Početní operace s mnohočleny

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

2) $5x+\frac{3}{4}x-\frac{4}{7}x$

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

4) $-5x^2+\frac{2}{5}x-\frac{3}{7}x^2-4x$

5) $\left(4x^3-5x^2+6\right)+\left(10x^3-12x^2+4x\right)$

6) $\left(4x^3-5x^2+6\right)-\left(10x^3-12x^2+4x\right)$

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

8) $\left(-2x\right)\cdot\left(-8x^2+5x-4\right)$

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

10) $3x\left(5-9x\right)-4\left(2x-3\right)$

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

12) $3n\cdot\frac{5}{6}n$

13) $2x\left(\frac{4}{5}x-\frac{2}{3}\right)$

14) $\left(-5a\right)\left(\frac{3}{2}a-\frac{3}{4}\right)$

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

16) $-5+2a\left[\left(4-3a\right)\left(-2a\right)-5\right]=$

17) $\left(2x+5\right)\left(4-3x\right)+\left(2x-3\right)\left(4x-9\right)$

18) $\left(3x-4\right)\left(1-3x\right)-\left(3x+5\right)\left(4x-9\right)$

19) $\left(-8a+7\right)\left(4b-5\right)-\left(6a-1\right)\left(-2b+9\right)-\left(-14a+26b\right)=$

20) $\left(3x-4\right)^2$

21) $\left(8+6a\right)^2$

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

23) $\left(2+7x\right)\left(1-5x\right)+\left(5x-6\right)^2$

24) $2\left(5-4x\right)+\left(2x+9\right)^2$

25) $\left(1-5x\right)\left(3+2x\right)-\left(4x-7\right)^2$

26) $3\left(-4-5x\right)-\left(3x+4\right)^2$

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

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

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

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)

$$5x+\frac{3}{4}x-\frac{4}{7}x=\frac{145}{28}x$$

3)

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

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

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

4)

$$-5x^2+\frac{2}{5}x-\frac{3}{7}x^2-4x=-\frac{38}{7}x^2-\frac{18}{5}x$$

5)

$$\left(4x^3-5x^2+6\right)+\left(10x^3-12x^2+4x\right)=4x^3-5x^2+6+10x^3-12x^2+4x=$$

$$=14x^3-17x^2+4x+6$$

6)

$$\left(4x^3-5x^2+6\right)-\left(10x^3-12x^2+4x\right)=4x^3-5x^2+6-10x^3+12x^2-4x=$$

$$=-6x^3+7x^2-4x+6$$

7)

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

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

8)

$$(-2x)\cdot\left(-8x^2+5x-4\right)=16x^3-10x^2+8x$$

9)

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

10)

$$3x(5-9x)-4(2x-3)=15x-27x^2-8x+12=-27x^2+7x+12$$

11)

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

12)

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

13)

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

14)

$$(-5a)\left(\frac{3}{2}a-\frac{3}{4}\right)=-\frac{15a^2}{2}+\frac{15a}{4}$$

15)

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

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

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

16)

$$-5+2a\left[(4-3a)(-2a)-5\right]=-5+2a\left[-8a+6a^2-5\right]=$$

$$-5-16a^2+12a^3-10a$$

17)

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

$$=2x^2-37x+47$$

18)

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

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

19)

$$(-8a+7)(4b-5)-(6a-1)(-2b+9)-(-14a+26b)=$$

$$-32ab+40a+28b-35-\left(-12ab+54a+2b-9\right)+14a-26b=$$

$$=-32ab+40a+28b-35+12ab-54a-2b+9+14a-26b=-20ab-26$$

20)

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

21)

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

22)

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

23)

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

24)

$$2(5-4x)+(2x+9)^2=10-8x+4x^2+36x+81=4x^2+28x+91$$

25)

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

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

26)

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

$$=-12-15x-9x^2-24x-16=-9x^2-39x-28$$

27)

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

28)

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

29)

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