

Algebra 2
Chapter 4 Review

① $-16x^4 - 3x^3 + 8x^2 - 11x + 1$

② $7x^2 + 5x - 4$

③ $5x^5 - 13x^4 - 13x^2 + x$

④ $2x^3 - 4x^2 + 5$

⑤ $6x^2 + 3x - 14x - 7$
 $\boxed{6x^2 - 11x - 7}$

⑥ $(x+3)(x+4)(x-1)$
 $(x+3)(x^2+3x-4)$
 x^3+3x^2-4x
 $+3x^2+9x-12$
 $\boxed{x^3+6x^2+5x-12}$

⑦ $(2x-3)(x^2-3x+5) = \boxed{2x^3-9x^2+19x-15}$
 $2x^3 - 6x^2 + 10x$
 $-3x^2 + 9x - 15$

⑧ $(x-7)(3x^2+4x-3) = \boxed{3x^3-17x^2-31x+21}$
 $3x^3+4x^2-3x$
 $-21x^2-28x+21$

⑨ $(2x+2)^3 = (2x+2)(2x+2)(2x+2)$
 $(2x+2)(4x^2+8x+4)$
 $8x^3+16x^2+8x$
 $+8x^2+16x+8$
 $\boxed{8x^3+24x^2+24x+8}$

$$\begin{aligned} \textcircled{10} \quad (3x-4)^3 &= (3x-4)(3x-4)(3x-4) \\ &= (3x-4)(9x^2-24x+16) \\ &= 27x^3 - 72x^2 + 48x \\ &\quad - 36x^2 + 96x - 64 \\ &= \boxed{27x^3 - 108x^2 + 144x - 64} \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad & \frac{4x-7 + \frac{11x-31}{x^2-3}}{x^2-3} \\ & \frac{4x^3 - 7x^2 - x - 10}{-4x^3 \quad -12x} \\ & \quad -7x^2 + 11x - 10 \\ & \quad +7x^2 \quad \quad 721 \\ & \quad \quad \quad 11x - 31 \end{aligned}$$

$$\begin{aligned} \textcircled{12} \quad & \frac{x^{-10/3} + 80/3(3x+2)}{3x+2} \\ & \frac{3x^2 - 8x + 20}{-3x^2 + 2x} \\ & \quad -10x + 20 \\ & \quad +10x + 20/3 \\ & \quad \quad \quad 80/3 \end{aligned}$$

$$\begin{array}{r} \textcircled{13} \quad -3 \overline{) 1 \quad 1 \quad 2 \quad 24} \\ \quad \quad -3 \quad 6 \quad -24 \\ \hline \quad \quad 1 \quad -2 \quad 8 \quad 1 \quad 0 \end{array} \quad \boxed{x^2 - 2x + 8}$$

$$\begin{array}{r} \textcircled{14} \quad -5 \overline{) 4 \quad 9 \quad -52 \quad 15} \\ \quad \quad -20 \quad 55 \quad -15 \\ \hline \quad \quad 4 \quad -11 \quad 3 \quad 1 \quad 0 \end{array} \quad \boxed{4x^2 - 11x + 3}$$

$$\textcircled{15} \quad 4k^5 - 100k^3 = 4k^3(k^2 - 25) = 4k^3(k+5)(k-5)$$

$$\textcircled{16} \quad 3r^4 - 11r^2 - 20 = (3r^2 + 4)(r^2 - 5)$$

$$(17) \quad c^3 - 1000 = (c - 10)(c^2 + 10c + 100)$$

$$(18) \quad 9n^6 - 243n^3 = 9n^3(n^3 - 27) = \boxed{9n^3(n-3)(n^2+3n+9)}$$

$$(19) \quad 4k^3 - 40k^2 + 10k - 100 = 2(2k^3 - 20k^2 + 5k - 50)$$

$$2[2k^2(k-10) + 5(k-10)]$$

$$\boxed{2(k-10)(2k^2+5)}$$

$$(20) \quad 9m^4 - 1 = \boxed{(3m^2+1)(3m^2-1)}$$

(21)

$$\begin{array}{r} 3 \overline{) 2 \quad -3 \quad -8 \quad -3} \\ \underline{ 6 \quad 9 \quad 3} \\ 2 \quad 3 \quad 1 \quad 0 \end{array}$$

