Početní operace s mnohočleny 2

1) $3a - \dfrac{2}{3}a + \dfrac{4}{7}a$

2) $-2x + \dfrac{1}{5}x - \dfrac{3}{2}x + \dfrac{3}{4}x$

3) $(5x + 3) - (2 - 8x)$

4) $\left(7a^3 - 3a^2b + 2ab^2\right) - \left(-9a^3 + 3a^2b - 6ab^2\right)$

5) $\left(8a^2 - 3ab + 2b^2\right) \cdot \left(-6ab^2\right)$

6) $2t\left(6t^2 - 5\right)$

7) $\left(x^2 - 3x\right)(2x + 5)$

8) $3n \cdot \dfrac{5}{6}n$

9) $2x\left(\dfrac{4}{5}x - \dfrac{2}{3}\right)$

10) $(x - 2)\left[3x + 6(2x - 5)\right]$

11) $(2x + 5)(4 - 3x) + (2x - 3)(4x - 9)$

12) $(3x - 4)(1 - 3x) - (3x + 5)(4x - 9)$

13) $(3x - 4)^2$

14) $(8 + 6a)^2$

15) $\left(3y^2 - 4\right)^2$

16) $(2 + 7x)(1 - 5x) + (5x - 6)^2$

17) $(1 - 5x)(3 + 2x) - (4x - 7)^2$

18) $3(-4 - 5x) - (3x + 4)^2$

19) $\left(14x^3 - 6x^2 + 3x\right) : (2x)$

20) $\left(32x^3y^2 - 10x^2y^3 + 16x^3y^4\right) : \left(-16x^2y^2\right)$

21) $\left(-3a^3b^2 - 5a^2b^3 + 2a^3b^3\right) : \left(-\dfrac{1}{3}a^2b\right)$

Řešení

1)

$$3a - \frac{2}{3}a + \frac{4}{7}a = \frac{3a}{1} - \frac{2a}{3} + \frac{4a}{7} = \frac{21 \cdot 3a - 7 \cdot 2a + 3 \cdot 4a}{21} = \frac{63a - 14a + 12a}{21} = \frac{61a}{21}$$

Jednodušší je spočítat na kalkulačce $3 - \frac{2}{3} + \frac{4}{7} = \frac{61}{21}$ a doplnit a

2)

$$-2x + \frac{1}{5}x - \frac{3}{2}x + \frac{3}{4}x = \frac{-2x}{1} + \frac{x}{5} - \frac{3x}{2} + \frac{3x}{4} = \frac{20 \cdot (-2x) + 4 \cdot x - 10 \cdot 3x + 5 \cdot 3x}{20} = \frac{-40x + 4x - 30x + 15x}{20} =$$

$$= -\frac{51x}{20}$$

Jednodušší je spočítat na kalkulačce $-2 + \frac{1}{5} - \frac{3}{2} + \frac{3}{4} = -\frac{51}{20}$ a doplnit x

3)

$$(5x + 3) - (2 - 8x) = 5x + 3 - 2 + 8x = 13x + 1$$

4)

$$(7a^3 - 3a^2b + 2ab^2) - (-9a^3 + 3a^2b - 6ab^2) = 7a^3 - 3a^2b + 2ab^2 + 9a^3 - 3a^2b + 6ab^2 = 16a^3 - 6a^2b + 8ab^2$$

5)

$$(8a^2 - 3ab + 2b^2) \cdot (-6ab^2) = -48a^3b^2 + 18a^2b^3 - 12ab^4$$

6)

$$2t(6t^2 - 5) = 12t^3 - 10t$$

7)

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

8)

$$3n \cdot \frac{5}{6}n = \frac{3n}{1} \cdot \frac{5n}{6} = \frac{15n^2}{6} = \frac{5n^2}{2}$$

9)

$$2x\left(\frac{4}{5}x - \frac{2}{3}\right) = \frac{8x^2}{5} - \frac{4x}{3}$$

10)

$$(x - 2)\left[3x + 6(2x - 5)\right] = (x - 2)[3x + 12x - 30] = (x - 2)[15x - 30] = 15x^2 - 30x - 30x + 60 =$$

$$= 15x^2 - 60x + 60$$

11)

$$(2x + 5)(4 - 3x) + (2x - 3)(4x - 9) = 8x - 6x^2 + 20 - 15x + 8x^2 - 18x - 12x + 27 = 2x^2 - 37x + 47$$

12)

$$(3x - 4)(1 - 3x) - (3x + 5)(4x - 9) = 3x - 9x^2 - 4 + 12x - (12x^2 - 27x + 20x - 45) =$$

$$= 3x - 9x^2 - 4 + 12x - 12x^2 + 27x - 20x + 45 = -21x^2 + 22x + 41$$

13)

$$(3x - 4)^2 = (3x)^2 - 2 \cdot 3x \cdot 4 + 4^2 = 9x^2 - 24x + 16$$

14)

$$(8 + 6a)^2 = 8^2 + 2 \cdot 8 \cdot 6a + (6a)^2 = 64 + 96a + 36a^2$$

15)

$$(3y^2 - 4)^2 = 9y^4 - 24y^2 + 16$$

16)

$$(2+7x)(1-5x)+(5x-6)^2 = 2-10x+7x-35x^2+25x^2-60x+36 = -10x^2-63x+38$$

17)

$$(1-5x)(3+2x)-(4x-7)^2 = 3+2x-15x-10x^2-\left(16x^2-56x+49\right) = 3-13x-10x^2-16x^2+56x-49 =$$

$$= -26x^2+43x-46$$

18)

$$3(-4-5x)-(3x+4)^2 = -12-15x-\left(9x^2+24x+16\right) = -12-15x-9x^2-24x-16 = -9x^2-39x-28$$

19)

$$\left(14x^3-6x^2+3x\right):(2x) = \frac{14x^3}{2x}-\frac{6x^2}{2x}+\frac{3x}{2x} = 7x^2-3x+\frac{3}{2}$$

20)

$$\left(32x^3y^2-10x^2y^3+16x^3y^4\right):\left(-16x^2y^2\right) = \frac{32x^3y^2}{-16x^2y^2}-\frac{10x^2y^3}{-16x^2y^2}+\frac{16x^3y^4}{-16x^2y^2} = -2x+\frac{5}{8}y-xy^2$$

21)

$$\left(-3a^3b^2-5a^2b^3+2a^3b^3\right):\left(-\frac{1}{3}a^2b\right) = \frac{-3a^3b^2}{-\frac{1}{3}a^2b}-\frac{5a^2b^3}{-\frac{1}{3}a^2b}+\frac{2a^3b^3}{-\frac{1}{3}a^2b} = 9ab+15b^2-6ab^2$$