

О разложении многочленов на множители:

$$\begin{aligned} \text{a) } & 2x^4 + 3x^3y + 6x^2y^2 + 3xy^3 + 2y^4 = \\ &= \underline{2x^4} + (\underline{x^3y} + \underline{2x^3y}) + (\underline{x^2y^2} + \underline{x^2y^2} + \underline{4x^2y^2}) + \\ &+ (\underline{xy^3} + \underline{2xy^3}) + \underline{2y^4} = (2x^4 + x^3y + x^2y^2) + \\ &+ (2x^3y + x^2y^2 + xy^3) + (4x^2y^2 + 2xy^3 + 2y^4) = \\ &= x^2 \cdot (2x^2 + xy + y^2) + xy \cdot (2x^2 + xy + y^2) + \\ &+ 2y^2 \cdot (2x^2 + xy + y^2) = \\ &= (2x^2 + xy + y^2) \cdot (x^2 + xy + 2y^2). \end{aligned}$$

$$\begin{aligned} \text{b) } & x^4 + 3x + 2 = \underline{x^4} + \underline{3x} + \underline{3} - \underline{1} = \\ &= (x^4 - 1) + (3x + 3) = \\ &= (x^2 + 1)(x + 1)(x - 1) + 3 \cdot (x + 1) = \\ &= (x + 1) \cdot ((x^2 + 1) \cdot (x - 1) + 3) = \\ &= (x + 1) \cdot (x^3 - x^2 + x - 1 + 3) = \\ &= (x + 1) \cdot (x^3 - x^2 + x + 2). \end{aligned}$$

$$\begin{aligned} \text{c) } & a^2 - 3ab - 4b^2 = a^2 - 3ab - (3b^2 + b^2) = \\ &= (a^2 - b^2) - (3ab + 3b^2) = \\ &= (a - b)(a + b) - 3b \cdot (a + b) = \\ &= (a + b) \cdot (a - b - 3b) = \\ &= (a + b) \cdot (a - 4b). \end{aligned}$$

$$\begin{aligned} \text{d) } & x^4 + 7x^2 + 16 = \\ &= x^4 + (8x^2 - x^2) + 16 = \\ &= (x^4 + 8x^2 + 16) - x^2 = \\ &= (x^2 + 4)^2 - x^2 = (x^2 + 4 - x) \cdot (x^2 + 4 + x) = \\ &= (x^2 - x + 4) \cdot (x^2 + x + 4). \end{aligned}$$

$$\begin{aligned} \text{e) } & x^4 + 4 = x^4 + 4x^2 - 4x^2 + 4 = \\ &= (x^4 + 4x^2 + 4) - 4x^2 = \\ &= (x^2 + 2)^2 - 4x^2 = \\ &= (x^2 + 2 + 2x) \cdot (x^2 + 2 - 2x) = \\ &= (x^2 + 2x + 2) \cdot (x^2 - 2x + 2). \end{aligned}$$
