

Výřešení

12.9.

$$6a^2 + 3a^2 = 9a^2$$

$$6a^3 \cdot 2a^2 = 12a^5$$

$$10z^3 : 5y = 2y^2$$

$$24b^3 - 8b^2 = 8b^2 \cdot (3b - 1)$$

$$54a^3b^3 - 24a^2b^2c = 6ab^2(9b - 4ac)$$

$$14a^2b + 12ab^2 = 2ab(7a + 6b)$$

$$2a + 6ab + 3x + 9bx = 2a \cdot (1+3b) + \\ + 3x \cdot (1+3b) = \underline{(1+3b) \cdot (2a+3x)}$$

$$2xz + 4x + 3yz + 6 = \cancel{2x \cdot (z+2) + 3 \cdot (y+2)} \\ = \underline{\underline{(y+2) \cdot (2x+3)}}$$

$$2yz^2 - 8yz - 3z + 12 = 2z(z-4) - 3 \cdot \\ \cdot (z-4) = \underline{\underline{(z-4)(2z-3)}}$$

$$2xz - 3x^2 - 4x + 6x = 2x(x-2) - \\ - 3x \cdot (x-2) = \underline{\underline{(x-2)(2x-3x)}}$$

$$ac - bc + ad - bd = c \cdot (a - b) + \\ + d \cdot (a - b) = \underline{\underline{(a-b)(c+d)}}$$

$$\begin{aligned}
 & \cancel{2ab - 4ax - by + 2xy} + \cancel{2x^2y} = \\
 & = b - (2a - y) + 2x \cdot (-2a + y) \\
 & = \underline{(b - 2x)(2a - y)}
 \end{aligned}$$

$$\begin{aligned}
 5a^2 - 5ax - 7a + 7x &= 5a(a - x) - 7 \cdot \\
 &\cdot (a - x) = \underline{(a - x)(5a - 7)}
 \end{aligned}$$

$$\begin{aligned}
 y^4 + y^3 - y - 1 &= y^3 \cdot (y + 1) - 1 \cdot (y + 1) \\
 &= \underline{(y + 1) \cdot (y^3 - 1)}
 \end{aligned}$$

## Císelné obory

- pětirozeneá čísla =  $\mathbb{N}$

1, 2, 3, 4

+,  $\times$ , /

- :

$$5 - 3 = 2 \quad 6 : 2 = 3$$

$$1 - 4 = \text{X} \quad 5 : 4 = 1 \text{ pb. } 1$$

$$4 - 1 = 3$$

$$1 - 4 = -3$$

- Celá =  $\mathbb{Z}$

-3, -2, -1, 0, 1, 2, 3, 1, ...

$\begin{matrix} + \\ | \\ - \end{matrix} \quad x \quad :$

$\rightarrow$  Racionálne čísla =  $Q$   $+; -, \times, :;$

$$5:4 = \frac{5}{4}$$
 slovesk

$$5:4 = 1,25$$
 des. čísla

$\rightarrow$  Reálna čísla =  $R$

$$\sqrt{2}, \pi$$

$x \sqrt{-1}$

Komplexné čísla

# Národní hodina

13.9.

- Matematika je abstraktní něčí
- Něčí dle s logickou strukturou
  - a) jedno nazývá na druhé
  - b) jedno nazývá se druhým
- používá názvy v ročním směru
- hmoždíře používají a procesy řešíme nás
- = Práce matematika ponáší do stále různých  
něčí oborů (zavodčové, medicína, ...)

## Rady pro tento řidič

- ještě má řidič řešit přípravu na studium na VŠ
- Je myšlenky: - schopnost řešit všechny zadání

## Matematika v 1.C:

1. Operacioní učiva ZS
2. Dízelné obory
3. Mocniny a odmocniny
4. Elementární teorie čísel a retvorice
5. Mnemonizace
6. Matematika
7. Lineární rovnice

8. Funkce (lineární a kvadratická)
9. Kvadratické rovnice a nerovnice
10. Výpočty

## Učebník

Matematické, fyzikální a chemické tabulky pro  
střední školy (matematika část) Omezený

- Samostudium
- Ikonické
- Realisticky · CO2

## Pomůcky

- 1) „něco“ na poznámky v hodinách (skript)
- 2) Tabulky
- 3) Papír, tužka
- 4) Kalkulačka

Pomér

15.9.

a:b ... Bräk. Mar

$$a:b = \frac{a}{b}$$

$$0,5:0,3 = \underline{\underline{5:3}}$$

$$42:14 = 6:2 = 3:1$$

$$2,5:6,5 = 25:65 = \underline{\underline{5:13}}$$

$$\frac{2}{7} : \frac{1}{3} = \frac{6}{21} : \frac{7}{21} = 6:7$$

$$3:8 = x:12$$

$$\frac{3}{8} = \frac{x}{12} / \cdot 24$$

$$9 = 2x / :2$$

$$\underline{\underline{x = 4,5}}$$

$$4:9 = x:6$$

$$\frac{4}{9} = \frac{x}{6} / \cdot 18$$

$$8 = 3x / :3$$

$$\underline{\underline{x = \frac{8}{3}}}$$

# Príma a druhá inérovad

$$\begin{array}{l} \uparrow 5 \text{ banánov} \dots 20 \text{ Kč}^- \\ \underline{7 \text{ banánov} \dots x \text{ Kč}^-} \end{array}$$

$$7:5 = x : 20$$

$$5x = 140 : 5$$

$$\underline{x = 28 \text{ Kč}^-}$$

$$\begin{array}{l} \uparrow 5 \text{ lidi}, 35 \text{ dnai}^o \\ \underline{7 \text{ lidi} \dots x \text{ dnai}^o} \end{array}$$

$$7:5 = 35:x$$

$$\underline{\quad\quad\quad\quad\quad}$$

$$7x = 175 : 7$$

$$\underline{x = 25 \text{ dnai}^o}$$

M. pek. 6 straze ... 324 h  
6 straze ... x h

$$6 : 6 = 03 \text{ h} : x$$

$$6x = 1296 : 6$$

$$x = 216 \text{ h}$$

Jmalo my je 216 hodin.

$$(2x-3)^2 - (x+2)^2 = \underline{\underline{(2x-3+x+2)}}.$$

$$\underline{\underline{(2x-3-x-2)}} = \underline{\underline{(3x-1)}}.$$

$$\therefore \underline{\underline{x-5}}$$

$$(1_a + 3)^2 - (3_a - 5)^2 = (4_a + 3 - 3_a - 5) \cdot (1_a + 3 + 3_a - 5) =$$

$$= \underline{\underline{(a+8)(2a-2)}}$$

$$(5_r - 7)^2 - (2_r - 4)^2 =$$

$$= (5_r - 7 + 2_r + 4) (5_r - 7 - 2_r - 4) = (7_r - 3) (3_r - 11)$$

Dopréměna čtvrtek 20. 9.

I.  $(a+b)^2$

$$(a-b)^2$$

II.  $a^2 - b^2$

$$\begin{aligned}x^2 + 8x + 12 &= x^2 + 2 \cdot x \cdot 4 + 16 - 16 + 12 = \\&= (x+4)^2 - 4 = (x+4+2)(x+4-2) = \\&= \underline{\underline{(x+6)(x+2)}}\end{aligned}$$

$$\begin{aligned}x^2 + 12x + 32 &= x^2 + 2 \cdot x \cdot 6 + 36 - 36 \\+ 32 &= (x+6)^2 - 4 = (x+6+2)(x+6-2) = \\- 2) &= \underline{\underline{(x+8)(x+4)}}\end{aligned}$$

$$\begin{aligned}x^2 - 14x + 48 &= x^2 - 2 \cdot x \cdot 7 + 49 - 49 + 48 = \\&= (x-7)^2 - 1 = (x-7+1) \cdot (x-7-1) \\&= \underline{\underline{(x-6)(x-8)}}\end{aligned}$$

$$\begin{aligned}x^2 - 3x - 54 &= x^2 - 2 \cdot x \cdot \frac{3}{2} + \frac{9}{4} - \frac{9}{4} - \\- \frac{216}{4} &= (x - \frac{3}{2})^2 - \frac{225}{4} = (x - \frac{3}{2} + \frac{15}{2}) \\(x - \frac{3}{2} - \frac{15}{2}) &= \underline{\underline{(x+6)(x-9)}}\end{aligned}$$

$$\begin{aligned}
 x^2 - 9x + 20 &= x^2 - 2 \cdot x \cdot \frac{9}{2} + \frac{81}{4} - \\
 - \frac{81}{4} + \frac{80}{4} &= (x - \frac{9}{2})^2 - \frac{1}{4} = \\
 = (x - \frac{9}{2} + \frac{1}{2})(x - \frac{9}{2} - \frac{1}{2}) &= \\
 = \underline{\underline{(x - 4)(x - 5)}}
 \end{aligned}$$

$$\begin{aligned}
 x^2 - 11x + 30 &= x^2 - 2 \cdot x \cdot \frac{11}{2} + \frac{121}{4} - \frac{121}{4} \\
 + \frac{120}{4} &= (x - \frac{11}{2})^2 - \frac{1}{4} = \\
 = (x - \frac{11}{2} + \frac{1}{2})(x - \frac{11}{2} - \frac{1}{2}) &= \\
 = \underline{\underline{(x - 5)(x - 6)}}
 \end{aligned}$$

