(2002   )

Series A

No. 1

解答

< 1   .   >

1

(1) $3 \times x + x + x = 5x$

(2) $2 \times x \times x \times 3 \times y \times y \times y \times y \times y = 6x^2 y^5$

(3) $a \times a \times (a - 3 \times b) = a^3 - 3a^2 b$

(4) $3 \times x \times x \times (x \times 4 - 3 \times y) = 12x^3 - 9x^2 y$

2

(1) $1\dfrac{1}{3} = \dfrac{4}{3}$

(2) $3\dfrac{3}{4} = \dfrac{15}{4}$

(3) $4\dfrac{1}{5} = \dfrac{21}{5}$

(4) $6\dfrac{2}{3} = \dfrac{20}{3}$

< **2**   .   >

(1) $3 \times a \times b \times x \times a \times b \times 2 \times b = 6a^2b^3x$

(2) $5(x - y) - 3(y + 2x) + x(2 + y) = x - 8y + xy$

(3) $6 \times x \times y \times y \div (x \times y \times 5 \times x \times 3) = \dfrac{2y}{5x}$

(4) $21ab^3 \div 28a^2b = \dfrac{3b^2}{4a}$

(5) $(5xy^2) \times (9x^3y^2) \div (15x^2y^3) = 3x^2y$

(6) $(3ab^2c) \div (2a^2bc^3) \times (6abc^2) = 9b^2$

< 3 . >

(1) $\dfrac{7}{6} - \dfrac{7}{8} = \dfrac{7}{24}$

(2) $\dfrac{2}{9} + \dfrac{5}{12} = \dfrac{23}{36}$

(3) $\dfrac{5}{4} - \dfrac{7}{8} = \dfrac{3}{8}$

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

(5) $\dfrac{a}{12} - \dfrac{b}{8} = \dfrac{2a - 3b}{24}$

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

(7) $\dfrac{y}{x} - \dfrac{a}{3} = \dfrac{3y - ax}{3x}$

(8) $\dfrac{b}{a} + \dfrac{d}{c} = \dfrac{bc + ad}{ac}$

(9) $\dfrac{1}{x} + \dfrac{1}{y} + \dfrac{1}{z} = \dfrac{yz + zx + xy}{xyz}$

< **4**   .   >

(1) $\dfrac{1}{\frac{7}{5}} = \dfrac{5}{7}$

(2) $\dfrac{\frac{2}{3}}{\frac{4}{9}} = \dfrac{3}{2}$

(3) $\dfrac{\frac{2}{3} - \frac{1}{2}}{\frac{2}{3} + \frac{1}{2}} = \dfrac{1}{7}$

(4) $\dfrac{1}{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}} = \dfrac{12}{13}$

(5) $\dfrac{\frac{d}{c}}{\frac{b}{a}} = \dfrac{ad}{bc}$

(6) $\dfrac{1}{\frac{zw}{xy}} = \dfrac{xy}{zw}$

(7) $\dfrac{1}{\frac{y}{x} + \frac{w}{z}} = \dfrac{xz}{yz + wx}$

(8) $\dfrac{\frac{1}{ac}}{\frac{b}{a} - \frac{d}{c}} = \dfrac{1}{bc - ad}$

(9) $\dfrac{1}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c}} = \dfrac{abc}{bc + ca + ab}$

