

1. Kombinatorika

1.1. Faktoriál – výrazy a rovnice

1.A) 210; B) 990; C) 29260; D) $1/5$; E) $1/240$; F) 157; G) $81/712$; H) $1/100$; I) $3,98 \cdot 10^{11}$; J) 86296950; K) 65824; L) 195878760; 2. A) x^3+3x^2+2x ; $x \in \mathbb{Z}$, $x \geq 1$; B) $1/(y^3-6y^2+11y-6)$; $y \in \mathbb{Z}$, $y \geq 4$; C) $(a^2-1)/(a^2-3a+2)$; $a \in \mathbb{Z}$, $a \geq 3$; D) $(k+3)/(k-2)$; $k \in \mathbb{Z}$, $k \geq 2$; E) $n/(n+2)$; $n \in \mathbb{Z}$, $n \geq 1$; F) $x/(x+1)!$; $x \in \mathbb{Z}$, $x \geq 0$; G) $(a+2)/(a+1)!$; $a \in \mathbb{Z}$, $a \geq 0$; H) 1; $n \in \mathbb{Z}$, $n \geq 0$; I) 1; $c \in \mathbb{Z}$, $c \geq 1$; J) 1; $v \in \mathbb{Z}$, $v \geq 2$; K) $(a^2+4a+6)/(a(a+1)(a+2)(a+3))$; $a \in \mathbb{Z}$, $a \geq 1$; L) 2; $e \in \mathbb{Z}$, $e \geq 2$; M) $1/((n+3)(n+1))$; $n \in \mathbb{Z}$, $n \geq 0$; N) k^3-4k^2+4k ; $k \in \mathbb{Z}$, $k \geq 2$; O) $3y^3-y^2+3y-4$; $y \in \mathbb{Z}$, $y \geq 3$; P) $(n^2+2n)/(n+1)!$; $n \in \mathbb{Z}$, $n \geq 1$; Q) $(1-m^2)/m!$; $m \in \mathbb{Z}$, $m \geq 2$; R) $1/(o+2)!$; $o \in \mathbb{Z}$, $o \geq -1$; S) $(1-x-2x^2-x^3)/(x(x+1)!)!$; $x \in \mathbb{Z}$, $x \geq 1$; T) 0; $r \in \mathbb{Z}$, $r \geq 0$; U) $2/(s+1)!$; $s \in \mathbb{Z}$, $s \geq -1$; V) $n/(n+1)!$; $n \in \mathbb{Z}$, $n \geq 1$; W) y ; $y \in \mathbb{Z}$, $y \geq 1$; 3. A) 12; B) 2; C) 2; D) 3; E) 4; F) 1; G) 4; H) 4; I) 21; J) 1; K) 3; L) 7; M) 5, 6; N) 4; O) 5.

Oprava:

příklad 3. I)

$$\frac{(x+11)!}{(x+9)!} = -x^2 + 64x + 89$$

příklad 3. M)

$$\frac{2(x-5)! + (x-3)!}{(x-4)!} = 4$$

1.2. Kombinační čísla – výrazy a rovnice

1.A) 66; B) nelze; C) 7315; D) 300; E) 40992; F) 4960; G) 1; H) 16215; I) 6864; J) 310; K) 4275289200; L) 715; 2. A) $(x^2+x)/x$; $x \in \mathbb{Z}$, $x \geq 1$; B) $(x^2+5x+6)/2$; $x \in \mathbb{Z}$, $x \geq -1$; C) x ; $x \in \mathbb{Z}$, $x \geq 1$; D) $(x^3-3x^2+2x)/6$; $x \in \mathbb{Z}$, $x \geq 3$; E) $(x^2-3x+2)/2$; $x \in \mathbb{Z}$, $x \geq 3$; F) $(x^4+74x^3+2051x^2+25195x+30)/24$; $x \in \mathbb{Z}$, $x \geq -16$; G) $x^2+9x+21$; $x \in \mathbb{Z}$, $x \geq -2$; H) $(-x^3+6x^2+4x+276)/6$; $x \in \mathbb{Z}$, $x \geq 6$; I) $(x^2+19x+40)/2$; $x \in \mathbb{Z}$, $x \geq 0$; J) $(-4x^3+33x^2-29x)/6$; $x \in \mathbb{Z}$, $x \geq 2$; K) $(3x^2+7x+60)/2$; $x \in \mathbb{Z}$, $x \geq 0$; L) $x^2+9x+32$; $x \in \mathbb{Z}$, $x \geq -3$; 3. A) 5; B) 4; C) 7; D) 2; E) {}; F) 9; G) 3; H) 5; I) {}; J) 5; K) 6; L) 2; M) 2; N) $x \in \mathbb{Z}$, $x \geq 4$; O) 4.

1.3. Permutace

1. 120; 2. 720; 3. 24; 4. 5040; 5. 40320; 6. 720; 7. 39916800; 8. 120; 9. 6; 10. 6227020800; 11. 34650; 12. 15200; 13. 10.

1.4. Variace

1. 120; 2. 2520; 3. 28; 4. 504; 5. 1716; 6. 665280; 332640; 55440; 7. 5040; 8. 336; 9. 60; 36; 10. 120; 20; 11. 60; 48; 12. 8; 13. 2730; 14. 4096; 15. 26^6 ; 52^6 ; $52^6 \cdot 10^2$; 16. 14406; 17. 254.

1.5. Kombinace

1. 2600; 2. 27405; 3. 378; 4. 1140; 5. 28; 6. 84; 7. 324632; 8. A) 792; B) 2277; C) 1485; D) 2211; 9. 231; 10. 4; 11. 6; 12. 15015; 13. 1380; 14. 594; 15. 616; 16. 12; 17. 7; 18. 3003; 19. $3,2 \cdot 10^{12}$.

1.6. Směs slovních úloh

1. 210; 2. 120; 3. 6840; 1140; 4. 20; 120; 5. 60; 6. záleží 8; zdvojnásobí se; 7. 10; 8. 11; 9. 7; 10. 52; 11. 8; 12. 64; 13. 4; 14. 10; 15. 462; 5005; 16. 216, 2142, 141; 17. 60; 18. A) 21; B) 19; C) 12; 19. A) 36; B) 216; 20. A) 90000; B) 27216; 21. 90; 22. A) 720; B) 240; C) 240; D) 96; 23. 1728; 362880; 24. 850668; 6660; 25. 40320; 26. 6; 27. A) 231; B) 126; 28. 31744; 29. 6; 30. A) 20; B) 343; C) 90; D) 147; 31. 32; 32) 3387.

