

Pracovní list - mnohočetný
- 8. ročník

1.

$$5r \cdot 10r^2 \cdot r^6 = 50r^{1+2+6} = 50r^9$$

$$(-3s^5)^2 = (-3)^2 \cdot (s^5)^2 = 9s^{10}$$

$$-8u^4 \cdot 2u^2v = -16u^6v$$

$$12g^3h^2 \cdot 2g \cdot 3h^3 = 42g^4h^5$$

$$2a^5a^23a^3 = 6a^{10}$$

$$(-2z^7)^3 = -8z^{21}$$

$$16v^2u \cdot v \cdot 3u^3 \cdot 5v^2 = 240u^4v^5$$

$$2x^2 \cdot 5 = 10x^2$$

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

$$\left(-\frac{1}{2}z^2\right)4yz = -2yz^2$$

$$2x^2y \cdot (-3xy^2) = -6x^3y^3$$

2.

$$4a - 2x + a - 3x = 5a - 5x$$

$$-1,5mn + 2,5mn^2 - 0,5m + 3,5mn - 2,5mn^2 + 0,5m = 2mn$$

$$4(p+2) - 7(3-2p) - (8p+7) - 2p = 4p+8-21+14p-8p-7 = 10p-6$$

$$a(k-2) = ak - 2a$$

$$(x+2) \cdot 3 = 3x + 6$$

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

$$3x(2x-y+1) = 6x^2 - 3xy + 3x$$

$$2y(5y-3) = 10y^2 - 6y$$

$$6x\left(x + \frac{1}{2}\right) = 6x^2 + 3x$$

$$(-2a)(4a+b-1) = -8a^2 - 2ab + 2a$$

$$7b(4+b-c) = 28b + 7b^2 - 7bc$$

$$7a - 5(a-2) = 7a - 5a + 10 = 2a + 10$$

$$3(x+2y) - 2y = 3x + 6y - 2y = 3x + 4y$$

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

$$5(2x-y) - 4(x-2y) = 10x - 5y - 4x + 8y = 6x + 3y$$

$$a^2b(b-a) = a^2b^2 - a^3b$$

$$(x^2-2y) \cdot \frac{1}{2}x = \frac{1}{2}x^3 - xy$$

$$(-s^2)(2-s^2) = -2s^2 + s^4$$

$$(a^2 - 2ab + b^2)(-1) = -a^2 + 2ab - b^2$$

$$(-3m^2)(2m^2 - 5m + 4) = -6m^4 + 15m^3 - 12m^2$$

$$\left(\frac{2}{3}m^2 - \frac{1}{4}m + \frac{5}{6}\right)(-12m) = -8m^3 + 3m^2 - 10m$$

$$(-2k)(4k-1)(-3k) = 6k^2(4k-1) = 24k^3 - 6k^2$$

VÝSLEDKY

3.

$$(a+3)(a+2) = a^2 + 3a + 2a + 6 = a^2 + 5a + 6$$

$$(x+y)(x+y) = (x+y)^2 = x^2 + 2xy + y^2$$

$$(s-2)(s+1) = s^2 - 2s + s - 2 = s^2 - s - 2$$

$$(c-3)(3-c) = (c-3)(c-3)(-1) = -(c-3)^2 = -c^2 + 6c - 9$$

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

$$(2a-b)(a-3b) = 2a^2 - ab - 6ab + 3b^2 = 2a^2 - 7ab + 3b^2$$

$$(4p-q)(2p+3q) = 8p^2 + 12pq - 3q^2$$

$$(2x-3)(x+1) = 2x^2 - 3x + 2x - 3 = 2x^2 - x - 3$$

$$(4x-y)(2x+3y) = 8x^2 + 12xy - 2xy - 3y^2 = 8x^2 + 10xy - 3y^2$$

$$(0,4x+3)(0,4x-1) = 0,16x^2 + 1,2x - 0,4x - 3 = 0,16x^2 + 0,8x - 3$$

$$(2a-1)(4a^2-7a+1) = 8a^3 - 14a^2 + 2a - 4a^2 + 7a - 1 = 8a^3 - 18a^2 + 9a - 1$$

$$A - B = (A + B) - 2B \quad (3a)$$

$$(A + B)(A - B) = A^2 - B^2 \quad (2a)$$

Příklady - úprava algebraických výrazů - 9. roč

$$(A + B)^2 = A^2 + 2AB + B^2 \quad (1a)$$

$$A^2 + 2AB + B^2 = (A + B)^2 \quad (1b)$$

$$(A - B)^2 = A^2 - 2AB + B^2 \quad (2a)$$

$$A^2 - 2AB + B^2 = (A - B)^2 \quad (2b)$$

1. Doplň chybějící členy výrazů

1a $(5 + k)^2 = 25 + 10k + k^2$

2a $(n - 2)^2 = n^2 - 4n + 4$

2a $(4a + 3b)^2 = 16a^2 + 24ab + 9b^2$

2a $(3 + 2ac)^2 = 9 + 12ac + 4a^2c^2$

3b $(n^2 + 2)(n^2 - 2) = n^4 - 4$

3b $(ab - 4c)(ab + 4c) = a^2b^2 - 16c^2$

3b $(2xy^2 + 1)(2xy^2 - 1) = 4x^2y^4 - 1$

2. Rozlož na součin

6x^2 - 2x = 2x(3x - 1)

12ab^2 - 9a^2b = 3ab(4b - 3a)

30k - 27k^2 = 3k(10 - 9k)

4x^2y^2 + 8x^2y = 4x^2y(y + 2)

-18z^3 + 12z - 8z^3 = -2z(-9z^2 + 6 - 4z^2)

