

p. 621: # 1-35

$$\begin{aligned} (1) & (a^2 - 4a + 6) + (-3a^2 + 3a + 1) \\ &= a^2 - 4a + 6 - 3a^2 + 3a + 1 \\ &= \boxed{-2a^2 + 9a + 7} \end{aligned}$$

$$\begin{aligned} (2) & (5x^2 - 2) + (8x^3 + 2x^2 - x + 9) \\ &= 5x^2 - 2 + 8x^3 + 2x^2 - x + 9 \\ &= \boxed{8x^3 + 7x^2 - x + 7} \end{aligned}$$

$$\begin{aligned} (3) & (5n^2 + 7n - 1) - (4n^2 - 3n - 8) \\ &= 5n^2 + 7n - 1 - 4n^2 + 3n + 8 \\ &= \boxed{11n^2 + 10n + 7} \end{aligned}$$

$$\begin{aligned} (4) & (9c^3 - 11c^2 + 2c) - (-6c^2 - 3c + 11) \\ &= 9c^3 - 11c^2 + 2c + 6c^2 + 3c - 11 \\ &= \boxed{9c^3 - 5c^2 + 5c - 11} \end{aligned}$$

$$\begin{aligned} (5) & (2z + 9)(z - 7) \\ &= 2z^2 - 14z + 9z - 63 \\ &= \boxed{2z^2 - 5z - 63} \end{aligned}$$

$$\begin{aligned} (6) & (5m - 8)(5m - 7) \\ &= 25m^2 - 35m - 40m + 56 \\ &= \boxed{25m^2 - 75m + 56} \end{aligned}$$

$$\begin{aligned} (7) & (b + 2)(-b^2 + 4b - 3) \\ &= -b^3 + 4b^2 - 3b - 2b^2 + 8b - 6 \\ &= \boxed{-b^3 + 2b^2 + 5b - 6} \end{aligned}$$

$$\begin{aligned} (8) & (5 + 7y)(1 - 9y) \\ &= 5 - 45y + 7y - 63y^2 \\ &= \boxed{-63y^2 - 38y + 5} \end{aligned}$$

$$\begin{aligned} (9) & (2x^2 - 3x + 5)(x - 4) \\ &= 2x^3 - 3x^2 + 5x - 8x^2 + 12x - 20 \\ &= \boxed{2x^3 - 11x^2 + 17x - 20} \end{aligned}$$

$$\begin{aligned} (10) & (5p - 6)(5p + 6) \\ &= \boxed{25p^2 - 36} \end{aligned}$$

$$\begin{aligned} (11) & (12 - 3a)^2 \\ &= \boxed{9a^2 - 72a + 144} \end{aligned}$$

$$\begin{aligned} (12) & (2s + 9t)^2 \\ &= \boxed{4s^2 + 36st + 81t^2} \end{aligned}$$

$$\begin{aligned} (13) & (11a + 4b)(11a - 4b) \\ &= \boxed{121a^2 - 16b^2} \end{aligned}$$

$$\begin{aligned} (14) & x^2 + 8x + 7 \\ &= \boxed{(x + 7)(x + 1)} \end{aligned}$$

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$$\begin{aligned} (15) & 2n^2 + 11n + 15 \\ &= 2n^2 + 5n + 6n + 15 \\ &= n(2n + 5) + 3(2n + 5) \\ &= \boxed{(n + 3)(2n + 5)} \end{aligned}$$

$$\begin{aligned} (15) & 2n^2 - 11n + 15 \\ &= 2n^2 - 5n - 6n + 15 \\ &= n(2n - 5) - 3(2n - 5) \\ &= \boxed{(n - 3)(2n - 5)} \end{aligned}$$

$$\begin{aligned} (16) & -12r^2 + 5r + 3 \\ &= -1(12r^2 - 5r - 3) \\ &= -1(12r^2 - 9r + 4r - 3) \\ &= -1[3r(4r - 3) + 1(4r - 3)] \\ &= \boxed{-1(4r - 3)(3r + 1)} \end{aligned}$$

$$\begin{aligned} (17) & t^2 - 10t + 25 \\ &= \boxed{(t - 5)^2} \end{aligned}$$

$$\begin{aligned} (18) & -3n^2 + 75 \\ &= -3(n^2 - 25) \\ &= \boxed{-3(n - 5)(n + 5)} \end{aligned}$$

$$\begin{aligned}
 (19) \quad & 3x^2 + 29x - 44 \quad -132 \\
 & = 3x^2 + 33x - 4x - 44 \quad 33 \hat{=} -4 \\
 & = 3x(x+11) - 4(x+11) \\
 & = \boxed{(3x-4)(x+11)}
 \end{aligned}$$

$$\begin{aligned}
 (27) \quad & t^2 + 7t = 60 \quad -60 \\
 & t^2 + 7t - 60 = 0 \quad -60 \hat{=} -30 \\
 & (t+10)(t-3) = 0 \\
 & \boxed{t = 3, -10}
 \end{aligned}$$