~~$$\begin{aligned}
 x^2 + 2x - 35 &= x^2 + 2 \cdot x \cdot 1 + 1 - 1 + 35 = \\
 = (x + 1)^2 + 34 &= (x + 1 - \sqrt{34}) \\
 (x + 1 + \sqrt{34})
 \end{aligned}$$~~

$$150. \quad 4 - \frac{7-6n}{5} \neq 3 + \frac{7n-3}{10} + \frac{n+1}{2} \quad | \cdot 10$$

$$40 - 14 + 12n \neq 30 + 7n - 3 + 5n + 5$$

$$26 + 12n \neq 32 + 12n \quad | -12n$$

$$26 \neq 32$$

$$\mathcal{K} = \emptyset$$

$$110. \quad \frac{1-3x}{2} + \frac{2x-3}{4} = \frac{5-x}{6} - \frac{4x-8}{3} \quad | \cdot 12$$

$$6 - 18x + 6x - 9 = 10 - 2x - 16x + 32$$

$$-3 - 12x = 42 - 18x \quad | +18x + 3$$

$$6x = 45 \quad | :6$$

$$\underline{\underline{x = 7,5}}$$

$$\mathcal{K} = \underline{\underline{\Sigma 7,5}}$$

$$131. \frac{2x-2}{4} - \frac{x-1}{6} = \frac{1}{3}(x-1)$$

$$\frac{2x-2}{4} - \frac{x-1}{6} = \frac{x}{3} - \frac{1}{3} / \cancel{12}$$

$$6x-6 - 2x+2 = 4x-4$$

$$4x-4 = 4x-4 / \cancel{4x}$$

$$R = \cancel{R}$$

202.

$$\frac{4}{5}(2b-5) - \frac{3}{2}(b-3) = \frac{5}{3}(b-2)-4$$

$$\frac{8b}{6} - 4 - \frac{3b}{2} + \frac{9}{2} = \frac{5b}{3} - \frac{10}{3} - 4 / \cancel{30}$$

$$48b - 120 - 45b + 135 = 50b - 100$$

$$3b + 15 = 50b - 220 / -3b$$

$$47b = 235 + 220$$

$$b = 5$$

$$R = \cancel{55}$$

$$129. \frac{4y+3}{3} - \frac{1}{3} = 1 - \frac{5(1-y)}{6}$$

$$\frac{4y+3}{3} - \frac{1}{3} = 1 - \frac{5-5y}{6} \quad | \cdot 6$$

$$8y+6 - 2 = 6 - 5 + 5y$$

$$8y + 4 = 1 + 5y \quad | -5y$$

$$3y = -3 \quad | :3$$

$$\underline{109. \frac{2z+2}{8} = \frac{2-2}{4} - 12 \quad | \cdot 8}$$

$$2z+2 = 2z - 14 - 8z$$

$$2z+2 = -6z - 14 \quad | +6z - 2$$

$$8z = -16 \quad | :8$$

$$\underline{z = -2}$$

$$144(z-3)(z+2) - (z+2)(z-4) = 2$$

$$z^2 + 2z - 3z - 6 - (z^2 - 4z + 2z - 8) = 2$$

$$\cancel{z^2} - z - 6 - \cancel{z^2} + 4z - 2z + 8 = 2$$

$$z + 2 = 2 / -2$$

$$z = 5$$

$$119. \underline{3((z+2)-4)} - z + 1 = 2(z - \frac{5}{2})$$

$$3[z - 2] - z + 1 = 2z - 5$$

$$3z - 6 - z + 1 = 2z - 5$$

$$2z - 5 = 2z - 5$$

$$z = R$$

26.9.

## Procent

- část celku ... %

$$1\% \dots 0,01R = \frac{1}{100} R$$

$$25\% \dots \frac{1}{4} R = 0,25R$$

$$50\% \dots \frac{1}{2} R = 0,5R$$

## Promile

$$1\% = 0,001R$$

V rodnici v Olomouci  $\frac{3}{5}$  měsíčního věku. Kolik % blýží?

$$\frac{3}{5} - \frac{3}{5} = \frac{2}{5} = 40\%$$

Jelikož stál 3200 Kč. Byl sleven o 10%

a později o dalších 15%. Za kolik se prodával?

$$\begin{array}{r}
 3200 \\
 - 320 \\
 \hline
 2880
 \end{array}
 \quad
 \begin{array}{r}
 7880 \\
 \cdot 0,15 \\
 \hline
 14400 \\
 2880 \\
 \hline
 43200
 \end{array}
 \quad
 \begin{array}{r}
 2880 \\
 - 432 \\
 \hline
 2458
 \end{array}$$

Zvýšení o 10% na 108 Kč.

$$1080 : 12 = 90 \dots \underline{\underline{0 \text{ Kč}}}$$

Smetka 325 Kč byl zvýšen o 20%.  
Kolik následně platí.

$$\begin{array}{r}
 325 \\
 \cdot 1,24 \\
 \hline
 300 \\
 650 \\
 \hline
 395
 \end{array}$$

403 Nc-

Rabatky mají slováno 16% na 798 Nc.

$$79800 : 84 = \underline{\underline{950 \text{ Nc}}}$$

Jinisté měš:

1. den .. 35% prasek

2. den .. 41% prasek

3. den .. 15,62m - 24%

$$\frac{1560}{120} : 24 = \underline{\underline{65 \text{ km}}}$$

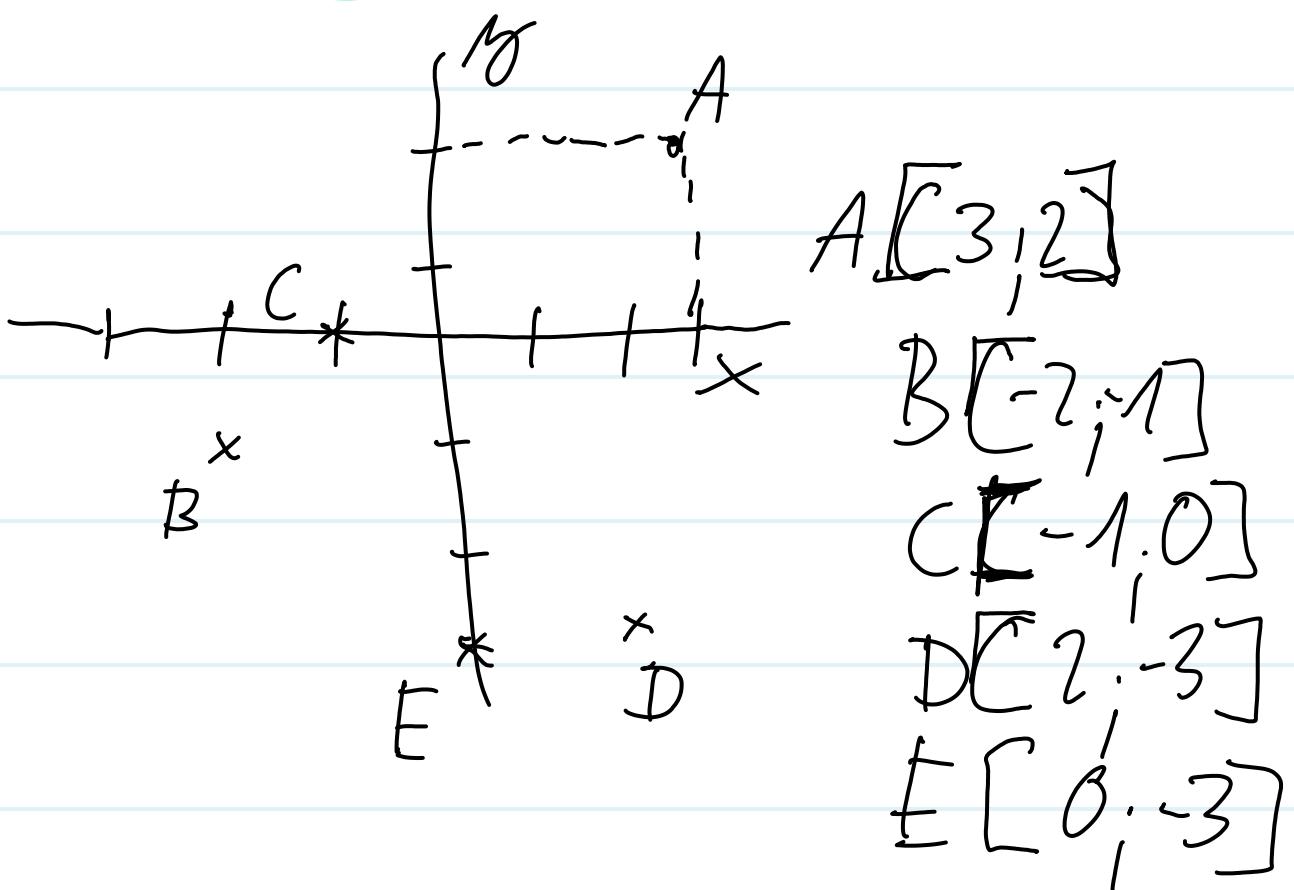
Jakou činu vložil do banky na rok  
až užitím jíž úrokové sazby 6% na vložku  
1500 Kč.