1.7. Binomická věta

1.A) $16x^4+192x^3+864x^2+1728x+1296$; B) $243x^{15}-2025x^{13}+6750x^{11}-11250x^9+9375x^7-3125x^5$; C) $256/x^8+224/x^5+1792/x^2+1792x+1120x^4+448x^7+112x^{10}+16x^{13}+x^{16}$; D) $625x^8-3000x^9+5400x^{10}-4320x^{11}+1296x^{12}$; E) $128/2187x^7+896/243x^8+896/9x^9+4480/3x^{10}+13440x^{11}+72576x^{12}+217726x^{13}+279936x^{14}$; F) $x^2+4x\sqrt{x+6}+4\sqrt{x+1}$; G) $128x^{21}-112x^{17}+42x^{13}-35/4x^9+35/32x^5-21/64x+7/2048x^{-3}-1/16384x^{-7}$; H) $32\sqrt{x}/x^3+40+20x^2\sqrt{x+5}x^5+5/8x^7\sqrt{x+10}/32$; I) $256a^8b^4-512a^7b^5+384a^6b^6-128a^5b^7+16a^4b^8$; J) $243a^{15}b^{10}+810a^{14}b^8+1080a^{13}b^6+720a^{12}b^4+240a^{11}b^2+32a^{10}$; K) $15625a^{12}b^{12}c^6-18750a^{10}b^{10}c^5+9375a^8b^8c^4-2500a^6b^6c^3+375a^4b^4c^2-30a^2b^2c+1$; L) $32/x^{15}+x^{10}/1024+20/x^{10}+(5x^5)/128+5/x^5+5/8$; M) $5/(16x^{3/2})+24/x^{5/2}+64/x^3+15/(4x^2)+3/(8192\sqrt{x})+3/(8192x^2)+3/(8192x^3)+3/(8192x^4)+3/(8192x^5)+3/(8192x^6)+3/(8192x^7)+3/(8192x^8)+3/(8192x^9)+3/(8192x^{10})+3/(8192x^{11})+3/(8192x^{12})+3/(8192x^{13})+3/(8192x^{14})+3/(8192x^{15})+3/(8192x^{16})+3/(8192x^{17})+3/(8192x^{18})+3/(8192x^{19})+3/(8192x^{20})+3/(8192x^{21})+3/(8192x^{22})+3/(8192x^{23})+3/(8192x^{24})+3/(8192x^{25})+3/(8192x^{26})+3/(8192x^{27})+3/(8192x^{28})+3/(8192x^{29})+3/(8192x^{30})+3/(8192x^{31})+3/(8192x^{32})+3/(8192x^{33})+3/(8192x^{34})+3/(8192x^{35})+3/(8192x^{36})+3/(8192x^{37})+3/(8192x^{38})+3/(8192x^{39})+3/(8192x^{40})+3/(8192x^{41})+3/(8192x^{42})+3/(8192x^{43})+3/(8192x^{44})+3/(8192x^{45})+3/(8192x^{46})+3/(8192x^{47})+3/(8192x^{48})+3/(8192x^{49})+3/(8192x^{50})+3/(8192x^{51})+3/(8192x^{52})+3/(8192x^{53})+3/(8192x^{54})+3/(8192x^{55})+3/(8192x^{56})+3/(8192x^{57})+3/(8192x^{58})+3/(8192x^{59})+3/(8192x^{60})+3/(8192x^{61})+3/(8192x^{62})+3/(8192x^{63})+3/(8192x^{64})+3/(8192x^{65})+3/(8192x^{66})+3/(8192x^{67})+3/(8192x^{68})+3/(8192x^{69})+3/(8192x^{70})+3/(8192x^{71})+3/(8192x^{72})+3/(8192x^{73})+3/(8192x^{74})+3/(8192x^{75})+3/(8192x^{76})+3/(8192x^{77})+3/(8192x^{78})+3/(8192x^{79})+3/(8192x^{80})+3/(8192x^{81})+3/(8192x^{82})+3/(8192x^{83})+3/(8192x^{84})+3/(8192x^{85})+3/(8192x^{86})+3/(8192x^{87})+3/(8192x^{88})+3/(8192x^{89})+3/(8192x^{90})+3/(8192x^{91})+3/(8192x^{92})+3/(8192x^{93})+3/(8192x^{94})+3/(8192x^{95})+3/(8192x^{96})+3/(8192x^{97})+3/(8192x^{98})+3/(8192x^{99})+3/(8192x^{100})+3/(8192x^{101})+3/(8192x^{102})+3/(8192x^{103})+3/(8192x^{104})+3/(8192x^{105})+3/(8192x^{106})+3/(8192x^{107})+3/(8192x^{108})+3/(8192x^{109})+3/(8192x^{110})+3/(8192x^{111})+3/(8192x^{112})+3/(8192x^{113})+3/(8192x^{114})+3/(8192x^{115})+3/(8192x^{116})+3/(8192x^{117})+3/(8192x^{118})+3/(8192x^{119})+3/(8192x^{120})+3/(8192x^{121})+3/(8192x^{122})+3/(8192x^{123})+3/(8192x^{124})+3/(8192x^{125})+3/(8192x^{126})+3/(8192x^{127})+3/(8192x^{128})+3/(8192x^{129})+3/(8192x^{130})+3/(8192x^{131})+3/(8192x^{132})+3/(8192x^{133})+3/(8192x^{134})+3/(8192x^{135})+3/(8192x^{136})+3/(8192x^{137})+3/(8192x^{138})+3/(8192x^{139})+3/(8192x^{140})+3/(8192x^{141})+3/(8192x^{142})+3/(8192x^{143})+3/(8192x^{144})+3/(8192x^{145})+3/(8192x^{146})+3/(8192x^{147})+3/(8192x^{148})+3/(8192x^{149})+3/(8192x^{150})+3/(8192x^{151})+3/(8192x^{152})+3/(8192x^{153})+3/(8192x^{154})+3/(8192x^{155})+3/(8192x^{156})+3/(8192x^{157})+3/(8192x^{158})+3/(8192x^{159})+3/(8192x^{160})+3/(8192x^{161})+3/(8192x^{162})+3/(8192x^{163})+3/(8192x^{164})+3/(8192x^{165})+3/(8192x^{166})+3/(8192x^{167})+3/(8192x^{168})+3/(8192x^{169})+3/(8192x^{170})+3/(8192x^{171})+3/(8192x^{172})+3/(8192x^{173})+3/(8192x^{174})+3/(8192x^{175})+3/(8192x^{176})+3/(8192x^{177})+3/(8192x^{178})+3/(8192x^{179})+3/(8192x^{180})+3/(8192x^{181})+3/(8192x^{182})+3/(8192x^{183})+3/(8192x^{184})+3/(8192x^{185})+3/(8192x^{186})+3/(8192x^{187})+3/(8192x^{188})+3/(8192x^{189})+3/(8192x^{190})+3/(8192x^{191})+3/(8192x^{192})+3/(8192x^{193})+3/(8192x^{194})+3/(8192x^{195})+3/(8192x^{196})+3/(8192x^{197})+3/(8192x^{198})+3/(8192x^{199})+3/(8192x^{200})+3/(8192x^{201})+3/(8192x^{202})+3/(8192x^{203})+3/(8192x^{204})+3/(8192x^{205})+3/(8192x^{206})+3/(8192x^{207})+3/(8192x^{208})+3/(8192x^{209})+3/(8192x^{210})+3/(8192x^{211})+3/(8192x^{212})+3/(8192x^{213})+3/(8192x^{214})+3/(8192x^{215})+3/(8192x^{216})+3/(8192x^{217})+3/(8192x^{218})+3/(8192x^{219})+3/(8192x^{220})+3/(8192x^{221})+3/(8192x^{222})+3/(8192x^{223})+3/(8192x^{224})+3/(8192x^{225})+3/(8192x^{226})+3/(8192x^{227})+3/(8192x^{228})+3/(8192x^{229})+3/(8192x^{230})+3/(8192x^{231})+3/(8192x^{232})+3/(8192x^{233})+3/(8192x^{234})+3/(8192x^{235})+3/(8192x^{236})+3/(8192x^{237})+3/(8192x^{238})+3/(8192x^{239})+3/(8192x^{240})+3/(8192x^{241})+3/(8192x^{242})+3/(8192x^{243})+3/(8192x^{244})+3/(8192x^{245})+3/(8192x^{246})+3/(8192x^{247})+3/(8192x^{248})+3/(8192x^{249})+3/(8192x^{250})+3/(8192x^{251})+3/(8192x^{252})+3/(8192x^{253})+3/(8192x^{254})+3/(8192x^{255})+3/(8192x^{256})+3/(8192x^{257})+3/(8192x^{258})+3/(8192x^{259})+3/(8192x^{260})+3/(8192x^{261})+3/(8192x^{262})+3/(8192x^{263})+3/(8192x^{264})+3/(8192x^{265})+3/(8192x^{266})+3/(8192x^{267})+3/(8192x^{268})+3/(8192x^{269})+3/(8192x^{270})+3/(8192x^{271})+3/(8192x^{272})+3/(8192x^{273})+3/(8192x^{274})+3/(8192x^{275})+3/(8192x^{276})+3/(8192x^{277})+3/(8192x^{278})+3/(8192x^{279})+3/(8192x^{280})+3/(8192x^{281})+3/(8192x^{282})+3/(8192x^{283})+3/(8192x^{284})+3/(8192x^{285})+3/(8192x^{286})+3/(8192x^{287})+3/(8192x^{288})+3/(8192x^{289})+3/(8192x^{290})+3/(8192x^{291})+3/(8192x^{292})+3/(8192x^{293})+3/(8192x^{294})+3/(8192x^{295})+3/(8192x^{296})+3/(8192x^{297})+3/(8192x^{298})+3/(8192x^{299})+3/(8192x^{300})+3/(8192x^{301})+3/(8192x^{302})+3/(8192x^{303})+3/(8192x^{304})+3/(8192x^{305})+3/(8192x^{306})+3/(8192x^{307})+3/(8192x^{308})+3/(8192x^{309})+3/(8192x^{310})+3/(8192x^{311})+3/(8192x^{312})+3/(8192x^{313})+3/(8192x^{314})+3/(8192x^{315})+3/(8192x^{316})+3/(8192x^{317})+3/(8192x^{318})+3/(8192x^{319})+3/(8192x^{320})+3/(8192x^{321})+3/(8192x^{322})+3/(8192x^{323})+3/(8192x^{324})+3/(8192x^{325})+3/(8192x^{326})+3/(8192x^{327})+3/(8192x^{328})+3/(8192x^{329})+3/(8192x^{330})+3/(8192x^{331})+3/(8192x^{332})+3/(8192x^{333})+3/(8192x^{334})+3/(8192x^{335})+3/(8192x^{336})+3/(8192x^{337})+3/(8192x^{338})+3/(8192x^{339})+3/(8192x^{340})+3/(8192x^{341})+3/(8192x^{342})+3/(8192x^{343})+3/(8192x^{344})+3/(8192x^{345})+3/(8192x^{346})+3/(8192x^{347})+3/(8192x^{348})+3/(8192x^{349})+3/(8192x^{350})+3/(8192x^{351})+3/(8192x^{352})+3/(8192x^{353})+3/(8192x^{354})+3/(8192x^{355})+3/(8192x^{356})+3/(8192x^{357})+3/(8192x^{358})+3/(8192x^{359})+3/(8192x^{360})+3/(8192x^{361})+3/(8192x^{362})+3/(8192x^{363})+3/(8192x^{364})+3/(8192x^{365})+3/(8192x^{366})+3/(8192x^{367})+3/(8192x^{368})+3/(8192x^{369})+3/(8192x^{370})+3/(8192x^{371})+3/(8192x^{372})+3/(8192x^{373})+3/(8192x^{374})+3/(8192x^{375})+3/(8192x^{376})+3/(8192x^{377})+3/(8192x^{378})+3/(8192x^{379})+3/(8192x^{380})+3/(8192x^{381})+3/(8192x^{382})+3/(8192x^{383})+3/(8192x^{384})+3/(8192x^{385})+3/(8192x^{386})+3/(8192x^{387})+3/(8192x^{388})+3/(8192x^{389})+3/(8192x^{390})+3/(8192x^{391})+3/(8192x^{392})+3/(8192x^{393})+3/(8192x^{394})+3/(8192x^{395})+3/(8192x^{396})+3/(8192x^{397})+3/(8192x^{398})+3/(8192x^{399})+3/(8192x^{400})+3/(8192x^{401})+3/(8192x^{402})+3/(8192x^{403})+3/(8192x^{404})+3/(8192x^{405})+3/(8192x^{406})+3/(8192x^{407})+3/(8192x^{408})+3/(8192x^{409})+3/(8192x^{410})+3/(8192x^{411})+3/(8192x^{412})+3/(8192x^{413})+3/(8192x^{414})+3/(8192x^{415})+3/(8192x^{416})+3/(8192x^{417})+3/(8192x^{418})+3/(8192x^{419})+3/(8192x^{420})+3/(8192x^{421})+3/(8192x^{422})+3/(8192x^{423})+3/(8192x^{424})+3/(8192x^{425})+3/(8192x^{426})+3/(8192x^{427})+3/(8192x^{428})+3/(8192x^{429})+3/(8192x^{430})+3/(8192x^{431})+3/(8192x^{432})+3/(8192x^{433})+3/(8192x^{434})+3/(8192x^{435})+3/(8192x^{436})+3/(8192x^{437})+3/(8192x^{438})+3/(8192x^{439})+3/(8192x^{440})+3/(8192x^{441})+3/(8192x^{442})+3/(8192x^{443})+3/(8192x^{444})+3/(8192x^{445})+3/(8192x^{446})+3/(8192x^{447})+3/(8192x^{448})+3/(8192x^{449})+3/(8192x^{450})+3/(8192x^{451})+3/(8192x^{452})+3/(8192x^{453})+3/(8192x^{454})+3/(8192x^{455})+3/(8192x^{456})+3/(8192x^{457})+3/(8192x^{458})+3/(8192x^{459})+3/(8192x^{460})+3/(8192x^{461})+3/(8192x^{462})+3/(8192x^{463})+3/(8192x^{464})+3/(8192x^{465})+3/(8192x^{466})+3/(8192x^{467})+3/(8192x^{468})+3/(8192x^{469})+3/(8192x^{470})+3/(8192x^{471})+3/(8192x^{472})+3/(8192x^{473})+3/(8192x^{474})+3/(8192x^{475})+3/(8192x^{476})+3/(8192x^{477})+3/(8192x^{478})+3/(8192x^{479})+3/(8192x^{480})+3/(8192x^{481})+3/(8192x^{482})+3/(8192x^{483})+3/(8192x^{484})+3/(8192x^{485})+3/(8192x^{486})+3/(8192x^{487})+3/(8192x^{488})+3/(8192x^{489})+3/(8192x^{490})+3/(8192x^{491})+3/(8192x^{492})+3/(8192x^{493})+3/(8192x^{494})+3/(8192x^{495})+3/(8192x^{496})+3/(8192x^{497})+3/(8192x^{498})+3/(8192x^{499})+3/(8192x^{500})+3/(8192x^{501})+3/(8192x^{502})+3/(8192x^{503})+3/(8192x^{504})+3/(8192x^{505})+3/(8192x^{506})+3/(8192x^{507})+3/(8192x^{508})+3/(8192x^{509})+3/(8192x^{510})+3/(8192x^{511})+3/(8192x^{512})+3/(8192x^{513})+3/(8192x^{514})+3/(8192x^{515})+3/(8192x^{516})+3/(8192x^{517})+3/(8192x^{518})+3/(8192x^{519})+3/(8192x^{520})+3/(8192x^{521})+3/(8192x^{522})+3/(8192x^{523})+3/(8192x^{524})+3/(8192x^{525})+3/(8192x^{526})+3/(8192x^{527})+3/(8192x^{528})+3/(8192x^{529})+3/(8192x^{530})+3/(8192x^{531})+3/(8192x^{532})+3/(8192x^{533})+3/(8192x^{534})+3/(8192x^{535})+3/(8192x^{536})+3/(8192x^{537})+3/(8192x^{538})+3/(8192x^{539})+3/(8192x^{540})+3/(8192x^{541})+3/(8192x^{542})+3/(8192x^{543})+3/(8192x^{544})+3/(8192x^{545})+3/(8192x^{546})+3/(8192x^{547})+3/(8192x^{548})+3/(8192x^{549})+3/(8192x^{550})+3/(8192x^{551})+3/(8192x^{552})+3/(8192x^{553})+3/(8192x^{554})+3/(8192x^{555})+3/(8192x^{556})+3/(8192x^{557})+3/(8192x^{558})+3/(8192x^{559})+3/(8192x^{560})+3/(8192x^{561})+3/(8192x^{562})+3/(8192x^{563})+3/(8192x^{564})+3/(8192x^{565})+3/(8192x^{566})+3/(8192x^{567})+3/(8192x^{568})+3/(8192x^{569})+3/(8192x^{570})+3/(8192x^{571})+3/(8192x^{572})+3/(8192x^{573})+3/(8192x^{574})+3/(8192x^{575})+3/(8192x^{576})+3/(8192x^{577})+3/(8192x^{578})+3/(8192x^{579})+3/(8192x^{580})+3/(8192x^{581})+3/(8192x^{582})+3/(8192x^{583})+3/(8192x^{584})+3/(8192x^{585})+3/(8192x^{586})+3/(8192x^{587})+3/(8192x^{588})+3/(8192x^{589})+3/(8192x^{590})+3/(8192x^{591})+3/(8192x^{592})+3/(8192x^{593})+3/(8192x^{594})+3/(8192x^{595})+3/(8192x^{596})+3/(8192x^{597})+3/(8192x^{598})+3/(8192x^{599})+3/(8192x^{600})+3/(8192x^{601})+3/(8192x^{602})+3/(8192x^{603})+3/(8192x^{604})+3/(8192x^{605})+3/(8192x^{606})+3/(8192x^{607})+3/(8192x^{608})+3/(8192x^{609})+3/(8192x^{610})+3/(8192x^{611})+3/(8192x^{612})+3/(8192x^{613})+3/(8192x^{614})+3/(8192x^{615})+3/(8192x^{616})+3/(8192x^{617})+3/(8192x^{618})+3/(8192x^{619})+3/(8192x^{620})+3/(8192x^{621})+3/(8192x^{622})+3/(8192x^{623})+3/(8192x^{624})$