$$\begin{aligned}
 (20) \quad & x^2 - 49 \\
 & = \boxed{(x-7)(x+7)}
 \end{aligned}$$

$$\begin{aligned}
 (28) \quad & 4x^2 = 22x + 42 \\
 & 4x^2 - 22x - 42 = 0 \quad 42 \\
 & 2(2x^2 - 11x - 21) = 0 \quad -14 \hat{=} 3 \\
 & 2(2x^2 - 14x + 3x - 21) = 0 \\
 & 2(2x(x-7) + 3(x-7)) = 0 \\
 & 2(2x+3)(x-7) = 0 \\
 & \boxed{x = -\frac{3}{2}, 7}
 \end{aligned}$$

$$\begin{aligned}
 (21) \quad & 2a^4 + 21a^3 + 49a^2 \\
 & = a^2(2a^2 + 21a + 49) \quad 98 \\
 & = a^2(2a^2 + 7a + 14a + 49) \quad \hat{=} 14 \\
 & = a^2(a(2a+7) + 7(2a+7)) \\
 & = \boxed{a^2(a+7)(2a+7)}
 \end{aligned}$$

$$\begin{aligned}
 (29) \quad & 56b^2 + b - 1 = 0 \quad -56 \\
 & 56b^2 + 8b - 7b - 1 = 0 \quad \hat{=} -7 \\
 & 8b(7b+1) - 1(7b+1) = 0 \\
 & (8b-1)(7b+1) = 0 \\
 & \boxed{b = \frac{1}{8}, -\frac{1}{7}}
 \end{aligned}$$

$$\begin{aligned}
 (22) \quad & y^3 + 2y^2 - 81y - 162 \\
 & = y^2(y+2) - 81(y+2) \\
 & = \boxed{(y-9)(y+9)(y+2)}
 \end{aligned}$$

$$\begin{aligned}
 (30) \quad & n^3 - 121n = 0 \\
 & n(n^2 - 121) = 0 \\
 & n(n-11)(n+11) = 0 \\
 & \boxed{n = \pm 11, 0}
 \end{aligned}$$

$$\begin{aligned}
 (23) \quad & 25a = 10a^2 \\
 & 0 = 10a^2 - 25a \\
 & 0 = 5a(2a-5) \\
 & \boxed{a = 0, \frac{5}{2}}
 \end{aligned}$$

$$\begin{aligned}
 (31) \quad & a^3 + a^2 - 64a - 64 = 0 \\
 & a^2(a+1) - 64(a+1) = 0 \\
 & (a-8)(a+8)(a+1) = 0 \\
 & \boxed{a = \pm 8, -1}
 \end{aligned}$$

$$\begin{aligned}
 (24) \quad & 21z^2 + 85z - 26 = 0 \quad -546 \\
 & \cancel{21z^2 + 7z + 78z - 26 = 0} \quad 98 \hat{=} -78 \\
 & 21z^2 - 6z + 91z - 26 = 0 \\
 & 3z(7z-2) + 13(7z-2) = 0 \\
 & (3z+13)(7z-2) = 0 \\
 & \boxed{z = -\frac{13}{3}, \frac{2}{7}}
 \end{aligned}$$

$$\begin{aligned}
 (32) \quad & (a) \quad h = -16t^2 + 4t \\
 & (b) \quad 0 = -16t^2 + 4t \\
 & 16t^2 - 4t = 0 \\
 & 0 = -4t(4t-1) \\
 & \boxed{t = \frac{1}{4}, \frac{1}{2} \text{ sec}}
 \end{aligned}$$

$$\begin{aligned}
 (25) \quad & x^2 - 22x = -121 \\
 & x^2 - 22x + 121 = 0 \\
 & (x-11)^2 = 0 \\
 & \boxed{x = 11}
 \end{aligned}$$

$$\begin{aligned}
 (26) \quad & a^2 - 11a + 24 = 0 \quad 24 \\
 & (a-8)(a-3) = 0 \quad \hat{=} 3 \\
 & \boxed{a = 8, 3}
 \end{aligned}$$

33 a. $3w^2 = 2w(w+2)$

b. $3w^2 = 2w^2 + 4w$

$w^2 - 4w = 0$

$w(w-4) = 0$

$w = \cancel{0}, 4$

12ft x 4ft
8ft x 6ft

34 $h = -16t^2 + 225$

$0 = -1(16t^2 - 225)$

$0 = (4t-15)(4t+15)$

$t = \frac{15 \text{ sec}}{4}, \cancel{\frac{15}{4}}$

35 a. $x^3 + 3x^2 - 16x + 12 = 0$

b. $0 = x^3 + 3x^2 - 16x + 12$

$0 = x^3 + 3x^2 - 16x - 48$

$0 = x^2(x+3) - 16(x+3)$

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

$x = 4, \cancel{-4}, \cancel{-3}$

10in x 2in x 3in