$$6\% \text{ .. } 1500 \text{ Kč}$$

$$\frac{150000}{30} : 6 = \underline{\underline{25000 \text{ Kč}}}$$

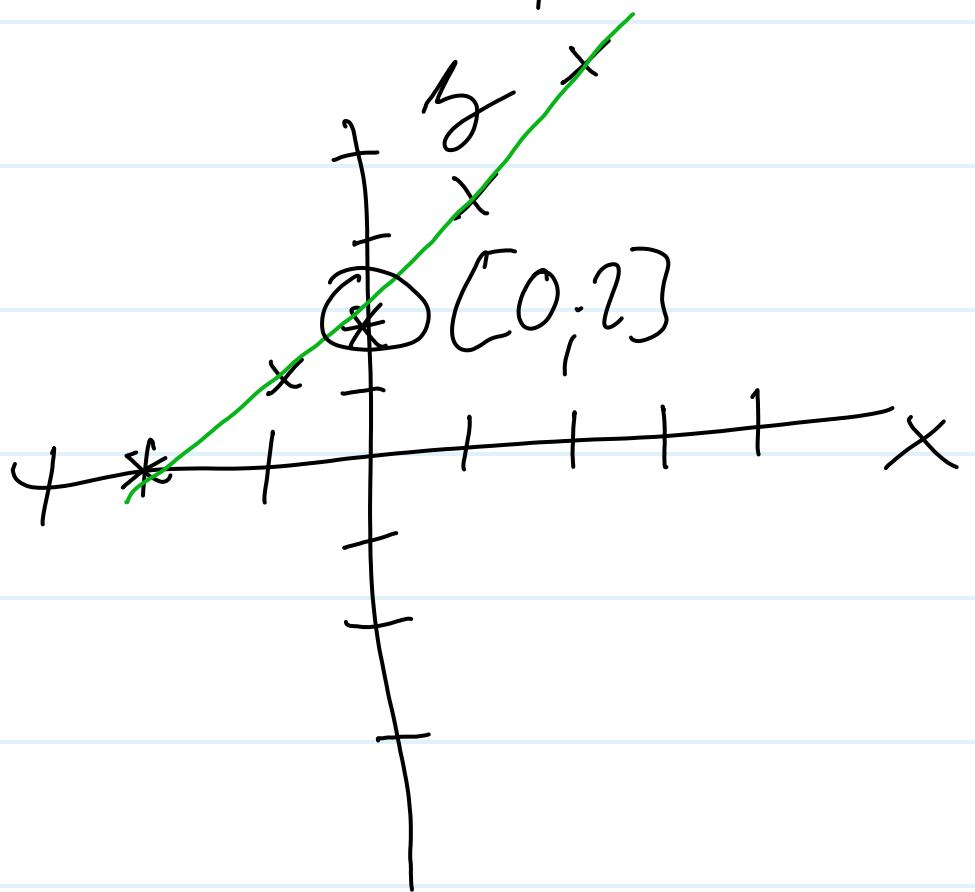
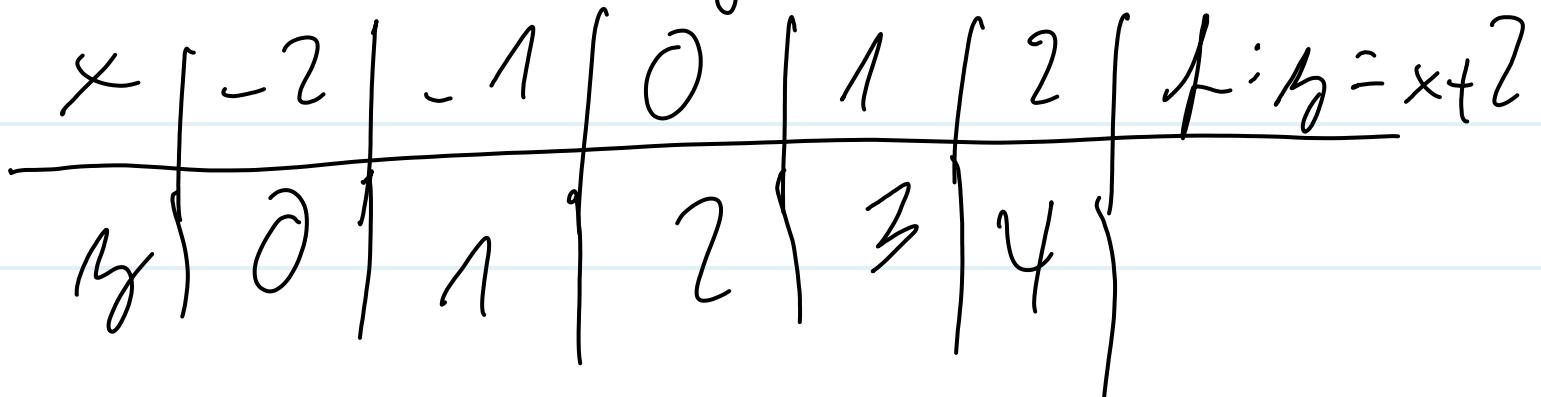
*Yanbara řešení*

3.10.