$15/(1024x) + 1/262144$; **N)** $1/x^{28} + 7/(2x^{22}) + 21/(4x^{16}) + x^{14}/128 + 35/(8x^{10}) + (7x^8)/64 + 35/(16x^4) + (21x^2)/32$; **O)** $a^{16}b^8 + 8a^{13}b^6 + 28a^{10}b^4 + 1/(a^8b^8) + 56a^7b^2 + 8/(a^5b^6) + 70a^4 + 28/(a^2b^4) + (56a)/b^2$; **P)** -64; **Q)** -316-12i; **R)** 42471 - 54280i; **S)** 575357587456/390625 - (67816390656i)/78125; **T)** i; **U)** $x^3/64 + 64/x^3 + (3x^2)/8 + 96/x^2 + (15x)/4 + 60/x + 20$; **V)** $-10x^{19/2} - 120x^{17/2} - 252x^{15/2} - 120x^{13/2} - 10x^{11/2} + x^{10} + 45x^9 + 210x^8 + 210x^7 + 45x^6 + x^5$; **W)** $28x^{14/3} - 56x^{11/3} + x^{8/3} + 28x^{10/3} - 8x^3 + x^{16/3} - 8x^5 - 56x^{13/3} + 70x^4$; **2. A)** $-4,8114 \cdot 10^{11} \cdot x^{22}$; **B)** $4480 \cdot x^{74}$; **C)** $2,645878929 \cdot 10^{12} \cdot x^{14}$; **D)** $1,259549491 \cdot 10^{10} \cdot x^{40}$; **E)** $9187079616x^{27}$; **F)** $4608x$; **G)** $4330260x^{25}$; **H)** $5005/8x^{24}$; **I)** $9661317120k^8l^8m^4$; **J)** $14/(9x^7)$; **K)** $4368/(kl^6)$; **L)** 69672960; **M)** 10264320; **3. A)** -47520*5⁵; 10. člen; **B)** 70/243; 7. člen; **C)** 2268; 7. člen; **D)** 3784704; 7. člen; **E)** 6. člen; **F)** 2. člen; **G)** 5. člen; **H)** 10. člen.