< **5**   .   >

(1) $R = \dfrac{E}{I}$

(2) $r^2 = \dfrac{S}{\pi}$

(3) $h = \dfrac{2E}{a+b}$

(4) $N = 9.74 \times 10^5 \times \dfrac{P}{T}$

(5) $\alpha = \dfrac{\sigma}{E(t-\tau)}$

(6) $E = 2(1+\mu)G$

(7) $a = \dfrac{bR}{b+R}$

(8) $R = \dfrac{abc}{bc+ac+ab}$

< 6   .   1 >

1

  (1) $123\text{m} = \boxed{0.123}\,\text{km}$

  (2) $7500\text{mm} = \boxed{7.5}\,\text{m}$

  (3) $1\text{mm} = \boxed{10000000}\,\text{Å}\ \ (= \boxed{10^7}\,\text{Å})$

2

  (1) $10.5\text{m} + 2.4\text{m} = 12.9\text{m}$

  (2) $2000\text{m} - 140\text{m} = 1860\text{m}$

3

  (1) $0.6\text{min} = \boxed{36}\,\text{s}$

  (2) $36\text{s} = \boxed{\frac{1}{100}}\,\text{h}\ \ (= \boxed{0.01}\,\text{h})$

  (3) $1\text{h} = \boxed{3600}\,\text{h}$

  (4) $156\text{s} = \boxed{2.6}\,\text{min}$

  (5) $2.3\text{h} = \boxed{138}\,\text{min}$

  (6) $15\text{min} = \boxed{0.25}\,\text{h}$

< 7 . 2 >

1

(1) $1\text{m}^2 = \boxed{10000}\,\text{cm}^2\ \ (=\boxed{10^4}\,\text{cm}^2)$

(2) $1\text{km}^2 = \boxed{1000000}\,\text{m}^2\ \ (=\boxed{10^6}\,\text{cm}^2)$

(3) $0.5\text{cm}^2 = \boxed{50}\,\text{mm}^2$

(4) $600\text{mm}^2 = \boxed{0.0006}\,\text{m}^2\ \ (=\boxed{6\times 10^{-4}}\,\text{m}^2)$

2

(1) $1\text{cm}^3 = \boxed{1000}\,\text{mm}^3$

(2) $1\text{m}^3 = \boxed{1000000}\,\text{cm}^3\ \ (=\boxed{10^6}\,\text{cm}^3)$

(3) $1\text{m}^3 = \boxed{1000000000}\,\text{mm}^3\ \ (=\boxed{10^9}\,\text{mm}^3)$

(4) $0.001\text{km}^3 = \boxed{1000000}\,\text{m}^3\ \ (=\boxed{10^6}\,\text{m}^3)$

< 8   .   3 >

1

$18\text{km/h} = \boxed{300}\,\text{m/min} = \boxed{5}\,\text{m/s}$

2

$\dfrac{5}{6}\text{m/s} = 3\text{km/h} \quad (\qquad 3\text{km})$

3

$\dfrac{54}{99}\text{km/min} = \dfrac{100}{11}\text{m/s}$

                            ( )   100m   11

$<$ **9**   .   **1** $>$

(1) $(a-b)^2 = a^2 - 2ab + b^2$

(2) $(a+b)(a+c) = a^2 + ab + bc + ca$

(3) $(a+b)(a-c) = a^2 + ab - bc - ca$

(4) $(a-b)(a-c) = a^2 - ab + bc - ca$

(5) $(a+b)(-a+b) = b^2 - a^2$

(6) $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

(7) $(a+b-c)^2 = a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$

(8) $(a-b-c)^2 = a^2 + b^2 + c^2 - 2ab + 2bc - 2ca$

$<$ **10**　　　．　　　　**2** $>$

(1) $(a+b)(a^2-ab+b^2) = a^3 - a^2b + ab^2 + a^2b - ab^2 + b^3 = a^3 + b^3$

(2) $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

(3) $(a-b)(a+b)^2 = (a^2-b^2)(a+b) = a^3 + a^2b - ab^2 - b^3$

(4) $(a^2-b^2)(a^2+b^2) = a^4 - b^4$

(5) $(a-b)^2(a+b)^2 = (a^2-b^2)(a^2-b^2) = a^4 - 2a^2b^2 + b^4$

$<$ **11**　　　　　．　　　　　　　　　$>$

$$5 \qquad (a+b)^2 = c^2 + \left(\frac{1}{2}ab\right) \times 4$$

$$c^2 = (a+b)^2 - \frac{4}{2}ab = a^2 + b^2$$

$$c^2 = a^2 + b^2$$

< 12   .   1 >

1

   (1) 4   (2) 16   (3) $\dfrac{6}{7}$ (4) 0.5

2

$$\text{OD} = \sqrt{(\text{OC})^2 + (\text{CD})^2} = \sqrt{3+1} = 2$$
$$\text{OE} = \sqrt{4+1} = \sqrt{5}$$
$$\text{OF} = \sqrt{5+1} = \sqrt{6}$$
$$\text{OG} = \sqrt{6+1} = \sqrt{7}$$