grafy funkcií

- lineární: f:  $y = ax + b$

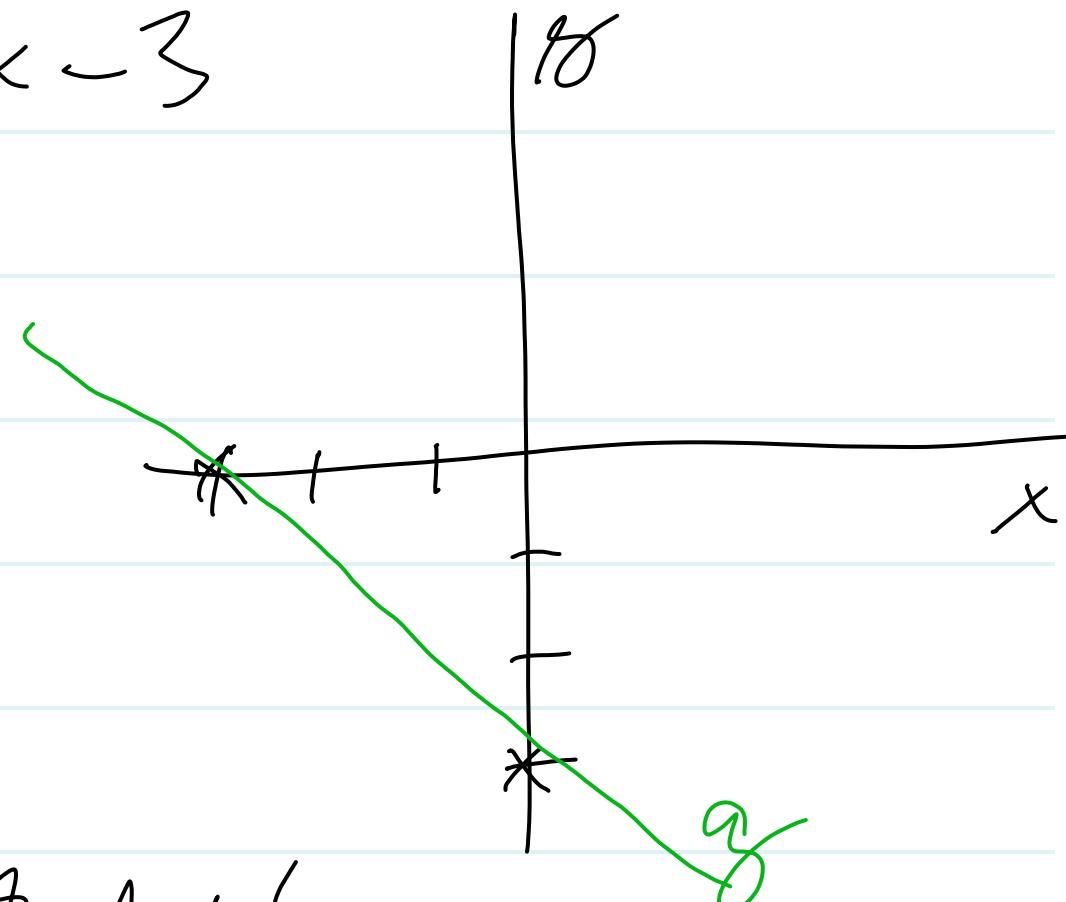


a ... směrnice

$a > 0 \dots$  rostoucí

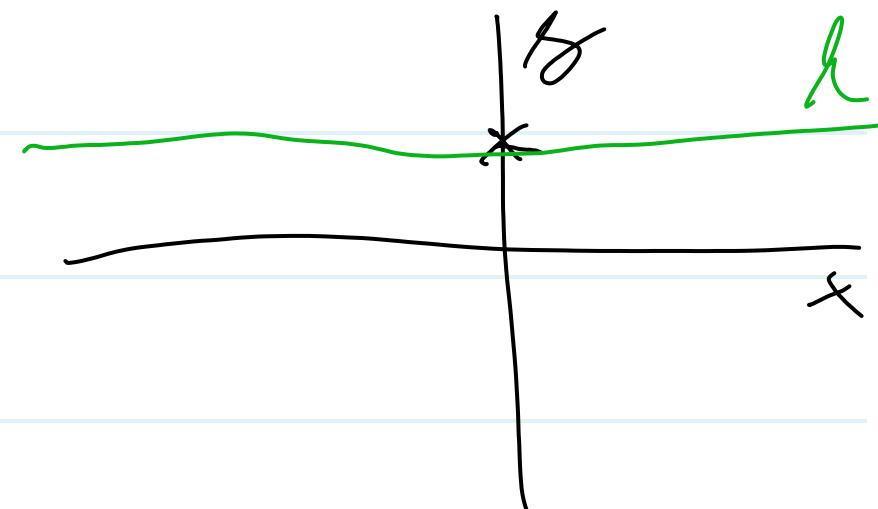
$a < 0 \dots$  klesající

$$g: y = -x - 3$$



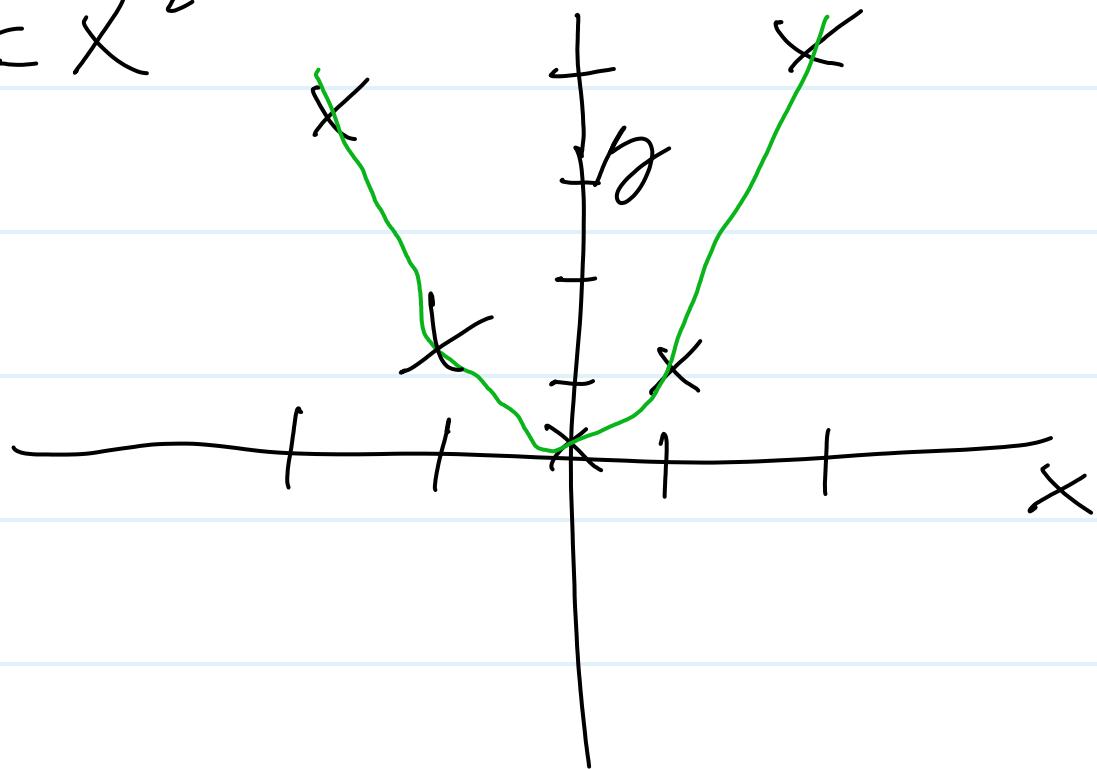
$a = 0$  - Translative

$$h: y = 1$$



Quadratische Funktion

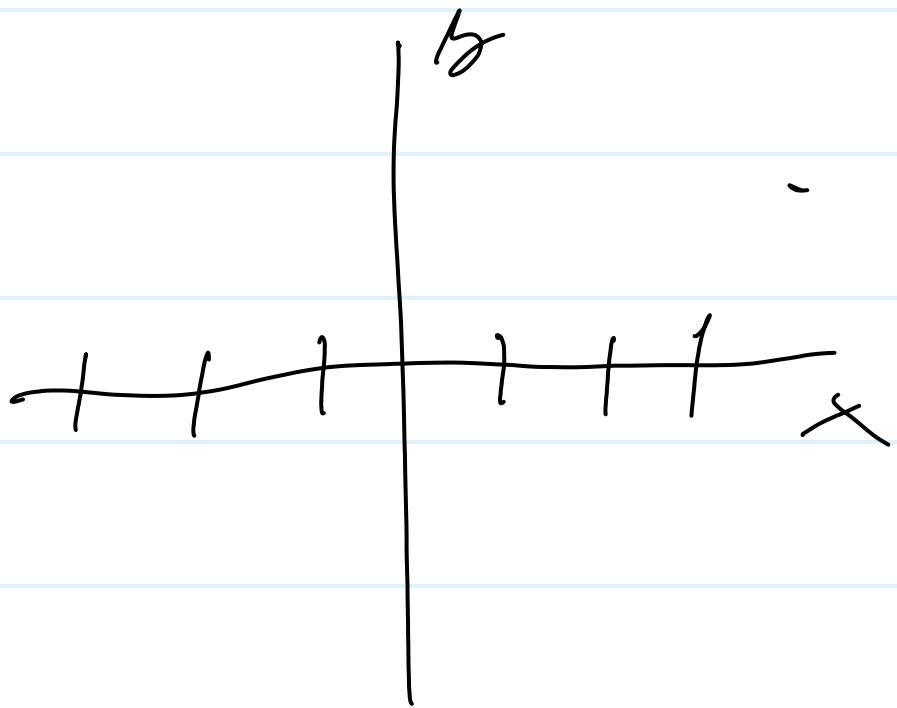
$$f: y = x^2$$



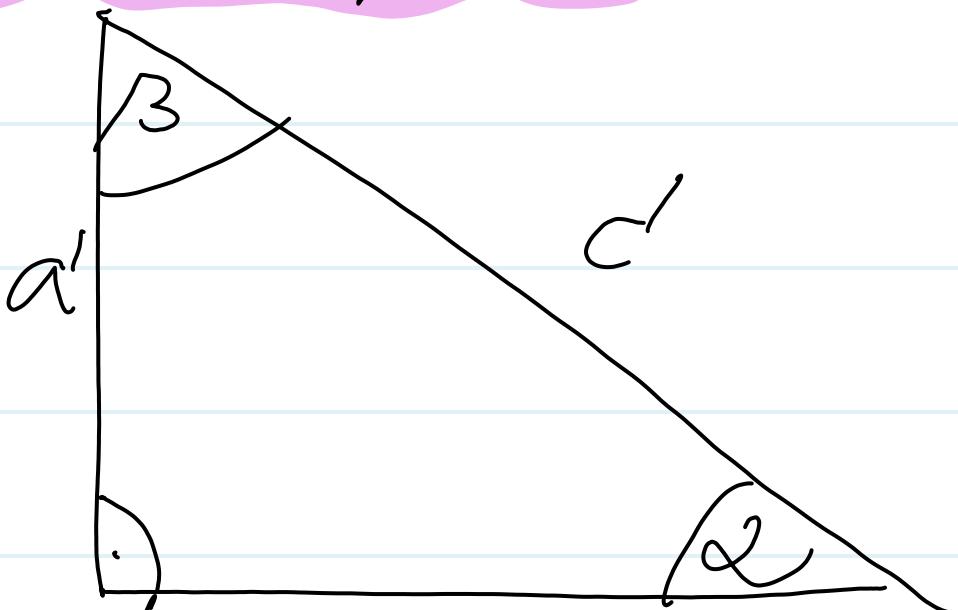
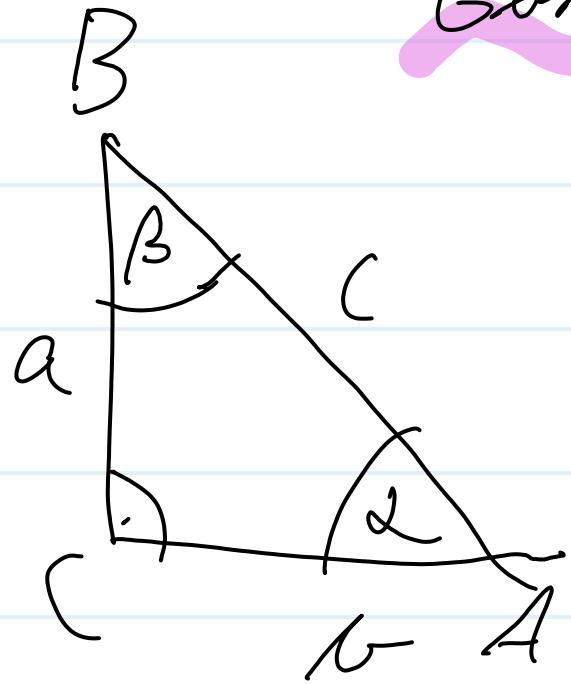
reziproker Wertmaß

$$f: y = \frac{1}{x}$$

$$f: y = \frac{1}{x}$$



# Goniometria delle punte



$$\frac{a}{c}$$

$$\frac{a'}{c'} = \frac{\gamma' \cdot a}{\alpha \cdot c}$$

$$\sin \angle = \frac{a}{c} \left( \frac{\text{della probabile aderenza}}{\text{della reale}} \right)$$

$$\cos \angle = \frac{b}{c} \left( \frac{\text{della reale aderenza}}{\text{della probabile}} \right)$$

$$\operatorname{tg} \angle = \frac{a}{b} \left( \frac{\text{della probabile aderenza}}{\text{della reale aderenza}} \right)$$

$$\cot \alpha = \frac{b}{a} \left( \frac{\text{delta nížešších oděsny}}{\text{delta protilehlé oděsny}} \right)$$

$$\sin 30^\circ = \underline{0,5}$$

$$\cos 30^\circ = \underline{\frac{\sqrt{3}}{2}}$$

$$\operatorname{tg} 30^\circ = \underline{\underline{\frac{\sqrt{3}}{3}}}$$

