

2.6

- 1) $ax + bx + ay + by = x(a + b) + y(a + b) = (a + b)(x + y)$
- 2) $a + b + ax + bx = ax + a + bx + b = a(x + 1) + b(x + 1) = (x + 1)(a + b)$
- 3) $ax - by - ay + bx = ax - ay + bx - by = a(x - y) + b(x - y) = (x - y)(a + b)$
- 4) $a - bx + b - ax = a - ax + b - bx = a(1 - x) + b(1 - x) = (1 - x)(a + b)$
- 5) $ax - 4x + 4y - ay = (ax - 4x) - (ay - 4y) = x(a - 4) - y(a - 4) = (a - 4)(x - y)$
- 6) $ax + x - a - 1 = x(a + 1) - (a + 1) = (a + 1)(x - 1)$
- 7) $a^3 + a^2 + a + 1 = a^2(a + 1) + (a + 1) = (a + 1)(a^2 + 1)$
- 8) $x^3 + x - x^2 - 1 = x(x^2 + 1) - (x^2 + 1) = (x^2 + 1)(x - 1)$
- 9) $a^3 + 2a - a^2 - 2 = a(a^2 + 2) - (a^2 + 2) = (a^2 + 2)(a - 1)$
- 10) $2a^4 - 3 - 2a^3 + 3a = 2a^4 - 2a^3 + 3a - 3 = 2a^3(a - 1) + 3(a - 1) = (a - 1)(2a^3 + 3)$
- 11) $a^2x - bx + a^2y^3 - by^3 = x(a^2 - b) + y^3(a^2 - b) = (a^2 - b)(x + y^3)$
- 12) $6x^2 + xy + 18xz + 3yz = x(6x + y) + 3z(6x + y) = (6x + y)(x + 3z)$
- 13) $15y^2 - 5yz - 6y + 2z = 5y(3y - z) - 2(3y - z) = (3y - z)(5y - 2)$
- 14) $20xy + 4y - 5x - 1 = 4y(5x + 1) - (5x + 1) = (5x + 1)(4y - 1)$
- 15) $10xz - 10z - x^2 + x = 10z(x - 1) - x(x - 1) = (x - 1)(10z - x)$
- 16) $6x^2 - 5xz - 6x + 5z = 6x^2 - 6x - 5xz + 5z = 6x(x - 1) - 5z(x - 1) = (x - 1)(6x - 5z)$
- 17) $1 + x^2 + y^2 + x^2y^2 = (1 + x^2) + y^2(1 + x^2) = (1 + x^2)(1 + y^2)$
- 18) $y^3 - y - y^2 + 1 = y(y^2 - 1) - (y^2 - 1) = (y^2 - 1)(y - 1) = (y + 1)(y - 1)(y - 1) = (y + 1)(y - 1)^2$
- 19) $x^2 + xy + xz + yz = x(x + y) + z(x + y) = (x + y)(x + z)$
- 20) $x^3 + 3y^3 + 3x^2y + xy^2 = x^3 + x^2y + 3x^2y + 3y^3 + xy^2 = x(x^2 + y^2) + 3y(x^2 + y^2) = (x^2 + y^2)(x + 3y)$
- 21) $xy - zy + xu - zu - xz + z^2 = y(x - z) + u(x - z) - z(x - z) = (x - z)(y + u - z)$
- 22) $x^2 - xy + xz - x + y - z = x(x - y + z) - (x - y + z) = (x - y + z)(x - 1)$

$$\begin{aligned}
 23) \quad 1 + x + x^2 + x^3 + x^4 + x^5 &= (1 + x + x^2) + (x^3 + x^4 + x^5) = \\
 &= (1 + x + x^2) + x^3(1 + x + x^2) = (1 + x + x^2)(1 + x^3) = \\
 &= (1 + x + x^2)(1 + x)(1 - x + x^2)
 \end{aligned}$$

$$\begin{aligned}
 24) \quad 1 - x + x^2 - x^3 + x^4 - x^5 &= (1 - x + x^2) - (x^3 - x^4 + x^5) = \\
 &= (1 - x + x^2) - x^3(1 - x + x^2) = (1 - x + x^2)(1 - x^3) = \\
 &= (1 - x + x^2)(1 - x)(1 + x + x^2)
 \end{aligned}$$