< 13 . 2 >

1

  (1) $(6\sqrt{3} - 2\sqrt{2}) + (3\sqrt{2} - 5\sqrt{3}) = \sqrt{3} + \sqrt{2}$

  (2) $(5\sqrt{2} - 2\sqrt{3}) - (3\sqrt{3} - \sqrt{2}) = 6\sqrt{2} - 5\sqrt{3}$

  (3) $3(\sqrt{5} + 2\sqrt{3}) + 2(2\sqrt{5} - 3\sqrt{3}) = 7\sqrt{5}$

  (4) $5(\sqrt{5} + \sqrt{3}) - 3(2\sqrt{5} - \sqrt{2}) = 3\sqrt{2} + 5\sqrt{3} - \sqrt{5}$

2

  (1) $(-\sqrt{11})^2 = 11$

  (2) $\sqrt{(-5)^2} = 5$

  (3) $\left(-\sqrt{\dfrac{2}{3}}\right)^2 = \dfrac{2}{3}$

  (4) $\sqrt{(-0.12)^2} = 0.12$

3

  (1) $\sqrt{2} \times \sqrt{3} = \sqrt{6}$

  (2) $\sqrt{5} \times \sqrt{7} = \sqrt{35}$

  (3) $\sqrt{4} \times \sqrt{11} = 2\sqrt{11}$

  (4) $\sqrt{3} \times \sqrt{12} = \sqrt{36} = 6$

< **14** . **3** >

1

(1) $\sqrt{18} = 3\sqrt{2}$

(2) $\sqrt{40} = 2\sqrt{10}$

(3) $\sqrt{75} = 5\sqrt{3}$

(4) $\sqrt{80} = 4\sqrt{5}$

(5) $\sqrt{147} = 7\sqrt{3}$

2

(1) $\sqrt{5} \times \sqrt{20} = 10$

(2) $\sqrt{7} \times \sqrt{63} = 21$

(3) $\sqrt{21} \times \sqrt{84} = 42$

3

(1) $\dfrac{\sqrt{28}}{\sqrt{7}} = 2$

(2) $\dfrac{\sqrt{405}}{\sqrt{15}} = 3\sqrt{3}$

(3) $\dfrac{\sqrt{3} \times \sqrt{18}}{\sqrt{2}} = 3\sqrt{3}$

$<$ **15**　　.　　**4** $>$

1

(1) $(\sqrt{5} + \sqrt{2})^2 = 7 + 2\sqrt{10}$

(2) $(\sqrt{2} + \sqrt{6})^2 = 8 + 4\sqrt{3}$

(3) $(\sqrt{3} - \sqrt{2})^2 = 5 - 2\sqrt{6}$

(4) $(\sqrt{6} - \sqrt{3})^2 = 9 - 6\sqrt{2}$

(5) $(\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2}) = 3$

(6) $(2 + \sqrt{3})(2 - \sqrt{3}) = 1$

2

(1) $\dfrac{\sqrt{2}}{\sqrt{3}} = \dfrac{\sqrt{6}}{3}$

(2) $\dfrac{1}{\sqrt{2}} = \dfrac{\sqrt{2}}{2}$

(3) $\dfrac{3}{\sqrt{3}} = \sqrt{3}$

(4) $\dfrac{4}{\sqrt{12}} = \dfrac{2\sqrt{3}}{3}$

(5) $\dfrac{2}{\sqrt{18}} = \dfrac{\sqrt{2}}{3}$

3

(1) $\dfrac{3}{\sqrt{3} + \sqrt{2}} = 3\sqrt{3} - 3\sqrt{2}$

(2) $\dfrac{1}{\sqrt{5} - \sqrt{3}} = \dfrac{\sqrt{5} + \sqrt{3}}{2}$

(3) $\dfrac{3}{\sqrt{6} + \sqrt{2}} = \dfrac{3\sqrt{6} - 3\sqrt{2}}{4}$

(4) $\dfrac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} = 5 - 2\sqrt{6}$