Řešení Mr. M. ( $R_s$ )

6.10.

$$\alpha, b, c, d, \beta, \gamma$$

- Pyth. věta

$$- d + \beta + \gamma = 180^\circ$$

$$- d + \beta = 90^\circ$$

- Goniometrické funkce

$$\sin 30^\circ$$

$$\sin \angle = \frac{1}{2}$$

$$\begin{array}{c} \sin^{-1} \\ \boxed{\sin} \end{array}$$

$$\angle = 30^\circ$$

$$\cos \angle = \frac{1}{2}$$

$$\angle = 60^\circ$$

$$\operatorname{tg} \angle = \frac{1}{2}$$

$$\begin{array}{c} \bullet \quad | \quad \| \end{array}$$

$$\angle = \underline{26^\circ 34'}$$

$$\sin 35^\circ 17' = \underline{0,58}$$

$$\Delta ABC : a = 3 \text{ cm} \quad \angle = ?^\circ$$

$$b = 4 \text{ cm} \quad \beta = ?^\circ$$

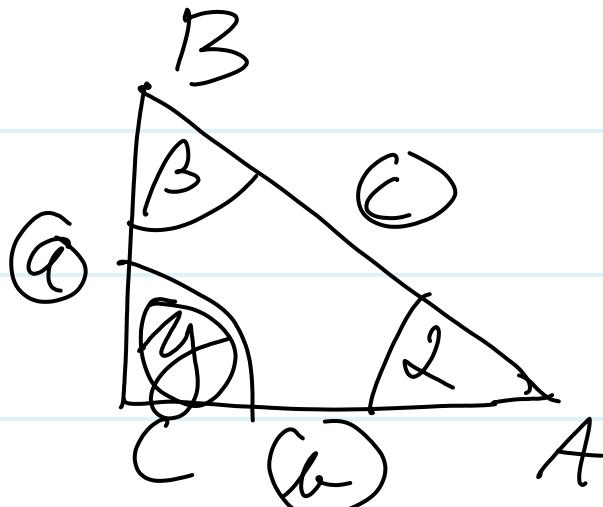
$$c = 5 \text{ cm} \quad \gamma = ?^\circ$$

$$c^2 = a^2 + b^2$$

$$25 = 9 + 16$$

25 = 25  $\Rightarrow \triangle ABC$  je rechteckig

$$\gamma = 90^\circ$$



$$\sin \alpha = \frac{a}{c}$$

$$\sin \alpha = \frac{3}{5}$$

$$\underline{\underline{\alpha = 36^\circ 52'}}$$

$$\beta: \cos \beta = \frac{a}{c}$$

$$\cos \beta = \frac{3}{5}$$

$$\underline{\underline{\beta = 53^\circ 8'}}$$

$\triangle ABC$  ( $\gamma = 90^\circ$ )

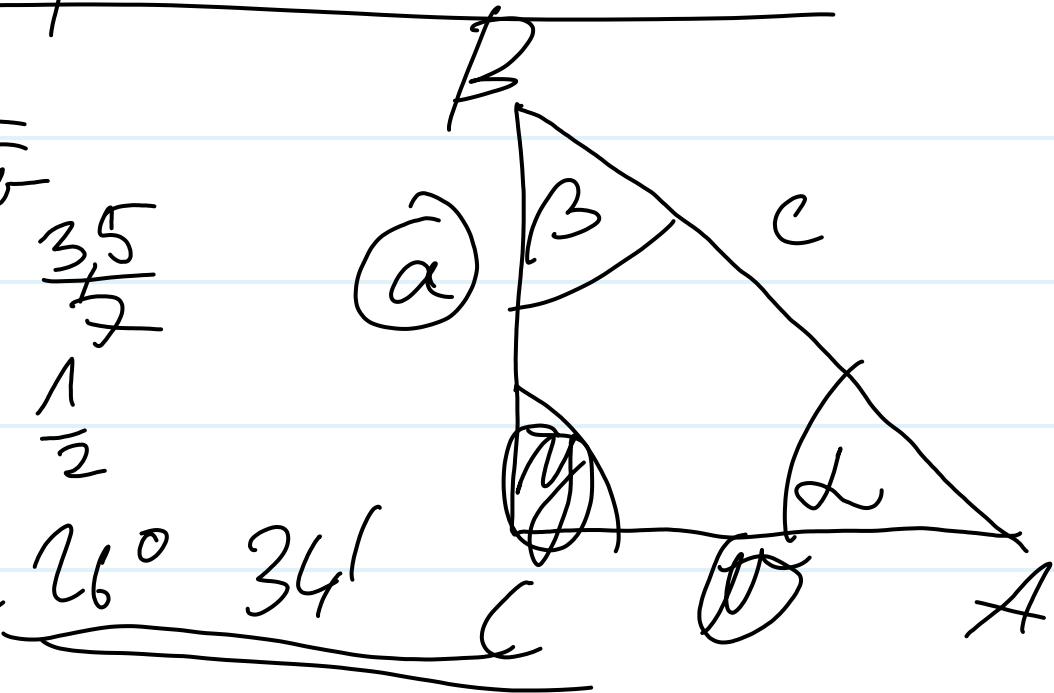
$a = 3,5 \text{ cm}$   $c = ? \text{ cm}$