3a $k^2 - 4 = (k - 2)(k + 2)$

3a $16 - 4q^2 = (4 - 2q)(4 + 2q)$

3a $4m^2 - 36n^2 = (2m - 6n)(2m + 6n)$

3a $a^2 - 9b^2 = (a - 3b)(a + 3b)$

3a $0,04p^2 - 1 = (0,2p - 1)(0,2p + 1)$

1b $\frac{g^2}{2} + 4g + \frac{4}{2} = (\frac{g}{2} + 2)^2$

2b $\frac{z^2}{2} - 6z + \frac{36}{2} = (\frac{z}{2} - 6)^2$

2b $\frac{a^2}{6} - 12ab + \frac{36b^2}{6} = (\frac{a}{6} - 6b)^2$

1b $\frac{49x^2}{9} + 14x + \frac{49}{9} = (\frac{7x}{3} + \frac{7}{3})^2$

1b $\frac{1}{4} - 2h + \frac{h^2}{4} = (\frac{1}{2} - h)^2$

3a $m^2 - 9n^2 = (m - 3n)(m + 3n)$

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

1b $\frac{49x^2}{25} + 28x + \frac{4}{25} = (\frac{7x}{5} + 2)^2$

3a $4z^2 - 36z^2 = (2z - 6z)^2$

3a $0,01 - p^2 = (0,1 - p)(0,1 + p)$

2b $1 - 4k + 4k^2 = (1 - 2k)^2$

1b $x^2 + 5x + 6 = (x + 3)(x + 2)$ *neumíme*

2b $x^2 - 16x + 63 = (x + 7)(x + 1)$ *neumíme*

3. Vynásob

1a $(x + 5)(x + 5) = (x + 5)^2 = x^2 + 10x + 25$

- $(2a + 5)(a - 3) = 2a^2 + 5a - 6a - 15 = 2a^2 - a - 15$

2d $(2x - 1)(2x - 1) = (2x - 1)^2 = 4x^2 - 4x + 1$

3b $(p + 2q)(p - 2q) = p^2 - 4q^2$

3b $(2n + 2)(2n - 2) = 4n^2 - 4$

1a $(y + 1)(y + 1) = (y + 1)^2 = y^2 + 2y + 1$

1a $(1 + b)^2 = 1 + 2b + b^2$

2a $(x - 2)^2 = x^2 - 4x + 4$

2a $(10 - 5x)^2 = 100 - 100x + 25x^2$

3b $(p + 3q)(p - 3q) = p^2 - 9q^2$

1a $(t + 0,1)^2 = t^2 + 0,2t + 0,01$

2a $(a - 4b)^2 = a^2 - 8ab + 16b^2$

1a $(uv + 1)^2 = u^2v^2 + 2uv + 1$

2a $(v - 0,3)^2 = v^2 - 0,6v + 0,09$

3b $(r - 0,3)(r + 0,3) = r^2 - 0,09$

3b $(x - 1)(x + 1) = x^2 - 1$

3b $(y - 5z)(y + 5z) = y^2 - 25z^2$

3b $(1 - q^2)(1 + q^2) = 1 - q^4$

- $3a(2a + 6b - 1) = 3a \cdot 2a + 3a \cdot 6b - 3a \cdot 1 = 6a^2 + 18ab - 3a$

- $4a(-a - 7b + 5) = 4a \cdot (-a) + 4a \cdot (-7b) + 4a \cdot 5 = -4a^2 - 28ab + 20a$

- $(-2a)(15a + b - 2) = -2a \cdot 15a - 2a \cdot b + 2a \cdot 2 = -30a^2 - 2ab + 4a$

- $(x - 1)(2x + 3) = x^2 - 2x - 2x + 3 = x^2 - 4x + 3$

- $(2y - 3)(3y - 2) = 6y^2 - 9y - 4y + 6 = 6y^2 - 13y + 6$

- $(3m + 6)(5n - 3m) = 15mn + 30n - 9m^2 - 18m$

- $(3x + 4)(x - 7) = 3x^2 + 4x - 21x - 28 = 3x^2 - 17x - 28$

- $(\frac{1}{2}x - 3y)(2x + 4y) = \frac{1}{2}x \cdot 2x - 3y \cdot 2x + \frac{1}{2}x \cdot 4y - 3y \cdot 4y = x^2 - 6xy + 2xy - 12y^2 = x^2 - 4xy - 12y^2$

- $(8a - 12b)(\frac{1}{4}b - \frac{3}{4}a) = 8a \cdot \frac{1}{4}b - 12b \cdot \frac{3}{4}a + 8a \cdot (-\frac{3}{4}a) - 12b \cdot (-\frac{3}{4}a) = 2ab - 9ab - 6a^2 + 9ab = -6a^2 + 2ab - 9ab = -6a^2 - 7ab$

4. Rozlož na součin

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

$81 - (3x - y)^2 = (9 - (3x - y))(9 + (3x - y)) = (9 - 3x + y)(9 + 3x - y)$

zkus částečné vytýkání = $(9 - 3x + y)(9 + 3x - y)$

$(4x^2 - 4xy + y^2) - z^2 = (2x - y)^2 - z^2 = (2x - y - z)(2x - y + z)$

$x^2 - 12x + 32 = x^2 - 4x - 8x + 32 = x(x - 4) - 8(x - 4) = (x - 4)(x - 8)$

* Někdy se to vyjadřuje na zorec, ale není

* $x^2 + 5x + 6 = x^2 + 2x + 3x + 6 = x(x + 2) + 3x(x + 2) = (x + 2)(x + 3)$

částečné vytýkání