2. Pravděpodobnost

1.1/6; **2.** 1/2; **3.** 0; **4. A)** 5/36; **B)** 1/6; **C)** 5/18; **5.** 0,7255; **6. A)** 36/125; **B)** 27/125; **C)** 0,0489; **D)** 0; **7. A)** 0,0069; **B)** 0,3596; **C)** 0,0069; **D)** 0; **8.** 0,959; **9.** 1/4; **10. A)** 1/6; **B)** 0,444444; **C)** 4/81; **11.** 0,2955; **12.** $3,85 \cdot 10^{-4}$; **13. A)** $8,84 \cdot 10^{-4}$; **B)** 0,1238; **C)** 0,8572; **D)** 0,4792; **14.** 0,2610; **15.** 0,333333; **16.** 0,1; **17.** 0,233333; **18. A)** 0,4213; **B)** 0,277777; **C)** 0,3472; **D)** 0,9815; **19.** 0,6299; **20.** 0,4968; **21. A)** 0,055555; **B)** 0,083333; **C)** 0,277777; **D)** 0,027777; **22.** 0,03; **23. A)** 0,2381; **B)** 0,9762; **24.** 0,9151; **25.** 0,16; **26. A)** 0,3596; **B)** $6,86 \cdot 10^{-3}$; **C)** $6,86 \cdot 10^{-3}$; **27.** 0,17; **28. A)** 1/2; **B)** 1/4; **29.** 0,5816; **30.** 0,188; **31.** 0,5; 0,375; **32. A)** 0,684; **B)** 0,95; **C)** 0,032; **D)** 0,999; **33. A)** 9/125; **B)** 0,992; **34. A)** 0,18; **B)** 0,999; **35. A)** 0,36; **B)** 0,91; **C)** 0,41; **D)** 0,55; **E)** 0,14; **F)** 0,09; **36.** 0,1435; **37.** 0,5895; **38.** 0,4247; **39.** 0,25; **40.** 0,0265; **41. A)** 0,14; **B)** 0,21.

3. Statistika

3.1. Základní pojmy statistiky, tabulka četnosti

1.

	1	2	3	4	5	6	Celkem
četnost	2	8	5	3	6	1	25
rel. četnost	0,08	0,32	0,2	0,12	0,24	0,04	1
četnost v %	8	32	20	12	24	4	100

2.

	1	2	3	4	5	6	7	8	9	10	Celkem
četnost	5	3	5	4	4	1	5	5	4	4	40
rel. četnost	0,13	0,08	0,13	0,1	0,1	0,03	0,13	0,13	0,1	0,1	1
četnost v %	12,5	7,5	12,5	10	10	2,5	12,5	12,5	10	10	100

3.

	250-270	271-290	291-310	311-330	331-350	351-370	371-390	391-410	Celkem
četnost	7	7	8	5	13	15	7	18	80
rel. četnost	0,0875	0,0875	0,1	0,0625	0,1625	0,1875	0,0875	0,225	1
četnost v %	8,75	8,75	10	6,25	16,25	18,75	8,75	22,5	100

4.

	989 a méně	990-993	994-997	998-1002	1003-1007	1008-1011	1012-1015	1015 a více	Celkem
četnost	10	5	2	6	4	3	3	12	45
rel. četnost	0,22222222	0,111111	0,044444	0,133333	0,0888889	0,0666667	0,0666667	0,2666667	1
četnost v %	22,2222222	11,1111	4,44444	13,3333	8,888889	6,666667	6,666667	26,66667	100

