Arbeitsblatt: Binomische Formeln

$\boxed{1}$ Verwende die binomischen Formeln!

a) $(3m - 2n)^2$

b) $(x^2 + y^2)^2$

c) $(3x^2 + 1) \cdot (3x^2 - 1)$

d) $(1 + k^3)^2$

e) $(3x^2yz^3 - 2xy^2z)^2$

f) $(5t - 2) \cdot (2 + 5t)$

g) $\left(\frac{x}{2} - \frac{2}{5}\right)^2$

h) $(-c - d)^2$

i) $\left(2a - \frac{3}{4}\right) \cdot \left(2a + \frac{3}{4}\right)$

j) $(x^3 + 2y) \cdot (x^3 - 2y)$

k) $(k + 1) \cdot (k - 1)$

l) $(-3x - 5y)^2$

$\boxed{2}$ Vereinfache so weit wie möglich, indem du die binomischen Formeln verwendest!

a) $(x + 3)^2 - (x - 3)^2 - 12x$

b) $(3x + 5)^2 - (3 - 5x)^2$

c) $(n^2 + 2m^3)^2 - 2n \cdot (nm^3 - 3m)$

d) $(2 - 3x)^2 \cdot (4x - 1)^2$

$\boxed{3}$ Ergänze die Lücken!

a) $(5x + \underline{\quad})^2 = 25x^2 + \underline{\quad} + y^2$

b) $(2{,}5a - \underline{\quad})^2 = \underline{\quad} - 6ab + 1{,}44b^2$

c) $(7a^2 + \underline{\quad})^2 = \underline{\quad} + \underline{\quad} + 4b^6$

d) $(5x - \underline{\quad})^2 = \underline{\quad} - 30xy + \underline{\quad}$

e) $\left(\frac{x}{3} - \underline{\quad}\right)^2 = \underline{\quad} - xy + \underline{\quad}$

f) $(\underline{\quad} + \underline{\quad})^2 = a^6b^4 + \underline{\quad} + a^2b^2$

g) $\left(\frac{2}{5}x^2 - \underline{\quad}\right)^2 = \underline{\quad} + \underline{\quad} + \frac{9}{16}y^6$

h) $(7a^3 - \underline{\quad})^2 = \underline{\quad} - \underline{\quad} + 25b^8$

$\boxed{4}$ Verwende die binomischen Formeln höherer Potenzen!

a) $(2x + 3y)^3$

b) $(5n - 3k)^3$

c) $\left(z + \frac{2}{3}\right)^3$

d) $\left(\frac{3}{4}a - \frac{1}{2}b\right)^3$

e) $(t - 2)^4$

f) $(2a + 5b)^4$

$\boxed{5}$ Vereinfache so weit wie möglich, indem du die binomischen Formeln verwendest!

a) $(a + 1)^3 - (a - 1)^2$

b) $(x + 2)^3 - (3 - x)^2$

c) $(x + y)^3 - (x - y)^3 - 2y^3$

d) $(a + b)^4 - ab \cdot (a + b) \cdot (a - b)$

$\boxed{6}$ Ergänze die Lücken!

a) $(2x + \underline{\quad})^3 = \underline{\quad} + 84x^2 + \underline{\quad} + 343$

b) $(\underline{\quad} + 3x)^3 = 216 + \underline{\quad} + 162x^2 + \underline{\quad}$

c) $(2s - \underline{\quad})^3 = \underline{\quad} - 36s^2t + \underline{\quad} - \underline{\quad}$

d) $(\underline{\quad} - \underline{\quad})^4 = t^4 - \underline{\quad} + \underline{\quad} - \underline{\quad} + 256$

e) $(\underline{\quad} + 3n)^4 = \underline{\quad} + \underline{\quad} + 216k^2n^2 + \underline{\quad} + \underline{\quad}$