$b = ? \text{ cm}$

$\angle \beta = ?^\circ$

$$\begin{aligned} \operatorname{tg} \alpha &= \frac{a}{b} \\ \operatorname{tg} \alpha &= \frac{3,5}{b} \\ \operatorname{tg} \alpha &= \frac{1}{2} \end{aligned}$$

$$\alpha \approx 26^\circ 34'$$



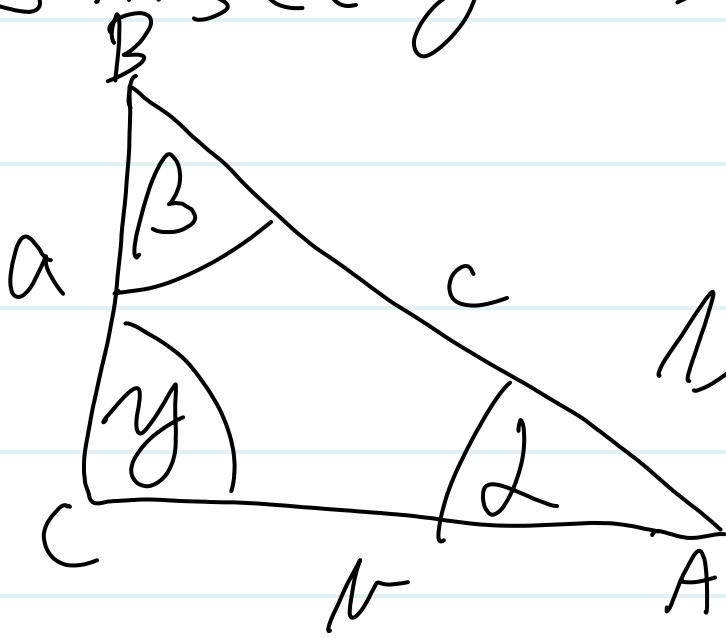
$$\operatorname{tg} \beta = \frac{b}{a}$$

$$\operatorname{tg} \beta = 2$$

$$\underline{\underline{\beta = 63^\circ 26'}}$$

28

$\triangle ABC (\gamma = 90^\circ)$   $c = 8 \text{ cm}$   $a = ? \text{ cm}$   
 $\beta = 40^\circ$   $b = ? \text{ cm}$



$$\sin \beta = \frac{a}{c}$$

$$\sin 40^\circ = \frac{a}{8}$$

$$a = 5,1 \text{ cm}$$

2)  $\cos \beta = \frac{a}{c}$

$$\cos 40^\circ = \frac{a}{8}$$

$$a = 6,1 \text{ cm}$$

## Samostudium – 9.10.2023 – řešení pravoúhlého trojúhelníku

- Úhlopříčky obdélníku svírají úhel  $54^{\circ}30'$ , delší strana má délku 125 mm. Vypočítej obsah, obvod tohoto obdélníka a délku úhlopříčky.
- Obvod trojúhelníku je 0,6 m. Délky jeho stran jsou v poměru 3:4:5. Rozhodněte, zda je pravoúhlý, a vypočítejte velikosti vnitřních úhlů.
- Jak velký středový úhel přísluší tětivě dlouhé 64 mm v kružnici s poloměrem 10 cm?
- Telekomunikační věž je 86 m vysoká. Pod jakým úhlem vidí pozorovatel vrchol věže, je-li na vodorovné rovině vzdálen 170 m od paty věže?

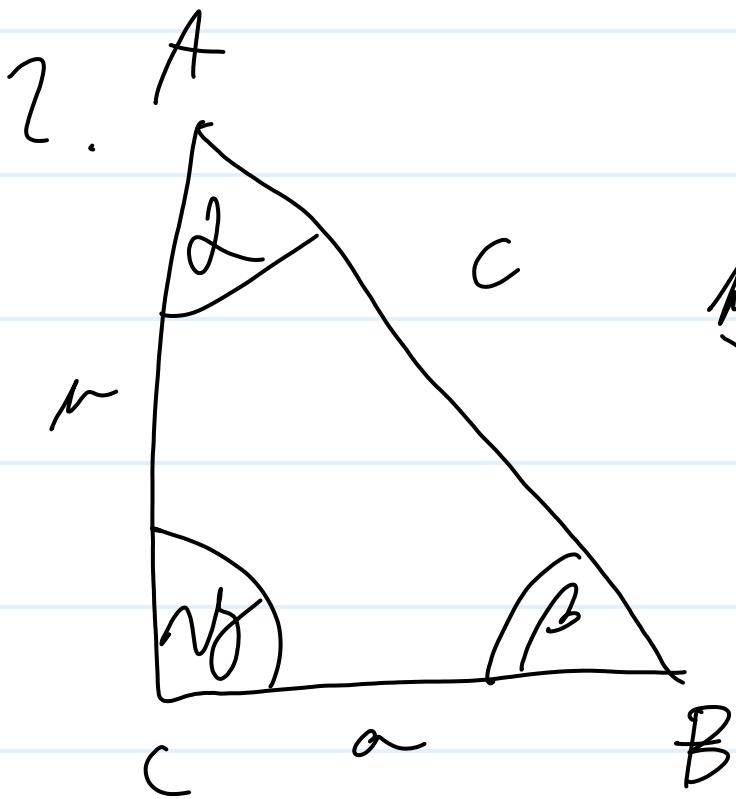
1.

$$\begin{aligned} \text{a} &= 125 \text{ mm} \\ \text{b} &= ? \text{ mm} \\ c &= ? \text{ mm} \\ S &= ? \text{ mm}^2 \\ \sigma &= ? \text{ mm} \\ n &= ? \text{ mm} \end{aligned}$$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ n^2 &= 125^2 + 64,37^2 \\ n^2 &= 140,6 \text{ mm} \end{aligned}$$

$$\begin{aligned} \alpha &= 54^{\circ}30' \\ \beta &= 90^{\circ} \\ \gamma &= 37^{\circ}45' \end{aligned}$$

$$\begin{aligned} \frac{a}{b} &= \frac{125}{64,37} \\ 1,942 &= \frac{125}{b} \\ 1,942 \text{ m} &= 125 \text{ mm} : 1,942 \\ b &= 64,37 \text{ mm} \end{aligned}$$