< 16   .   1 >

1

(1) $(12)_8 = (10)_{10}$

(2) $(33)_8 = (27)_{10}$

(3) $(234)_8 = (156)_{10}$

(4) $(707)_8 = (455)_{10}$

(5) $(2001)_8 = (1025)_{10}$

2

(1) $(21)_{10} = (25)_8$

(2) $(45)_{10} = (55)_8$

(3) $(79)_{10} = (117)_8$

(4) $(156)_{10} = (234)_8$

3

(1) $(3.14)_{10} = 3 + \dfrac{1}{10} + \dfrac{4}{10^2}$

(2) $(1.5)_8 = 1 + \dfrac{5}{8}$

(3) $(5.73)_8 = 5 + \dfrac{7}{8} + \dfrac{3}{8^2}$

＜ 17　　　.　　　　　**2** ＞

1

（　　）

$a + b + c$　　3　　　　　　　　　　　$a + b + c = 3n$　　n

$$(abc)_{10} = 100a + 10b + c$$

$$= 3(33a + 3b) + (a + b + c)$$

$$= 3(33a + 3b + n)$$

$(abc)_{10} = 3 \times (33a + 3b + n)$　　　3　　　　　　　　　（　　　　）

2

（　　）

$a + b + c$　　7　　　　　　　　　　$a + b + c = 7n$　　n

$$(abc)_8 = 64a + 8b + c$$

$$= 7(9a + b) + (a + b + c)$$

$$= 7(9a + b + n)$$

$(abc)_8 = 7 \times (9a + b + n)$　　　7　　　　　　　　　　（　　　　）

< 18 　　．　　1 >

1

$$(abcd)_x = ax^3 + bx^2 + cx + d$$

2

(1) $2(3x - 4x^2 + 1) + 3(x - 5 + 2x^2) = -2x^2 + 9x - 13$

(2) $(3x - 1)(4 - 5x) = -15x^2 + 17x - 4$

< 19 . 2 >

1

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

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

(3) $(x - 3)(2 + x) = x^2 - x - 6$

(4) $(4x - 3)(6 - 5x) = 24x - 18 - 20x^2 + 15x$

$$= -20x^2 + 39x - 18$$

2

(1) $(x + a)^2 = x^2 + 2ax + a^2$

(2) $(x - a)^2 = x^2 - 2ax + a^2$

(3) $(x + a)(x - a) = x^2 - a^2$

(4) $(x - a)(x - b) = x^2 - (a + b)x + ab$

(5) $(x - a)(x^2 + ax + a^2) = x^3 - a^3$

(6) $(x - a)^3 = x^3 + 3ax^2 + 3a^2x + a^3$

＜ **20** .   ＞

(1)

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

$$
\begin{array}{r}
x+2 \\
x+1 \overline{\smash{\big)}\ x^2+3x} \\
\underline{x^2+\ x} \\
2x \\
\underline{2x+2} \\
-2
\end{array}
$$

(2)

$$\frac{x^2 + 3x + 5}{x - 2} = x + 5 + \frac{15}{x - 2}$$

$$
\begin{array}{r}
x+\ 5 \\
x-2 \overline{\smash{\big)}\ x^2+3x+\ 5} \\
\underline{x^2-2x} \\
5x+\ 5 \\
\underline{5x-10} \\
15
\end{array}
$$

(3)

$$\frac{2x^2 - 3x - 1}{x - 1} = 2x - 1 - \frac{2}{x - 1}$$

$$
\begin{array}{r}
2x-1 \\
x-1 \overline{\smash{\big)}\ 2x^2-3x-1} \\
\underline{2x^2-2x} \\
-x-1 \\
\underline{-x+1} \\
-2
\end{array}
$$

(4)

$$\frac{x^3 - 5x^2 + 7x - 2}{x - 3} = x^2 - 2x + 1 + \frac{1}{x - 3}$$

$$
\begin{array}{r}
x^2-2x+1 \\
x-3 \overline{\smash{\big)}\ x^3\ -5x^2+7x-2} \\
\underline{x^3\ -3x^2} \\
-2x^2+7x \\
\underline{-2x^2+6x} \\
x-2 \\
\underline{x-3} \\
1
\end{array}
$$