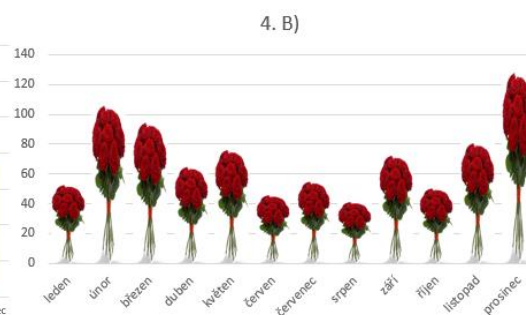
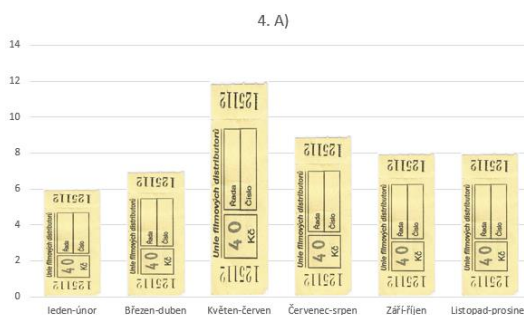
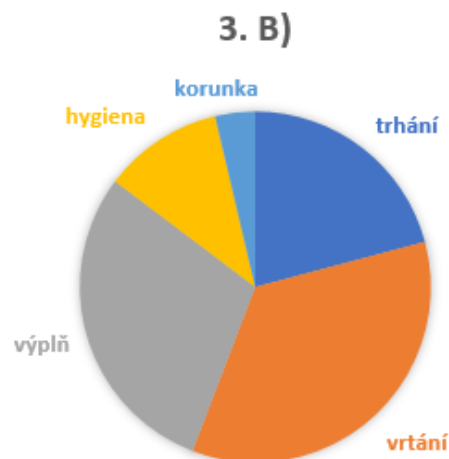
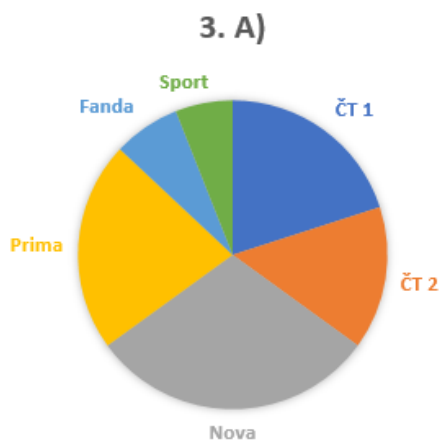
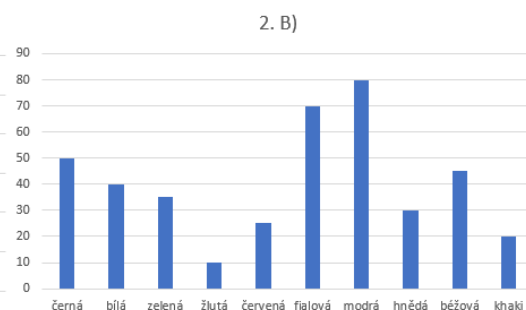
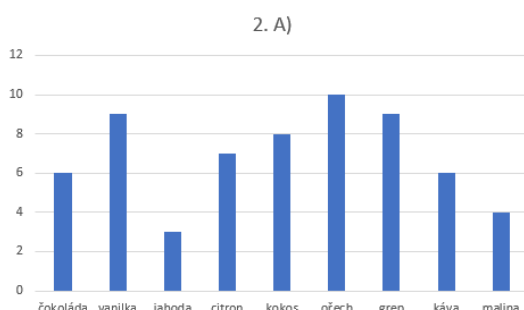
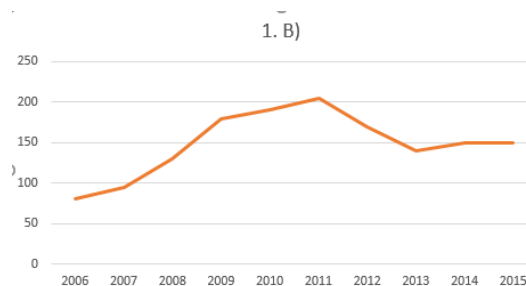
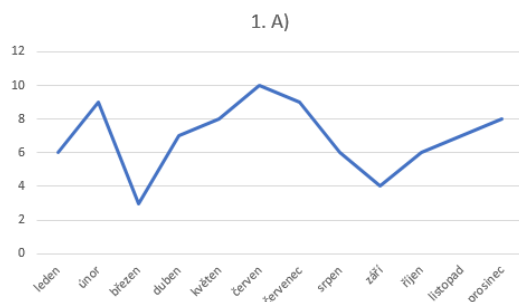
3.2. Střední hodnoty

1. $\bar{x} = 159,67$; $\hat{x} = 157; 167$; $\tilde{x} = 161$; 2. $\bar{x} = 11,91$; $\hat{x} = 10; 12$; $\tilde{x} = 12$; 3. $\bar{x} = 3,26$; $\hat{x} = 5$; $\tilde{x} = 3$; 4. $\bar{x} = 5,52$; $\hat{x} = 5$; $\tilde{x} = 5$.

3.3. Odchylky a rozptyl

1. $d = 312$; $\sigma = 395,306$; $\sigma^2 = 156267$; 2. $d = 10,07$; $\sigma = 12,98$; $\sigma^2 = 168,6$; 3. $d = 6,33$; $\sigma = 6,98$; $\sigma^2 = 48,66$; 4. $d = 1,02$; $\sigma = 1,26$; $\sigma^2 = 1,6$.

3.4. Grafy

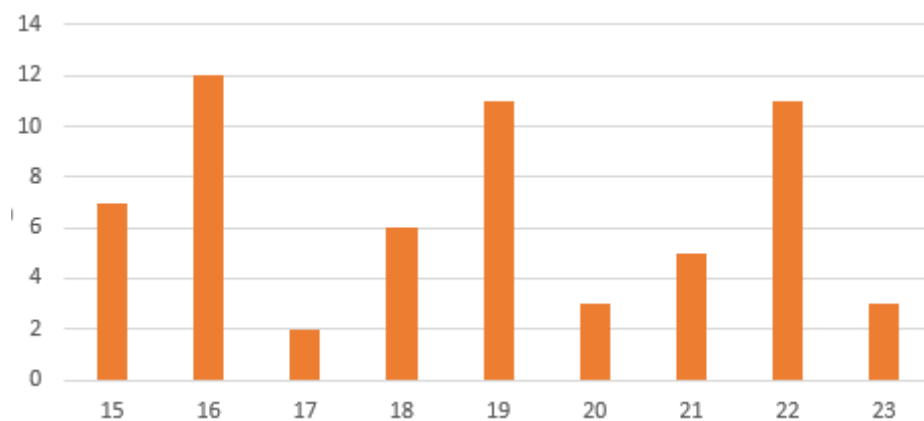


3.5. Komplexní úlohy

1.

	15	16	17	18	19	20	21	22	23	Celkem
četnost	7	12	2	6	11	3	5	11	3	60
rel.četnost	0,12	0,2	0,03	0,1	0,18	0,05	0,08	0,18	0,05	1
četnost v %	11,7	20	3,33	10	18,3	5	8,33	18,3	5	100

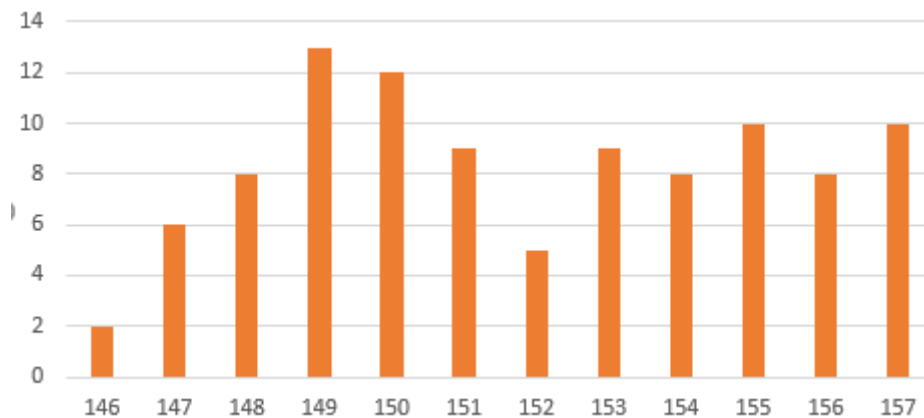
$$\bar{x} = 18,73; \hat{x} = 16; \tilde{x} = 19; d = 2,23; \sigma = 2,58; \sigma^2 = 6,66$$



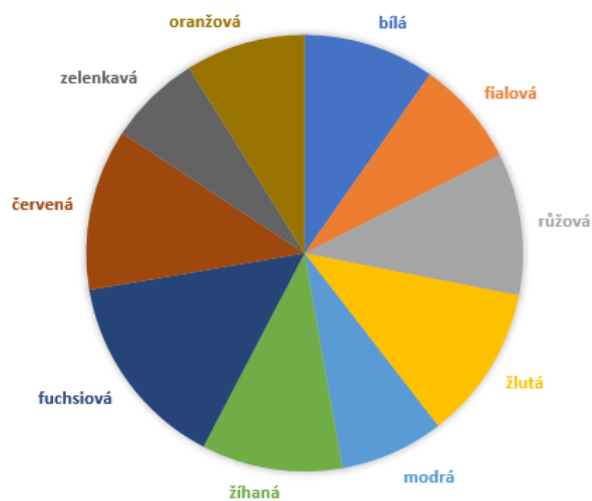
2.