$\boxed{1}$ a) $9m^2 - 12mn + 4n^2$ g) $\frac{1}{4}x^2 - \frac{2}{5}x + \frac{4}{25}$

     b) $x^4 + 2x^2y^2 + y^4$ h) $c^2 + 2cd + d^2$

     c) $9x^4 - 1$ i) $4a^2 - \frac{9}{16}$

     d) $k^6 + 2k^3 + 1$ j) $x^6 - 4y^2$

     e) $9x^4y^2z^6 - 12x^3y^3z^4 + 4x^2y^4z^2$ k) $k^2 - 1$

     f) $25t^2 - 4$ l) $9x^2 + 30xy + 25y^2$

$\boxed{2}$ a) 0 c) $4m^6 + 2m^3n^2 + 6mn + n^4$

     b) $-16x^2 + 60x + 16$ d) $144x^4 - 264x^3 + 169x^2 - 44x + 4$

$\boxed{3}$ a) $(5x + \mathbf{y})^2 = 25x^2 + \mathbf{10xy} + y^2$ e) $\left(\frac{x}{3} - \frac{\mathbf{3y}}{\mathbf{2}}\right)^2 = \frac{\mathbf{x^2}}{\mathbf{9}} - xy + \frac{\mathbf{9y^2}}{\mathbf{4}}$

     b) $(2{,}5a - \mathbf{1{,}2b})^2 = \mathbf{6{,}25a^2} - 6ab + 1{,}44b^2$ f) $(\mathbf{a^3b^2} + \mathbf{ab})^2 = a^6b^4 + \mathbf{2a^4b^3} + a^2b^2$

     c) $(7a^2 + \mathbf{2b^3})^2 = \mathbf{49a^4} + \mathbf{28a^2b^3} + 4b^6$ g) $(\frac{2}{5}x^2 - \frac{3}{4}\mathbf{y^3})^2 = \frac{4}{25}\mathbf{x^4} + \frac{3}{5}\mathbf{x^2y^3} + \frac{9}{16}y^6$

     d) $(5x - \mathbf{3y})^2 = \mathbf{25x^2} - 30xy + \mathbf{9y^2}$ h) $(7a^3 - \mathbf{5b^4})^2 = \mathbf{49a^6} - \mathbf{70a^3b^4} + 25b^8$

$\boxed{4}$ a) $8x^3 + 36x^2y + 54xy^2 + 27y^3$ d) $\frac{27}{64}a^3 - \frac{27}{32}a^2b + \frac{9}{16}ab^2 - \frac{1}{8}b^3$

     b) $125n^3 - 225n^2k + 135nk^2 - 27k^3$ e) $t^4 - 8t^3 + 24t^2 - 32t + 16$

     c) $z^3 + 2z^2 + \frac{4}{3}z + \frac{8}{27}$ f) $16a^4 + 160a^3b + 600a^2b^2 + 1000ab^3 + 625b^4$

$\boxed{5}$ a) $a^3 + 2a^2 + 5a$ c) $6x^2y$

     b) $x^3 + 5x^2 + 18x - 1$ d) $a^4 + 3a^3b + 6a^2b^2 + 5ab^3 + b^4$

$\boxed{6}$ a) $(2x + \mathbf{7})^3 = \mathbf{8x^3} + 84x^2 + \mathbf{294x} + 343$

     b) $(\mathbf{6} + 3x)^3 = 216 + \mathbf{324x} + 162x^2 + \mathbf{27x^3}$

     c) $(2s - \mathbf{3t})^3 = \mathbf{8s^3} - 36s^2t + \mathbf{54st^2} - \mathbf{27t^3}$

     d) $(\mathbf{t} - 4)^4 = t^4 - \mathbf{16t^3} + \mathbf{96t^2} - \mathbf{256t} + 256$

     e) $(\mathbf{4k} + 3n)^4 = \mathbf{256k^4} + \mathbf{768k^3n} + 216k^2n^2 + \mathbf{432kn^3} + \mathbf{81n^4}$