< **21**   **.**   >

1

(1) $x = 0$ $(x+2)(x+3) = 6,$ $x^2 + 5x + 6 = 6$

(2) $x = 1$ $(x+2)(x+3) = 12,$ $x^2 + 5x + 6 = 12$

(3) $x = 2$ $(x+2)(x+3) = 20,$ $x^2 + 5x + 6 = 20$

(4) $x = 3$ $(x+2)(x+3) = 30,$ $x^2 + 5x + 6 = 30$

(5) $x = 4$ $(x+2)(x+3) = 42,$ $x^2 + 5x + 6 = 42$

2

(1) $(x+\alpha)^2 = x^2 + 2\alpha x + \alpha^2$

(2) $(x-\alpha)^2 = x^2 - 2\alpha x + \alpha^2$

(3) $(x+\alpha)(x-\alpha) = x^2 - \alpha^2$

(4) $(x+\alpha)(x+\beta) = x^2 + (\alpha + \beta)x + \alpha\beta$

(5) $(x-\alpha)(x-\beta) = x^2 - (\alpha + \beta)x + \alpha\beta$

(6) $(x+\alpha)(x-\beta) = x^2 + (\alpha - \beta)x - \alpha\beta$

3

(1)

(2)

(3)

(4)

< 22   .2   1 >

(1) $x^2 + 4x + 4 = (x + 2)^2$

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

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

(4) $x^2 + 5x + 6 = (x + 2)(x + 3)$

< 23 .**2** **2 >**

(1) $x^2 + 2\alpha x + \alpha^2 = (x + \alpha)^2$

(2) $x^2 - 2\alpha x + \alpha^2 = (x - \alpha)^2$

(3) $x^2 - \alpha^2 = (x + \alpha)(x - \alpha)$

(4) $x^2 - (\alpha + \beta)x + \alpha\beta = (x - \alpha)(x - \beta)$

(5) $x^2 + (\alpha - \beta)x - \alpha\beta = (x + \alpha)(x - \beta)$

< 24　　　**.2**　　　　　　**3 >**

(1) $x^2 + 6x + 9 = (x + 3)^2$

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

(3) $x^2 + 12x + 36 = (x + 6)^2$

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

(5) $x^2 - 8 = \left(x + 2\sqrt{2}\right)\left(x - 2\sqrt{2}\right)$

(6) $x^2 - 1 = (x + 1)(x - 1)$

(7) $x^2 + 3x + 2 = (x + 1)(x + 2)$

(8) $x^2 + 5x + 6 = (x + 2)(x + 3)$

(9) $x^2 + 7x + 10 = (x + 2)(x + 5)$

(10) $x^2 + 7x + 12 = (x + 3)(x + 4)$

< 25   .2   4 >

(1) $x^2 + 5x - 6 = (x - 1)(x + 6)$

(2) $x^2 + x - 6 = (x - 2)(x + 3)$

(3) $x^2 + 2x - 15 = (x - 3)(x + 5)$

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

(5) $x^2 - 4x - 5 = (x - 5)(x + 1)$

(6) $x^2 - 2x - 8 = (x - 4)(x + 2)$

(7) $x^2 - 6x + 5 = (x - 5)(x - 1)$

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

(9) $x^2 - 9x + 8 = (x - 8)(x - 1)$

(10) $x^2 - 6x + 8 = (x - 4)(x - 2)$

$< \mathbf{26} \quad \mathbf{.2} \quad \mathbf{1} >$

(1)$x^2 - 4 = 0$

$$\underline{x = \pm 2}$$

(2)$x^2 - 8 = 0$

$$\underline{x = \pm 2\sqrt{2}}$$

(3)$(x - 2)^2 - 5 = 0$

$$\underline{x = 2 \pm \sqrt{5}}$$

(4)$3 - (x + 2)^2 = 0$

$$\underline{x = -2 \pm \sqrt{3}}$$

(5)$(x - 3)^2 - 9 = 0$

$$x = 3 \pm 3 \qquad \underline{x = 0 \qquad 6}$$

(6)$4 - (x + 1)^2 = 0$