	146	147	148	149	150	151	152	153	154	155	156	157	Celkem
četnost	2	6	8	13	12	9	5	9	8	10	8	10	100
rel.četnost	0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	1
četnost v %	2	6	8	13	12	9	5	9	8	10	8	10	100

$$\bar{x} = 151,91; \hat{x} = 149; \tilde{x} = 151,5; d = 2,83; \sigma = 3,21; \sigma^2 = 10,32$$

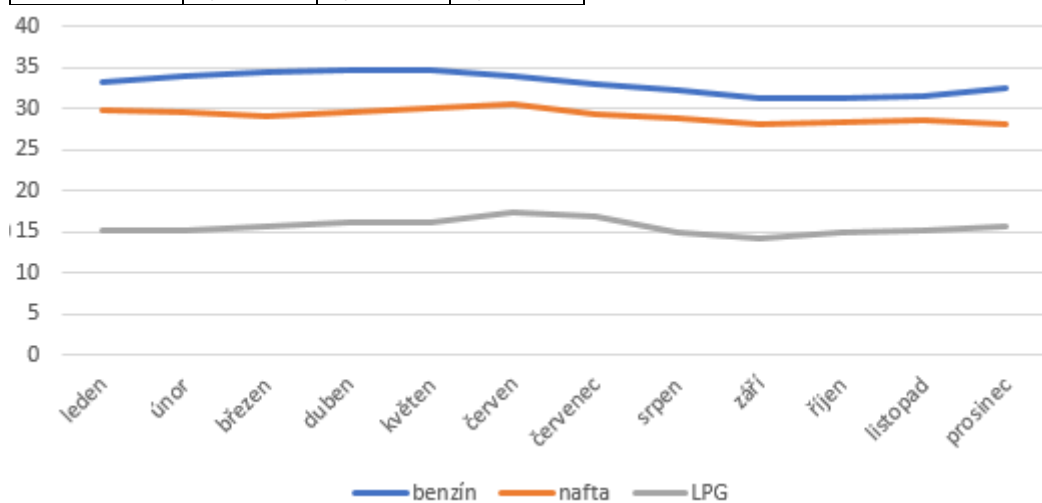


3. $\hat{x} = \text{fuchsiová}$



4.

	benzín	nafta	LPG
průměr	33,11667	29,175	15,675
modus	31,4	29,5	15,3
medián	33,1	29,2	15,45
d	1,1	0,625	0,6875
σ	1,250222	0,745123	0,842739
σ^2	1,563056	0,555208	0,710208

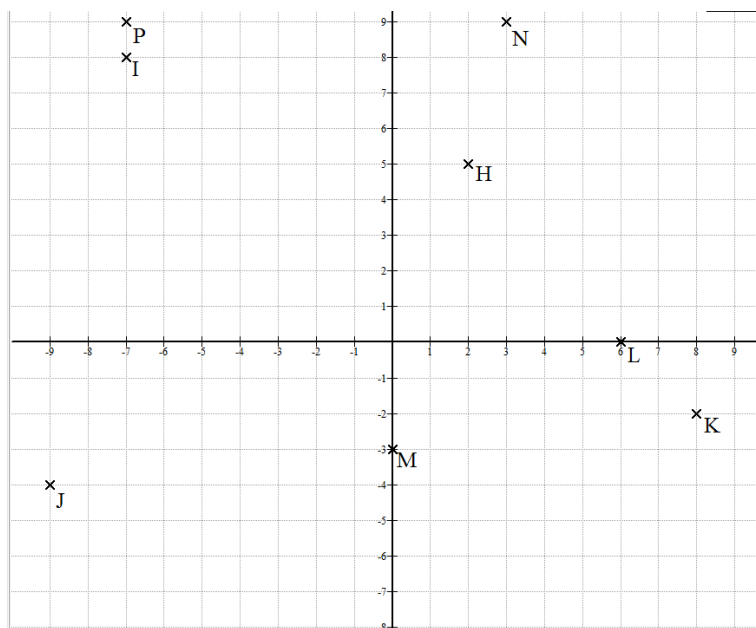


4. Analytická geometrie

4.1. Souřadnice bodů

1.A[-1;0]; B[-2;-5]; C[1;-4]; D[0;-7]; E[2;-5]; F[6;7]; G[-5;4]

2.



4.2. Velikost a střed úsečky

1.A) $[1;7]$; $2\sqrt{17}$; B) $[-1;-11/2]$; $\sqrt{193}$; C) $[6;-7/2]$; $\sqrt{85}$; D) $[7;8]$; 2; E) $[4;4]$; $2\sqrt{65}$; 2. A) $a=2\sqrt{58}$; $b=2\sqrt{37}$; $c=2\sqrt{17}$; $t_a=5\sqrt{2}$; $t_b=\sqrt{113}$; $t_c=\sqrt{173}$; $s_a=\sqrt{17}$; $s_b=\sqrt{37}$; $s_c=\sqrt{58}$; B) $d=2\sqrt{10}$; $e=4\sqrt{5}$; $f=2\sqrt{34}$; $t_d=7\sqrt{2}$; $t_e=2\sqrt{17}$; $t_f=\sqrt{26}$; $s_d=\sqrt{10}$; $s_e=2\sqrt{5}$; $s_f=\sqrt{34}$; 3. A) $[-1;1]$; B) $[2;-5]$; C) $[2;9]$; D) $[14; -10]$.

4.3. Vektory

1.A) $(-11;11)$; $11\sqrt{2}$; $(11;11)$; B) $(-3;6)$; $3\sqrt{5}$; $(6;3)$; C) $(-8;5)$; $\sqrt{89}$; $(5;8)$; D) $(-13; -9)$; $5\sqrt{10}$; $(9; -13)$; E) $(15; -7)$; $\sqrt{274}$; $(7; 15)$; F) $(7; -9)$; $\sqrt{130}$; $(9; 7)$; G) $(9;4)$; $\sqrt{97}$; $(4; -9)$; 2. $[2;-6]$; $(-14;5)$; $[-7;14]$; $[15;12]$; $[-1;14]$; $(-10;2)$; $[1;11]$; $[-4;6]$; $(9;2)$.

4.4. Operace s vektory

4.4.1. Sčítání a odčítání vektorů, násobení vektoru číslem

4.4.1.1. Početně

1.A) $(11;1)$; B) $(-14;-22)$; C) $(-7;2)$; D) $(23;-1)$; E) $(36;1)$; F) $(-1;-1)$; G) $(25; 8)$; H) $(0,7; -2,7)$; I) $(51,7; -12,1)$; J) $(-5,3; -0,8)$; 2. A) ano; B) ne; C) ano; D) ano; E) ne; F) ne; 3. A) $(5;1)$; B) $(-2; 2)$; C) $(-12; 10)$; D) $(14; 11)$; E) $(8; 2)$; F) $(2; 14)$.

4.4.1.2. Graficky

1. $(2;7)$; 2. $(9; -1)$; 3. $(6;-1)$; 4. $(1; 11)$; 5. $(2; -24)$; 6. $(-17; 7)$; 7. $(0,5; 16)$; 8. $(6; 10)$; 9. $(19; 11)$.