$$2x^2 + 3x + 1$$

$$(2x+1)(x+1)$$

$$\boxed{f(x) = (x-3)(2x+1)(x+1)}$$

(22)

$$\begin{array}{r} 7 \overline{) 3 \quad -19 \quad -22 \quad 56} \\ \underline{ 21 \quad 14 \quad -56} \\ 3 \quad 2 \quad -8 \quad 0 \end{array}$$

$$3x^2 + 2x - 8$$

$$(3x-4)(x+2)$$

$$\boxed{f(x) = (x-7)(3x-4)(x+2)}$$

$$\begin{array}{r} 23) \quad 2 \mid 1 \quad -3 \quad 0 \quad 4 \\ \quad \quad \quad \quad \quad 2 \quad -2 \quad -4 \\ \hline \quad \quad \quad 1 \quad -1 \quad -2 \mid 0 \end{array}$$

$$x^2 - x - 2 = 0$$

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

$$x = 2, -1$$

OR

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{1 \pm \sqrt{9}}{2} = \frac{1 \pm 3}{2} = \frac{4}{2} = 2 \quad \text{or} \quad \frac{-2}{2} = -1$$

Zeros

$$\boxed{\{2, -1\}}$$

$$\begin{array}{r} 24) \quad -3 \mid 1 \quad 2 \quad -13 \quad -38 \quad -24 \\ \quad \quad \quad \quad \quad -3 \quad 3 \quad 30 \quad 24 \\ \hline -1 \mid 1 \quad -1 \quad -10 \quad -8 \mid 0 \\ \quad \quad \quad \quad \quad -1 \quad 2 \quad 8 \\ \hline \quad \quad \quad 1 \quad -2 \quad -8 \mid 0 \end{array}$$

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

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

$$x = 4, -2$$

Zeros:

$$\boxed{\{-3, -1, 4, -2\}}$$

possible rational zeros:
 $\pm 1, \pm 2, \pm 4, \pm 8$

$$(25) \pm 1, \pm 3, \pm 9$$

$$(26) \frac{\pm 1, \pm 2}{\pm 1, \pm 2} \rightarrow \pm 1, \pm 2, \pm \frac{1}{2}$$

$$(27) g(x) = x^3 - x^2 - x + 1$$

$$\begin{array}{r|rrrr} 1 & 1 & -1 & -1 & 1 \\ & & 1 & 0 & -1 \\ \hline & 1 & 0 & -1 & 0 \end{array}$$

$$x^2 - 1 = 0$$
$$(x-1)(x+1) = 0 \quad x = 1, -1$$

Zeros:

$$\{1, -1\}$$

$$(28) \begin{array}{r} -1 \\ \hline 1 \end{array} \begin{array}{r} 1 & -4 & -9 & 16 & 20 \\ & -1 & 5 & 4 & -20 \\ \hline 1 & -5 & -4 & 20 & 0 \end{array}$$

$$\begin{array}{r} 2 \\ \hline 1 \end{array} \begin{array}{r} 1 & -5 & -4 & 20 & 0 \\ & 2 & -6 & -20 & \\ \hline 1 & -3 & -10 & 0 & \end{array}$$

$$x^2 - 3x - 10$$
$$(x-5)(x+2) = 0$$
$$x = 5, -2$$

Zeros:

$$\{-1, 2, 5, -2\}$$

$$\textcircled{29} \quad \begin{array}{r|rrrr} 2 & 0 & -42 & 40 & \\ & 2 & 2 & -40 & \\ \hline & 2 & 2 & -40 & 0 \end{array}$$

$$2x^2 + 2x - 40 = 0$$

$$2(x^2 + x - 20) = 0$$

$$2(x+5)(x-4) = 0$$

$$x = -5, 4$$

Zeros:
 $\{1, -5, 4\}$

$$\textcircled{30} \quad \begin{array}{r|rrrr} \frac{1}{2} & 2 & -5 & -2 & 2 \\ & 1 & -2 & -2 & \\ \hline & 2 & -4 & -4 & 0 \end{array}$$

$$2x^2 - 4x - 4 = 0$$

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

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-2)}}{2}$$

$$x = \frac{2 \pm \sqrt{12}}{2} = \frac{2 \pm 2\sqrt{3}}{2} = 1 \pm \sqrt{3}$$

Zeros:
 $\left\{ \frac{1}{2}, 1 \pm \sqrt{3} \right\}$