Algebra – Resultate zu den Theorie-Aufgaben Kapitel 7

$(c+d)^5 = c^5 + 5c^4d + 10c^3d^2 + 10c^2d^3 + 5cd^4 + d^5$

$(f-g)^6 = f^6 - 6f^5g + 15f^4g^2 - 20f^3g^3 + 15f^2g^4 - 6fg^5 + g^6$

$(2u - v^2)^3 = (2u)^3 - 3(2u)^2v^2 + 3 \cdot 2u(v^2)^2 - (v^2)^3 = 8u^3 - 12u^2v^2 + 6uv^4 - v^6$

$(r+3s)^4 = r^4 + 4r^3 \cdot 3s + 6r^2(3s)^2 + 4r(3s)^3 + (3s)^4 = r^4 + 12r^3s + 54r^2s^2 + 108rs^3 + 81s^4$

$$\begin{aligned}(p^2+2q)^5 &= (p^2)^5 + 5(p^2)^4 \cdot 2q + 10(p^2)^3(2q)^2 + 10(p^2)^2(2q)^3 + 5p^2(2q)^4 + (2q)^5 \\ &= p^{10} + 10p^8q + 40p^6q^2 + 80p^4q^3 + 80p^2q^4 + 32q^5\end{aligned}$$

$$\begin{aligned}(2x^3 - 3y)^4 &= (2x^3)^4 - 4(2x^3)^3 \cdot 3y + 6(2x^3)^2(3y)^2 - 4 \cdot 2x^3(3y)^3 + (3y)^4 \\ &= 16x^{12} - 96x^9y + 216x^6y^2 - 216x^3y^3 + 81y^4\end{aligned}$$

$(3e + 2f + 11)^2 = 9e^2 + 4f^2 + 121 + 12ef + 66e + 44f$

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

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

$(3f - g)(9f^2 + 3fg + g^2) = 27f^3 - g^3$

$(5a^2 + b)(25a^4 - 5a^2b + b^2) = 5a^6 + b^3$

$(p+3q)(p^2 - 6pq + 9q^2) = p^3 - 6p^2q + 9pq^2 + 3p^2q - 18pq^2 + 27q^3 = p^3 - 3p^2q - 9pq^2 + 27q^3$

$(x+3y)(x^2 + 3xy + 9y^2) = x^3 + 3x^2y + 9xy^2 + 3x^2y + 9xy^2 + 27y^3 = x^3 + 6x^2y + 18xy^2 + 27y^3$

$8 - 27s^3 = (2 - 3s)(4 + 6s + 9s^2)$

$f^6 + 216g^3 = (f^2 + 6g)(f^4 - 6f^2g + 36g^2)$

$a^6 - b^6 = (a^3 + b^3)(a^3 - b^3) = (a+b)(a^2 - ab + b^2)(a-b)(a^2 + ab + b^2)$

$a^5b^6c - a^8b^3c^7 = a^5b^3c(b^3 - a^3c^6) = a^5b^3c(b - ac^2)(b^2 + bac^2 + a^2c^4)$