4.4.2. Součin vektorů

1.A) 18; B) -16; C) 21; D) -14; E) 33; F) -20; G) 32; H) -35; I) 4; J) 4;
2. rovnoběžné a a d , g a h ; kolmé b a c ; e a f ; 3. A) $(5;-25)$; B) $(-4; -8)$; C) $(25/3; 10)$; D) $(-121/14; 11)$; E) $(8; -32)$; F) $(-98; 14)$; 3. A) $(2; 3)$; $(-2; -3)$; $(4; 6)$; B) $(-7; 4)$; $(7; -4)$; $(14; -8)$; C) $(5; -3)$; $(-5; 3)$; $(10; -6)$; D) $(8; 4)$; $(-8; -4)$; $(16; 8)$; E) $(9; -7)$; $(-9; 7)$; $(18; -14)$; F) $(5; -6)$; $(-5; 6)$; $(10; -12)$; G) $(1,1; 0,5)$; $(-1,1; -0,5)$; $(11; 5)$.

4.4.3. Odchylka vektorů

1.A) $55^\circ 59'$; B) $4^\circ 24'$; C) 90° ; D) $19^\circ 26'$; E) $14^\circ 2'$; F) $114^\circ 46'$; 2. A) $104^\circ 22'$; $54^\circ 12'$; $21^\circ 26'$; B) $43^\circ 42'$; $55^\circ 33'$; $80^\circ 45'$.

4.5. Parametrická rovnice přímky

1.A) $x=3-4t$; $y=2+4t$; B) $x=5-9t$; $y=-2-3t$; C) $x=7+3t$; $y=9+5t$; D) $x=-3+t$; $y=-5-3t$; 2. A) A, C – ano; B, D – ne; B) G, H – ano; E, F – ne; 3. A) rovnoběžné různé; B) různoběžné; P[11; -15]; $15^\circ 15'$; C) různoběžné; P[-23; -2]; $18^\circ 26'$; D) rovnoběžné různé; E) různoběžné; P[158/41; 75/41]; $31^\circ 5'$; F) různoběžné; P[148/25; 186/25]; 90° ; 4. AB: $x=2-6t$, $y=5+2t$; BC: $x=-4+5r$, $y=7-16r$; AC: $x=2-s$, $y=5-$

14s; **5. A)** rovnoběžná $x=4-2r$, $y=-6+3r$; kolmá $x=4+3s$, $y=-6-2s$; **B)** rovnoběžná: $x=-3+3t$; $y=5-5t$; kolmá $x=-3+5r$; $y=5+3r$.

4.6. Obecná rovnice přímky

1.A) $5x+6y-37=0$; **B)** $x-4y-20=0$; **C)** $2x+y-16=0$; **D)** $3x+2y+21=0$; **2. A)** A,D – ano; B,C – ne; **B)** E,F – ne; G, H – ano; **3. A)** rovnoběžné různé; **B)** různoběžné; $P[51/14; 23/7]$; $53^\circ 15'$; **C)** různoběžné; $P[-4; 4]$; $46^\circ 45'$; **D)** rovnoběžné totožné; **E)** různoběžné; $P[13/4; 45/4]$; $4^\circ 24'$; **F)** různoběžné; $P[-3/2; 1/2]$; $71^\circ 34'$; **G)** různoběžné; $[14/27; 1/9]$; $67^\circ 50'$; **H)** rovnoběžné různé; **4.a:** $13x+5y+22=0$; $b: 11x+y-26=0$; $c: x+3y-14=0$; **5. A)** $3x-5y-39=0$; $11x+y-26=0$; **B)** $2x-y+8=0$; $x+2y-1=0$; **6. A)** $5\sqrt{34/34}$; **B)** $7\sqrt{13/13}$; **C)** 8; **D)** 2,18; **E)** 3; **F)** 10,27.

4.7. Směrnice tvar rovnice přímky

1.A) $y=-5x-2$; **B)** $y=-x/4-1/2$; **C)** $y=-3/2x+12$; **D)** $y=-5x-17$; **E)** $y=1,5x$; **F)** $y=2,14x-8,42$; **G)** $y=-0,78x-6,56$; **2. A)** různoběžné; $P[-1/5; 22/5]$; $55^\circ 33'$; **B)** různoběžné; $P[-5/13; 95/13]$; $21^\circ 30'$; **C)** rovnoběžné různé; **3.** $y=-x/5+26/5$; $y=-7x+12$; $y=-15x/7-18/7$; **4. A)** rovnoběžná $y=-x-3$; kolmá $y=x-9$; **B)** rovnoběžná $y=-x/2$; kolmá $y=2x+7$.

4.8. Kružnice

1.A) $(x+3)^2+(y-5)^2=25$; $x^2+y^2+6x-10y+9=0$; **B)** $(x-2)^2+(y+3)^2=1$; $x^2+y^2-4x+6y+12=0$; **C)** $(x-3)^2+(y+6)^2=10$; $x^2+y^2-6x+12y+35=0$; **D)** $x^2+(y-4)^2=10$; $x^2+y^2-8y+6=0$; **E)** $(x-7/2)^2+(y-1)^2=61/4$; $x^2+y^2-7x-2y-2=0$; **F)** $(x+5)^2+(y+2)^2=13$; $x^2+y^2+10x+4y+16=0$; **2.A)** $S[-3; 5]$; $r=5$; $P_x[-3; 0]$; $P_y[0; 9]$; $[0; 1]$; **B)** $S[5; 0]$; $r=1$; $P_x[6; 0]$; $[4; 0]$; P_y neex.; **C)** $S[0; -6]$; $r=7$; $P_x[\sqrt{13}; 0]$; $[-\sqrt{13}; 0]$; $P_y[0; 1]$; $[0; -13]$; **D)** $S[2; -3]$; $r=4$; $P_x[2+\sqrt{7}; 0]$; $[2-\sqrt{7}; 0]$; $P_y[0; -3+2\sqrt{3}]$; $[0; -3-2\sqrt{3}]$; **E)** $S[1; -2]$; $r=3$; $P_x[1+\sqrt{5}; 0]$; $[1-\sqrt{5}; 0]$; $P_y[0; -2+2\sqrt{2}]$; $[0; -2-2\sqrt{2}]$; **F)** $S[-3; 1/2]$; $r=1/2$; $P_x[-3; 0]$; P_y neex.; **G)** $S[2; 0]$; $r=5/2$; $P_x[9/2; 0]$; $[-1/2; 0]$; $P_y[0; 3/2]$; $[0; -3/2]$; **3.** $(x-7)^2+(y+4)^2=49$; $(x+7)^2+(y+4)^2=49$; **4.** $(x-3)^2+(y-6)^2=9$; **5.** $(x+3)^2+(y-17/8)^2=289/64$; **6.** $(x-3)^2+(y-3)^2=9$; $(x-1)^2+(y+1)^2=1$; **7.** $(x+8+\sqrt{30})^2+(y+8+\sqrt{30})^2=94+16\sqrt{30}$; $(x+8-\sqrt{30})^2+(y+8-\sqrt{30})^2=94-16\sqrt{30}$; **8. A)** sečna; **B)** vnější přímka; **C)** tečna; **9. A)** $x-2\sqrt{2}y+11+8\sqrt{2}=0$; $x+2\sqrt{2}y+11-8\sqrt{2}=0$; **B)** $\sqrt{7}x-y-5-\sqrt{7}=0$; $\sqrt{7}x-y-5+\sqrt{7}=0$; **C)** není tečný bod; **D)** $\sqrt{5}x+2y-9-6\sqrt{5}=0$; $\sqrt{5}x+2y-9+6\sqrt{5}=0$; **E)** $4x+3y-29=0$; $-4x+3y-45=0$.

