x^2+24x+36$　⑥ $25x^2-20x+4$
⑦ $9x^2+30x+25$　⑧ $x^2+2xy+y^2$　⑨ $4x^2-16x+16$
⑩ $x^2-10xy+25y^2$　⑪ $16x^2-48x+36$　⑫ $x^2+24x+144$
⑬ $64x^2+16x+1$　⑭ $x^2-2xy+y^2$　⑮ $x^2+16xy+64y^2$
⑯ $25x^2+20xy+4y^2$　⑰ $100x^2+20x+1$　⑱ $x^2-30xy+225y^2$

練習2-6

① $x^2+\frac{3}{2}x+\frac{9}{16}$　② $x^2-5x+\frac{25}{4}$　③ $x^2+\frac{4}{3}x+\frac{4}{9}$
④ $x^2-\frac{2}{3}xy+\frac{1}{9}y^2$　⑤ $x^2+xy+\frac{1}{4}y^2$　⑥ $16x^2-6xy+\frac{9}{16}y^2$

p11

例3

① x^2-16　② $9x^2-25y^2$　③ $9y^2-x^2$

解説

① $(x+4)(x-4)$
$=x^2-4^2$
$=x^2-16$

② $(3x+5y)(3x-5y)$
$=(3x)^2-(5y)^2$
$=9x^2-25y^2$

③ $(-x+3y)(x+3y)$
$=(3y)^2-x^2$
$=9y^2-x^2$

練習3-1

① x^2-4　② x^2-36　③ x^2-25
④ x^2-1　⑤ x^2-64　⑥ x^2-100
⑦ $x^2-\frac{1}{4}$　⑧ $x^2-\frac{9}{16}$　⑨ $x^2-\frac{4}{9}$

練習3-2

① $9x^2-16$　② $36x^2-1$　③ $16x^2-9$
④ $25x^2-4$　⑤ $4x^2-49$　⑥ $64x^2-121$
⑦ x^2-25　⑧ x^2-81　⑨ x^2-144
⑩ x^2-49　⑪ x^2-1　⑫ x^2-100

練習3-3

① x^2-9y^2　② x^2-25y^2　③ x^2-4y^2
④ x^2-y^2　⑤ x^2-36y^2　⑥ x^2-81y^2
⑦ $x^2-\frac{9}{4}y^2$　⑧ $x^2-\frac{1}{16}y^2$　⑨ $x^2-\frac{4}{25}y^2$

p12

練習3-4

① $4x^2-49y^2$　② $9x^2-y^2$　③ $25x^2-16y^2$
④ $16x^2-36y^2$　⑤ $64x^2-9y^2$　⑥ $36x^2-169y^2$
⑦ x^2-49y^2　⑧ x^2-64y^2　⑨ x^2-121y^2
⑩ x^2-36y^2　⑪ x^2-y^2　⑫ x^2-64y^2

練習3-5

① x^2-25　② x^2-4y^2　③ x^2-64y^2
④ x^2-9y^2　⑤ x^2-1　⑥ x^2-36y^2
⑦ $x^2-\frac{9}{25}y^2$　⑧ $x^2-\frac{1}{4}y^2$　⑨ $x^2-\frac{4}{25}$

練習3-6

① $4x^2-25$　② $81x^2-y^2$　③ $25x^2-y^2$
④ x^2-144y^2　⑤ $25x^2-16$　⑥ $36x^2-81y^2$
⑦ x^2-16y^2　⑧ x^2-4　⑨ x^2-225y^2
⑩ x^2-49y^2　⑪ $25x^2-y^2$　⑫ x^2-36