$$O = 0,6 \text{ m} = 60 \text{ cm}$$

poměr stran  $3:4:5$

$$60 : 12 = 5$$

$$\text{a} \dots 5 \cdot 3 = 15$$

$$\text{n} \dots 5 \cdot 4 = 20$$

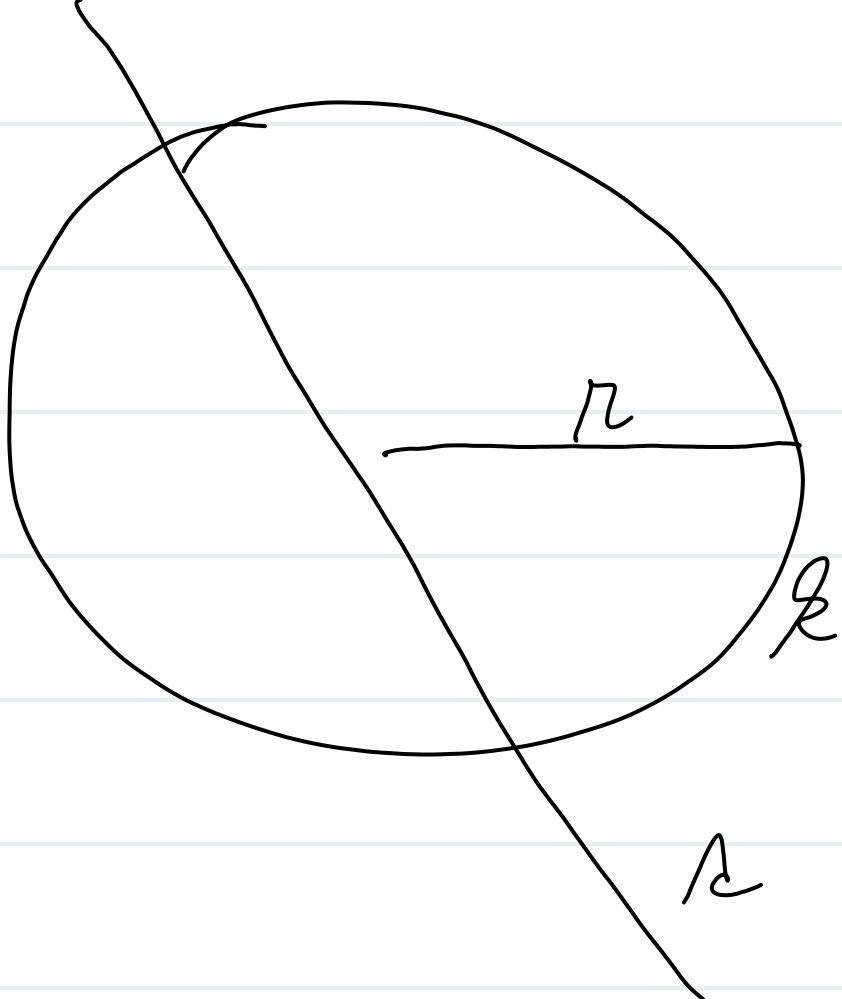
$$\text{c} \dots 5 \cdot 5 = 25$$

$$c^2 = a^2 + b^2$$

$$25^2 = 15^2 + 20^2$$

$$\underline{625} = \underline{625} \Rightarrow \Delta \text{ je pravý}$$

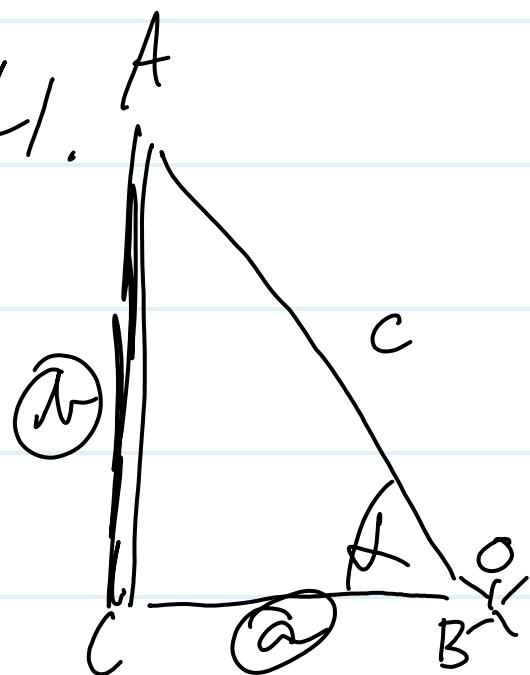
3.



$$r = 10 \text{ cm}$$

$$l = 64 \text{ mm}$$

4.



$$a = 170 \text{ m}$$

$$b = 86 \text{ m}$$

$$\gamma = ?^\circ$$

$$\begin{aligned} \lg d &= \frac{b}{a} & d &= 26^{\circ} 50' \\ \lg d &= \frac{86}{75} \\ \lg d &= \frac{43}{85} \end{aligned}$$

Rac. čísla

10.10.

$$\begin{aligned} -1 - \xi - [ -2 - (-3 - 4) ] - 5 \\ - 6 = -1 - \xi - [ 5 ] - \cancel{\xi} - 6 = \\ = \underline{\underline{3}} \end{aligned}$$

$$\begin{aligned} (-1 - 2) \cdot [ (-3 + 4) \cdot 5 - (6 - 7) \cdot 8 ] = \\ = -3 \cdot [ 5 + 8 ] = -\underline{\underline{39}} \end{aligned}$$

$$\frac{\frac{1}{3}}{\frac{2}{15}} = \frac{1}{3} \cdot \frac{15}{2} = \underline{\underline{\frac{5}{2}}}$$

$$\left(\frac{1}{2} - \frac{3}{4}\right) : \left(\frac{5}{6} - \frac{7}{8}\right) = -$$

$$\begin{aligned} & \left(-\frac{7}{9} \cdot \frac{21}{27}\right) - \left(-\frac{5}{6} - \frac{7}{9}\right) = \left(-\frac{7}{9} \cdot \frac{21}{27}\right) - \\ & - \left(\frac{-15 - 14}{18}\right) = -1 + \frac{29}{18} = \\ & = - \end{aligned}$$

$$\frac{5}{12} - \left(-\frac{5}{6}\right) - \frac{1}{4}$$

$$\begin{aligned} & \frac{5}{12} \cdot \left(\frac{4}{9} - \left(-\frac{2}{3}\right)\right) = \\ & = \frac{\frac{5}{12} \cdot \left(\frac{4+6}{9}\right)}{3} = \frac{1}{3} \cdot \frac{10}{9} = \end{aligned}$$

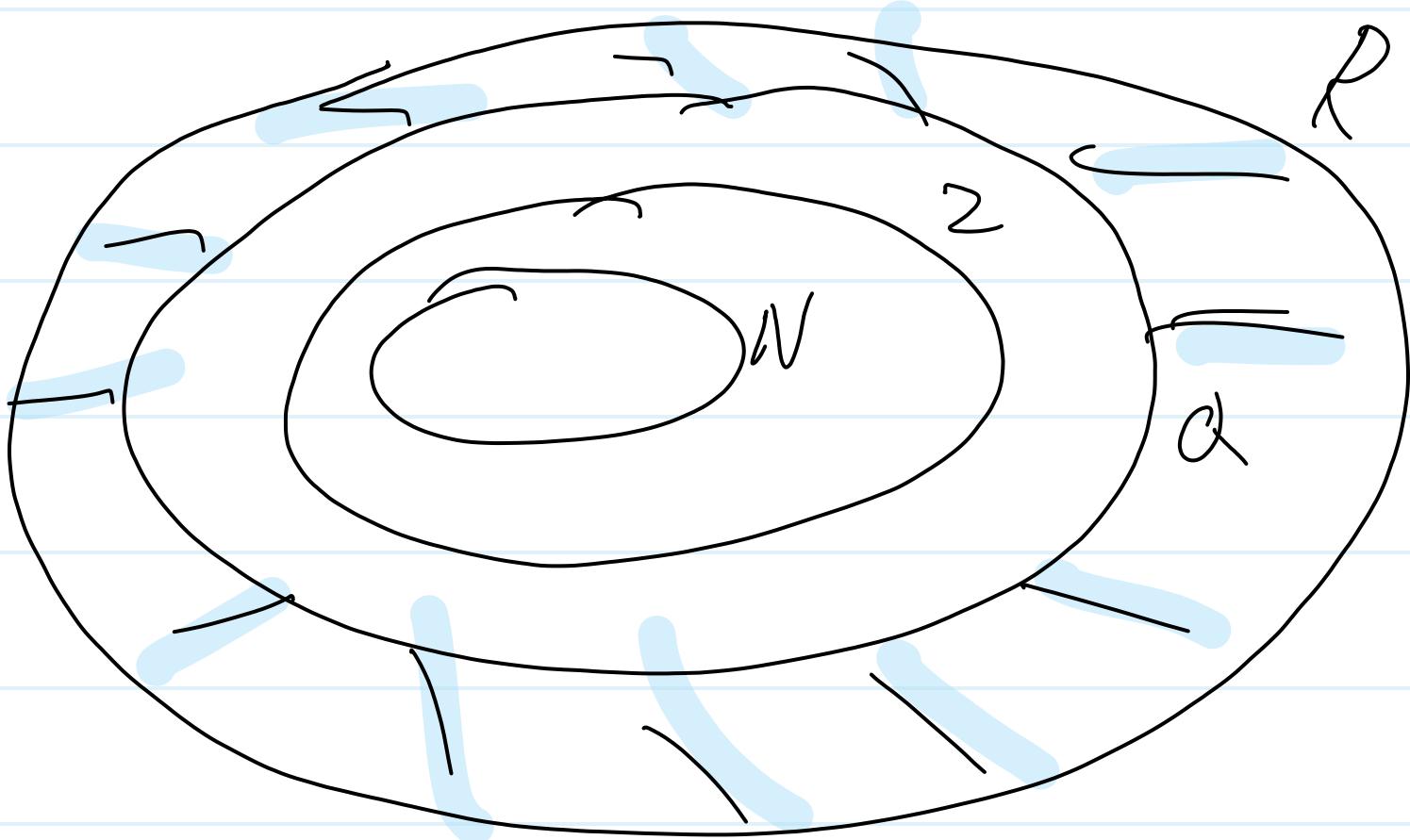
$$= \frac{1}{3} \cdot \frac{3}{10} = \underline{\underline{\frac{3}{10}}}$$

$$\begin{aligned}
 & -\left(\frac{3}{4} - 1\frac{1}{2}\right) : \left(\frac{3}{4} + 1\frac{1}{2}\right) = \\
 & = -\left(\frac{3-6}{4}\right) : \left(\frac{3+6}{4}\right) = \\
 & = \frac{3}{4} : \frac{9}{4} = \frac{3}{4} \cdot \frac{4}{9} = \frac{1}{3}
 \end{aligned}$$

Racionálna a reálná čísla

M.10.