4.9. Elipsa

1.A) $(x+3)^2/9+(y-5)^2/25=1$; $25x^2+9y^2+150x-90y+225=0$; $A[-3; 0]$; $B[-3; 10]$; $C[0; 5]$; $D[-6; 5]$; $E[-3; 1]$; $F[-3; 9]$; **B)** $(x+2)^2/28+(y+4)^2/64=1$; $16x^2+7y^2+64x+56y-2772=0$; $A[-2; 4]$; $B[-2; -12]$; $C[-2+2\sqrt{7}; -4]$; $D[-2-2\sqrt{7}; -4]$; $E[-2; 2]$; $F[-2; -10]$; **C)** $(x-4)^2/117+(y-5)^2/36=1$; $12x^2+39y^2+96x-390y-237=0$; $A[4+3\sqrt{13}; 5]$; $B[4-3\sqrt{13}; 5]$; $C[4; 11]$; $D[4; -1]$; $E[13; 5]$; $F[-5; 5]$; **D)** $(x-3)^2/25+(y+2)^2/41=1$; $41x^2+25y^2+246x+100y-556=0$; $A[3; -2-\sqrt{41}]$; $B[3; -2+\sqrt{41}]$; $C[8; -2]$; $D[-2; -2]$; $S[3; -2]$; **E)** není elipsa; **F)** $(x-12)^2/36+(y-4)^2/9=1$; $x^2+4y^2+24x+32y+172=0$; $S[12; 4]$; $D[12; 1]$; $E[12-3\sqrt{3}; 4]$; $F[12+3\sqrt{3}; 4]$; **G)** $(x+5)^2/16+(y-5)^2/4=1$; $x^2+4y^2+10x-40y+109=0$; $S[-5; 5]$; $B[-1; 5]$; $E[-5-2\sqrt{3}; 5]$; $F[-5+2\sqrt{3}; 5]$; **2.A)** $S[-3; 5]$; $A[-6; 5]$; $B[0; 5]$; $C[-3; 3]$; $D[-3; 7]$; P_x neex; $P_y[0; 5]$; $a=3$; $b=2$; $e=\sqrt{5}$; **B)** $S[5; 0]$; $A[5; 10]$; $B[5; -10]$; $C[3; 0]$; $D[7; 0]$; $P_x[3; 0]$; $[7; 0]$; P_y neex; $a=10$; $b=2$; $e=4\sqrt{6}$; **C)** $x^2+(y+6)^2/0,5=1$; $A[-1; -6]$; $B[1; -6]$; $C=P_y=[0; -6+\sqrt{2}/2]$; $D=P_y=[0; -6-\sqrt{2}/2]$; $E[-\sqrt{2}/2; -6]$; $F[\sqrt{2}/2; -6]$; **D)** $(x-2)^2/4+(y+3)^2/36=1$; $A[2; 3]$; $B[2; -9]$; $C=P_y=[0; -3]$; $D[4; -3]$; $E[2; -3+4\sqrt{2}]$; $F[2; -3-4\sqrt{2}]$; **E)** $(x-1)^2/9+(y-2)^2/4=1$; $A[-2; 2]$; $B[4; 2]$; $C[1; 4]$; $D=P_x=[1; 0]$; $E[1-\sqrt{5}; 2]$; $F[1+\sqrt{5}; 2]$; **F)** $S[2; 1]$; $A[5; 1]$; $B[-1; 1]$; $C[2; 3]$; $D[2; -1]$; $P_x[2+3\sqrt{3}/2; 0]$; $[2-3\sqrt{3}/2; 0]$; $P_y[0; 1-2\sqrt{5}/3]$; $[0; 1+2\sqrt{5}/3]$; $a=3$; $b=2$; $e=\sqrt{5}$; **G)** $(x-0,5)^2+y^2=0,25$; rovnice kružnice; **3. A)** vnější přímka; **B)** sečna; **4. A)** $-4x+17,01y-112,04=0$; $-4x-17,01y+24,04=0$; **B)** není bod elipsy; **C)** $9x+4,24y-48,72=0$; $9x-4,24y-23,28=0$; **D)** $1,74x-6,22=0$; $-1,74x+4,22=0$.

4.10. Parabola

1.A) $(y+4)^2=10(x-3)$; $y^2-10x+8y+46=0$; $(y+4)^2=-10(x-3)$; $y^2+10x+8y-14=0$; **B)** $(x+4)^2=12(y+3)$; $x^2+8x-12y-20=0$; $(x+4)^2=-12(y+3)$; $x^2+8x+12y+52=0$; **C)** $(x-5)^2=2(y-4)$; $(y-4)^2=54(x-5)$; **D)** $(y-2)^2=3(x+3)$; $y^2-4y-3x-5=0$; $(x+3)^2=3(y-2)$; $x^2+6x-3y+15=0$; **E)** $(y+3)^2=80(x-1)$; $y^2+6y-80x+89=0$; **F)** $(x-6)^2=-48(y-2)$;

$x^2-12x+48y-60=0$; $(y+4)^2=-10(x-3)$; $y^2+10x+8y-14=0$; **2. A)** $V[-3; 5]$; $F[-3; 5,75]$; $p=1,5$; $y=4,25$; **B)** $V[4; -3]$; $F[4; -3,5]$; $p=2$; $y=-2,5$; **C)** $V[-5; 4]$; $F[-43/8; 4]$; $p=0,75$; $x=-37/8$; **D)** $V[0; -1]$; $F[7/8; 0]$; $p=1,75$; $x=-7/8$; **E)** $V[-4; -2]$; $F[-4; -11/8]$; $p=3/4$; $y=-21/8$; **F)** $V[-6; 1]$; $F[-23/4; 1]$; $p=1/2$; $x=-25/4$; **G)** $V[0; 5]$; $F[0; 37/8]$; $p=3/4$; $y=43/8$; **3.A)** přímka rovnoběžná s osou paraboly; **B)** žádný společný bod; **C)** tečna; **D)** sečna – dva společné body; **4.A)** $8x-3y+8=0$; **B)** $-2x+y+13=0$; **C)** $7x+28y+91=0$; **D)** $x+2y+19=0$; $x-2y-5=0$.

4.11. Hyperbola

1.A) $(y+4)^2/3-(x-3)^2=1$; $-3x^2+y^2+18x+8y-14=0$; **B)** $(x+1)^2/9-(y-5)^2/91=1$; $91x^2-9y^2+162x+90y-953=0$; **C)** $(x-6)^2/(9/2)-(y+2)^2/(9/2)=1$; $2x^2-2y^2-24x-8y+55=0$; **D)** $(x-3)^2/9-(y-4)^2/16=1$; $16x^2-9y^2-96x+72y-11=0$; **2. A)** $S[-2; 4]$; $A[-5; 4]$; $B[1; 4]$; $P_x[-2-3\sqrt{5}; 0]$; P_y neex; $a=3$; $b=2$; $x=-2$; $y=4$; **B)** $S[2; 0]$; $A[2; 10]$; $B[2; -10]$; $P_x[0; 10\sqrt{2}]$; P_y neex; $a=10$; $b=2$; $e=2\sqrt{26}$; $x=2$; $y=0$; **C)** $S[0; -4]$; $A[1; -4]$; $B[-1; -4]$; $P_x[\sqrt{17}; 0]$; P_y neex; $a=1$; $b=1$; $e=\sqrt{2}$; $x=0$; $y=-4$; **D)** $S[-2; 1]$; $A[-2; 4]$; $B[-2; -2]$; P_x neex; $P_y[0; 1-3\sqrt{2}]$; $a=3$; $b=2$; $e=\sqrt{13}$; $x=-2$; $y=1$; **E)** $S[-1; -2]$; $A[-1; -6]$; $B[-1; 2]$; P_x neex; $P_y[0; -2-2\sqrt{37/3}]$; $a=4$; $b=6$; $e=5\sqrt{2}$; $x=-1$; $y=-2$; **F)** $S[0; -3]$; $A[10; -3]$; $B[-10; -3]$; $P_x[-5\sqrt{13}; 0]$; P_y neex; $a=10$; $b=2$; $x=0$; $e=2\sqrt{26}$; $y=-3$; **G)** $S[4; 1]$; $A[5; 1]$; $B[3; 1]$; $P_x[4-\sqrt{2}; 0]$; $P_y[0; 1-\sqrt{15}]$; $a=1$; $b=1$; $e=\sqrt{2}$; $x=4$; $y=1$; **3.A)** přímka rovnoběžná s asymptotou; **B)** tečna; **C)** přímka rovnoběžná s asymptotou; **4. A)** $x+14=0$; **B)** $9x+50y+172=0$; $-9x+50y+190=0$; **C)** $x+4=0$; $x+6=0$; **D)** $x+1+\sqrt{7}=0$; $x+1-\sqrt{7}=0$.