$$x = -1 \pm 2 \qquad \underline{x = -3 \qquad 1}$$

$< \mathbf{27} \quad \mathbf{.2} \quad \mathbf{2} >$

(1) $x^2 + 6x + 8 = 0$

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

(2) $x^2 - 10x + 16 = 0$

$$(x - 5)^2 = 9 \qquad \underline{x = 2 \qquad 8}$$

(3) $x^2 + 8x - 11 = 0$

$$(x + 4)^2 = 27 \qquad \underline{x = -4 \pm 3\sqrt{3}}$$

(4) $x^2 - 4x + 1 = 0$

$$(x - 2)^2 = 3 \qquad \underline{x = 2 \pm \sqrt{3}}$$

(5) $x^2 - 3x + 1 = 0$

$$\left(x - \frac{3}{2}\right)^2 = \frac{5}{4} \qquad \underline{x = \frac{3 \pm \sqrt{5}}{2}}$$

(6) $x^2 + 5x - 2 = 0$

$$\left(x + \frac{5}{2}\right)^2 = \frac{33}{4} \qquad \underline{x = \frac{-5 \pm \sqrt{33}}{2}}$$

$< 28\qquad .2\qquad 3 >$

$$ax^2 + bx + c = 0$$

$$\Rightarrow\quad x^2 + \frac{b}{a}x = -\frac{c}{a}$$

$$\Rightarrow\quad \left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a^2} - \frac{c}{a}$$

$$\Rightarrow\quad \left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

$$\Rightarrow\quad x + \frac{b}{2a} = \pm\frac{\sqrt{b^2 - 4ac}}{2a}$$

$$\Rightarrow\quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$(\ )\quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

< **29**   .   **1** >

(1)$x^2 - 6x + 8 = 0$

$x = 2 \qquad x = 4$

(2)$x^2 - 8x + 7 = 0$

$x = 1 \qquad x = 7$

(3)$x^2 - 7x + 10 = 0$

$x = 2 \qquad x = 5$

(4)$x^2 + x - 12 = 0$

$x = -4 \qquad x = 3$

(5)$x^2 - x - 2 = 0$

$x = -1 \qquad x = 2$

(6)$x^2 + 5x + 4 = 0$

$x = -4 \qquad x = -1$

(7)$x^2 - 5 = 0$

$x = \pm\sqrt{5}$

(8)$x^2 + x - 1 = 0$

$x = \dfrac{-1 \pm \sqrt{5}}{2}$

< **30**　　　　　**.2**　　　　　　　　　　　**2** >

1

$$\left(x - \frac{1 + \sqrt{5}}{2}\right)\left(x - \frac{1 - \sqrt{5}}{2}\right)$$

$$= x^2 - \left(\frac{1 + \sqrt{5}}{2} + \frac{1 - \sqrt{5}}{2}\right)x + \frac{1 + \sqrt{5}}{2} \cdot \frac{1 - \sqrt{5}}{2}$$

$$= x^2 - x - 1$$

2

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

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

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

(4) $x^2 - x - 4 = \left(x - \frac{1 + \sqrt{17}}{2}\right)\left(x - \frac{1 - \sqrt{17}}{2}\right)$

(5) $2x^2 - 6x - 20 = 2(x - 5)(x + 2)$

(6) $3x^2 + 3x - 18 = 3(x - 2)(x + 3)$

(7) $9x^2 + 6x + 1 = (3x + 1)^2$

(8) $3x^2 - 5x - 2 = (3x + 1)(x - 2)$

< 31   .   >

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

(2) $x^3 - 6x + 5 = (x - 1)(x^2 + x - 5) = (x - 1)\left(x + \dfrac{1 + \sqrt{21}}{2}\right)\left(x + \dfrac{1 - \sqrt{21}}{2}\right)$