$$N - 2 - Q - R$$



$Q \leftarrow$  Blanete

des. císla  $\rightarrow P$  retrocepción de císla  
 $0,5 ; 5 \rightarrow 4$   
 o periodo. císla

$$\frac{1}{3} = 0,333\overline{3}$$

$R \leftarrow Q$

racionalm'

$$\sqrt{\pi} = 3,141592653589\dots$$

$$\sqrt{2} = 1,41424\dots$$

$$\frac{3}{4} = 3:4 = 0,75$$

$$\frac{9}{25} = 9:25 = 0,36$$

$$\frac{1}{2} = 1:2 = 0,333\dots = 0,\overline{3}$$

$$0,6 = \frac{6}{10} = \frac{3}{5}$$

$$\frac{1}{7} = 0.\overline{142857}$$

$$\frac{2}{7} = 0.\overline{285714}$$

$$\frac{3}{7} = 0.\overline{428571}$$

$$\frac{1}{17} = 0.05882352941$$

$$\frac{2}{17} = 0.117647\overline{0588}$$

$$\frac{3}{17} = 0.1764705\overline{882}$$

$$n_1 = 3h$$

$$V_1 = 160 \text{ m/h}$$

$$n_2 = 2h$$

$$V_2 = 0 \text{ m/h}$$

$$n_3 = 1h \quad V_3 = 90 \text{ m/h}$$

$$\frac{V_1 \cdot \lambda_1 + V_2 \cdot \lambda_2 + V_3 \cdot \lambda_3}{\lambda_1 + \lambda_2 + \lambda_3} - \overline{G} =$$

$$V_1 = 0,85 \text{ m/s}$$

$$V_2 = 0,4 \text{ m/s}$$

$$\lambda = 90 \text{ m}$$

$$\lambda_1 = 90 : 0,85 = \frac{90}{0,85} = 105$$

$$\lambda_3 =$$

$$0,85 \cdot 90 = 76,5 \text{ s}$$

$$0,4 \cdot 90 =$$

Absolutbetrag und Zeichen

12.10.

$$|a| \begin{cases} a \geq 0 \Rightarrow a \in \mathbb{R}_0^+ \\ -a \geq 0 \Rightarrow a \in \mathbb{R}_0^- \end{cases}$$

$$|5| = 5$$

$$|-3| = 3$$

$$5 + |-1| - 4|1-3| = -2$$

$$|-8| - |-9| = 1$$

$$\sqrt{16} = 4$$

$$\sqrt{(-4)^2} = 4$$

$$\underbrace{\sqrt{x^2}}_{=} = |x|$$

Mazgottollmanni

0 - 4 - dolu

5 - 9 - makhon

$$\frac{89}{1} \cdot \frac{6}{1} = 90$$

$$\frac{89}{1} \cdot \frac{6}{1} = \underline{\underline{90}}$$

$$\frac{15}{1} + \frac{7}{1} \cdot \frac{3}{1} = \underline{\underline{157}}$$

$$1^\circ = 60'$$

$$35^\circ 34' = 36^\circ$$

$$0,9^2 = 0,81$$

$$\sqrt{9} = x$$

$$(-4)^2 = 16$$

$$\sqrt{100} = 20$$

$$-6^2 = -36$$

$$\sqrt{0,0036} = 0,06$$

$$1,2^2 = 1,44$$

$$0,375^2 = \frac{(375)^2}{(1000)^2} =$$

$$0,14^2 = 0,0196$$

$$= \frac{15}{40} = \frac{3}{8} = \frac{9}{64}$$

$$\sqrt{0,04} = 0,2$$

Nomennormen!

$$\frac{a}{b} \text{ ist Br. Zahl, dann } \Leftrightarrow b \in \mathbb{N}$$

$$\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{2}} = \underline{\underline{\frac{2\sqrt{3}}{3}}}$$

$$\frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \underline{\underline{\frac{\sqrt{10}}{2}}}$$

$$\frac{1}{\sqrt{3}-\sqrt{2}} \cdot \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{3}+\sqrt{2}}{3-2} = \underline{\underline{\sqrt{3}+\sqrt{2}}}$$

$$\frac{1}{\sqrt{7}+2} \cdot \frac{\sqrt{7}-2}{\sqrt{7}-2} = \frac{\sqrt{7}-2}{7-4} = \underline{\underline{\frac{\sqrt{7}-2}{3}}}$$

$$\frac{1-\sqrt{2}}{3-\sqrt{2}} \cdot \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{(1-\sqrt{2})(3+\sqrt{2})}{9-2} =$$

$$= \frac{3+\sqrt{2}-3\sqrt{2}-2}{7} = \underline{\underline{\frac{1-2\sqrt{2}}{7}}}$$

$$\frac{2-\sqrt{3}}{3+\sqrt{9}} \cdot \frac{3-\sqrt{2}}{3-\sqrt{2}} = \frac{6-2\sqrt{2}-3\sqrt{3}+\sqrt{6}}{9-2}$$

$$\frac{+ \sqrt{6}}{9-2} = \frac{6-2\sqrt{2}-3\sqrt{3}+\sqrt{6}}{7}$$

13.10.

$$(1x - 5c_3 + 20c_1) - z =$$

$$= 4x \cdot (1+5c) - z \cdot (1+5c)$$

$$= \underbrace{(1+5c)}_{\text{---}} \cdot (4x - z)$$

$$b^2 - 8b + 7 = b^2 - 2 \cdot 4 \cdot b + 16 - 16$$

$$+ 7 = (b-4)^2 - 9 = (b-4+3)(b-4-3)$$

$$= \underbrace{(b-1)(b-7)}$$

$$\begin{aligned}
 & (4x+4)^2 - (3x-16)^2 = \\
 &= [(4x+4) + (3x-16)] \cdot \\
 &\quad [(4x+4) - (3x-16)] = \\
 &= [7x-12] \cdot (x+20)
 \end{aligned}$$

$$\begin{aligned}
 3_p + 3_{pq} + 2q + 2q^2 &= \\
 &= 3_p \cdot (1+q) + 2q \cdot (1+q) \\
 &= \underline{(1+q)(3_p + 2q)}
 \end{aligned}$$

$$\begin{aligned}
 x^2 - 9x + 20 &= x^2 - 2 \cdot x \cdot \frac{9}{2} + \frac{81}{4} \\
 - \frac{81}{4} + 20 &= \left(x - \frac{9}{2}\right)^2 - \frac{1}{4} = \\
 &= \left(x - \frac{9}{2} + \frac{1}{2}\right) \left(x - \frac{9}{2} - \frac{1}{2}\right) \\
 &= (x-4)(x-5)
 \end{aligned}$$

$$\begin{aligned}
 & (6x - 7)^2 - (2x + 5)^2 = \\
 &= [(6x - 7) + (2x + 5)] \cdot \\
 &\quad [(6x - 7) - (2x + 5)] = \\
 &= [8x - 2] \cdot [4x - 12]
 \end{aligned}$$

$$\begin{aligned}
 & 12xy + 6y^2 + 2x - 1 = \\
 &= 2x \cdot (6y + 1) + y \cdot (6y + 1) \\
 &= \underline{(6y + 1)(2x + y)}
 \end{aligned}$$

$$\begin{aligned}
 x^2 + 3x - 18 &= x^2 + 2 \cdot x \cdot \frac{3}{2} + \frac{9}{4} \\
 -\frac{9}{4} - 18 &= \left(x + \frac{3}{2}\right)^2 - \frac{9}{4} - \\
 &= \left(x + \frac{3}{2} + \frac{\sqrt{22}}{2}\right) \left(x + \frac{3}{2} - \frac{\sqrt{22}}{2}\right) \\
 &= \left(x + \frac{28}{4}\right) \left(x - \frac{64}{4}\right) -
 \end{aligned}$$

$$\underline{\underline{= (x+6)(x-3)}}$$

$$\begin{aligned} 16x^2 - (3b-5)^2 &= \\ C(4b + (3b-5)) \cdot (4b - (3b-5)) &= \\ \underline{\underline{= C(7b-5)(b+5)}} \end{aligned}$$

$$\begin{aligned} a(a-b) - b(b-a) &= \\ = a \cdot (a-b) + b \cdot (a-b) &= \\ \underline{\underline{(a+b)(a-b)}} \end{aligned}$$

$$\begin{aligned} x^2 - 3x - 54 &= x^2 - 2 \cdot x \cdot \frac{3}{2} + \frac{9}{4} - \frac{9}{4} \\ - \frac{225}{4} &= (x - \frac{3}{2})^2 - \frac{225}{4} = \\ = (x - \frac{3}{2} + \frac{15}{2}) \cdot (x - \frac{3}{2} - \frac{15}{2}) \end{aligned}$$

$$= \underline{(x+6)(x-9)}$$

$$\begin{aligned}
 & (3y+2)^2 - (2y-1)^2 = \\
 & = [(3y+2) + (2y-1)] - \\
 & \quad \cdot [(3y+2) - (2y-1)] = \\
 & = \underline{\underline{(5y-1)(y+3)}}
 \end{aligned}$$

$$\begin{aligned}
 & (m+6nx+16n^2 + 15nx = \\
 & = 2m \cdot (2+3x) + 5n \cdot (2+3x) \\
 & = \underline{\underline{(2+3x)(2m+5n)}}
 \end{aligned}$$