

Hier nochmals die drei binomischen Formeln:

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

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

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

(1) Wende die 1. binomische Formel an:

(a)  $(m+n)^2 = m^2 + 2mn + n^2$  (b)  $(3a+4b)^2 = 9a^2 + 24ab + 16b^2$  (c)  $(7x+15)^2 = 49x^2 + 210x + 225$   
 (d)  $(5c+6d)^2 = 25c^2 + 60cd + 36d^2$  (e)  $(15x+4y)^2 = 225x^2 + 120xy + 16y^2$  (f)  $(\frac{1}{2}x + \frac{3}{2})^2 = \frac{1}{4}x^2 + \frac{6}{4}x + \frac{9}{4}$   
 (g)  $(3x + \frac{2}{3})^2 = 9x^2 + 4x + \frac{4}{9}$  (h)  $(8b + \frac{1}{16}a)^2 = 64b^2 + ab + \frac{1}{256}a^2$  (i)  $(\frac{1}{2}x^2 + 4x)^2 = \frac{1}{4}x^4 + 4x^3 + 16x^2$

(2) Wende die 2. binomische Formel an:

(a)  $(5a-c)^2 = 25a^2 - 10ac + c^2$  (b)  $(7a-2b)^2 = 49a^2 - 28ab + 4b^2$  (c)  $(20x-25)^2 = 400x^2 - 1000x + 625$   
 (d)  $(ab-4)^2 = a^2b^2 - 8ab + 16$  (e)  $(-2-4a)^2 = 4 + 16a + 16a^2$  (f)  $(\frac{1}{4}a - \frac{1}{2}b)^2 = \frac{1}{16}a^2 - \frac{2}{8}ab + \frac{1}{4}b^2$   
 (g)  $(4x - \frac{1}{4})^2 = 16x^2 - 2x + \frac{1}{16}$  (h)  $(\frac{1}{4}u - \frac{3}{4}v)^2 = \frac{1}{16}u^2 - \frac{6}{16}uv + \frac{9}{16}v^2$  (i)  $(\frac{2}{3}x^2 - 6)^2 = \frac{4}{9}x^4 - 8x^2 + 36$

(3) Wende die 3. binomische Formel an:

(a)  $(c-d)(c+d) = c^2 - d^2$  (b)  $(3a-2b)(3a+2b) = 9a^2 - 4b^2$  (c)  $(5x+1)(5x-1) = 25x^2 - 1$   
 (d)  $(4a - \frac{1}{2})(4a + \frac{1}{2}) = 16a^2 - \frac{1}{4}$  (e)  $(a^2-b)(a^2+b) = a^4 - b^2$  (f)  $(4-x^2)(x^2+4) = 16 - x^4$   
 (g)  $(\frac{1}{2}x+3)(\frac{1}{2}x-3) = \frac{1}{4}x^2 - 9$  (h)  $(-8u-v)(-8u+v) = 64u^2 - v^2$  (i)  $(6+2x)(-6+2x) = 4x^2 - 36$

(4) Wende die geeignete binomische Formel an:

(a)  $(4a-7b)(-4a-7b) = -16a^2 + 49b^2$  (b)  $(\frac{1}{2}x-5)^2 = \frac{1}{4}x^2 - 5x + 25$   
 (c)  $(3x+4)^2 = 9x^2 + 24x + 16$  (d)  $(8x-2y)(-2y+8x) = 8x^2 - 32xy + 4y^2$

(5)

(a)  $(4a-2b)^2 - (2a+b)^2 - (2a-b)^2 = 16a^2 - 16ab + 4b^2 - 4a^2 - 4ab - b^2 - 4a^2 + 4ab - b^2 = 8a^2 - 16ab + 2b^2$  (d)  $(a+b)^2 \cdot (a+b) = (a^2+2ab+b^2) \cdot (a+b) = a^3 + a^2b + 2a^2b + 2ab^2 + ab^2 + b^3 = a^3 + 3a^2b + 3ab^2 + b^3$   
 (b)  $(2u-8v)(2u+8v) - (8v+u)(8v-u) = 4u^2 - 64v^2 - 64v^2 + u^2 = 5u^2 - 128v^2$  (e)  $(a-b)^2 \cdot (a-b) = (a^2-2ab+b^2)(a-b) = a^3 - 3a^2b + 3ab^2 + b^3$   
 (c)  $(x^2-4)^2 - (x^2+2)^2 = x^4 - 8x^2 + 16 - x^4 - 4x^2 - 4 = -12x^2 + 12$  (f)  $(a^2-b^2)(a^2+b^2) - (a^2-b^2)^2 = (a^4-b^4) - (a^4 - 2a^2b^2 + b^4) = a^4 - b^4 - a^4 + 2a^2b^2 - b^4 = 2a^2b^2 - b^4$