< **32**   **.3**   >

(1) $x^3 + 3x^2 - x - 3 = 0$

  $(x + 3)(x + 1)(x - 1) = 0$

  $\underline{x = -3 \qquad x = -1 \qquad x = 1}$

(2) $x^3 + 2x^2 - 5x - 6 = 0$

  $(x + 3)(x + 1)(x - 2) = 0$

  $\underline{x = -3 \qquad x = -1 \qquad x = 2}$

(3) $x^3 - 3x + 2 = 0$

  $(x + 2)(x - 1)^2 = 0$

  $\underline{x = -2 \qquad x = 1}$

(4) $x^3 + 3x^2 + 3x + 1 = 0$

  $(x + 1)^3 = 0$

  $\underline{x = -1}$

< 33 　　 . 　 >

(1) $a_n = 3n - 5$

$a_1 = -2, \quad a_2 = 1, \quad a_3 = 4, \quad a_4 = 7$

(2) $a_n = 3n^2$

$a_1 = 3, \quad a_2 = 12, \quad a_3 = 27, \quad a_4 = 48$

(3) $a_n = (-1)^n$

$a_1 = -1, \quad a_2 = 1, \quad a_3 = -1, \quad a_4 = 1$

(4) $a_n = \dfrac{1}{9} \times 3^n$

$a_1 = \dfrac{1}{3}, \quad a_2 = 1, \quad a_3 = 3, \quad a_4 = 9$

(5) $a_n = 8 \times \left(\dfrac{1}{2}\right)^n$

$a_1 = 4, \quad a_2 = 2, \quad a_3 = 1, \quad a_4 = \dfrac{1}{2}$

< 34   .   >

1

$a_n = a + (n-1)d$

2

$a_n = 1 + 2(n-1) = 2n - 1$

3

$a_n = 1 + 7(n-1) = 7n - 6$

< 34   .   >

< 35   .   1 >

1

(1)   1   3

(2)   256 $\frac{1}{4}$

(3) $\frac{1}{9}$ -3

(4) -1 -1

2

(1) 2 , 6 , $\boxed{18}$, 52 , $\boxed{162}$

(2) 18 , -6 , $\boxed{2}$, $\boxed{-\dfrac{2}{3}}$, $\dfrac{2}{9}$

< 36 　　　. 　　　2 >

1

$a_n = ar^{n-1}$

2

(1)　$a_n = 2^{n-1}$

(2)　$a_n = 4 \times 3^{n-1}$

(3)　$a_n = 81 \times \left(\dfrac{1}{3} \right)^{n-1}$

(4)　$a_n = 8 \times \left(-\dfrac{1}{2} \right)^{n-1}$

$<$ **37**   . $>$

(1) $2^0 = 1$

(2) $1^{-1} = 1$

(3) $2^{-2} = \dfrac{1}{4}$

(4) $3^{-3} = \dfrac{1}{27}$

(5) $6 \times 4^{-3} = \dfrac{3}{32}$

(6) $3^6 \times 27^{-2} = 1$

(7) $(2^2)^{-1} = \dfrac{1}{4}$

(8) $(3^{-1})^2 = \dfrac{1}{9}$

(9) $(5^{-1})^{-2} = 25$

< 38 .   1 >

(1) $\sqrt{169} = 13$

(2) $\sqrt[3]{8} = 2$

(3) $\sqrt[3]{125} = 5$

(4) $\sqrt[4]{256} = 4$

(5) $\sqrt[4]{\dfrac{81}{625}} = \dfrac{3}{5}$

(6) $\sqrt[5]{3125} = 5$

$<$ **39** **.** **2** $>$

(1) $\sqrt[3]{3} \times \sqrt[3]{5} = \sqrt[3]{15}$

(2) $\sqrt[4]{2} \times \sqrt[4]{4} = \sqrt[4]{8}$

(3) $\dfrac{\sqrt[3]{3}}{\sqrt[3]{15}} = \dfrac{1}{\sqrt[3]{5}}$

(4) $\dfrac{\sqrt[5]{128}}{\sqrt[5]{4}} = \sqrt[5]{32} = 2$

< **40** . **3** >

1

  (1) $\sqrt[3]{54} = 3\sqrt[3]{2}$

  (2) $\sqrt[4]{112} = 2\sqrt[4]{7}$

  (3) $\sqrt[5]{64} = 2\sqrt[5]{2}$

2

  (1) $\left(\sqrt[4]{4}\right)^2 = 2$

  (2) $\left(\sqrt[9]{27}\right)^3 = 3$

  (3) $\sqrt[4]{16^2} = 4$

  (4) $\sqrt[6]{25^3} = 5$