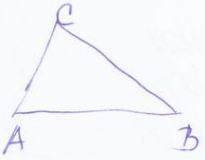
① $J + K = 575$; $K = J - 75$ ⇒ Jirka 325, Karel 250

② 366 → x, $x+11$, $x+22$ ⇒ $366 - 33 = 333$; $333 : 3 = 111$ → 111, 122, 133

③ 49 → x, $2x$, $4x$ ⇒ $7x = 49$, $x = 7$ ⇒ prostřední páska 28 l

④ 

AB x
BC $x+17$
AC $(x+17)-11$
$o = 83$ cm

$x + x + 17 + (x+17) - 11 = 83$
$3x = 60$
$x = 20$
$|AB| = 20$ cm, $|BC| = 37$ cm, $|AC| = 26$ cm

⑤ K x
M $1{,}22x$

$x + 1{,}22x = 444$
$2{,}22x = 444$
$x = 200$

$1{,}22 \cdot 200 = 244$ Milan má 244 známek.

⑥ celkem 24640 Kč ... 33 dní
první den 600 Kč
nejvíce v x-tém dni o 220 Kč

$33 \cdot 600 = 19\,800$
$24\,640 - 19\,800 = 4\,840$
$4\,840 : 220 = 22$

$33 - 22 = 11$ ⇒ nejvíce ⇒ ve 12. dne

⑦ A x
L $x + \frac{1}{2}x = 1{,}5x$
M $1{,}5x$ a $1{,}5x = 1{,}5 \cdot 1{,}5x = 2{,}25x$
celkem 418

$x + 1{,}5x + 2{,}25x = 418$
$4{,}75x = 418$
$x = 88$

Nejvíce má 198 kuliček.

⑧ 500 Kč 200 Kč 100 Kč
1 : 3 : 15
2600 Kč

počty bankn.

500 Kč + 600 Kč + 1500 Kč
2600 Kč

200 Kč bankovky jsou 3.

(9) P1 x
P2 $1,2x$
P3 $1,25 \cdot 1,2x = 1,5x$
celkem 122,1 kg

$x + 1,2x + 1,5x = 122,1$
$3,7x = 122,1$
$x = 33$ kg ⇒ ve 3. pytli 49,5 kg

(10) LEDEN
12 450 Kč

BŘEZEN
+15 %
14 317,5 Kč

KVĚTEN
−10 %
a)
12 885,75 ≐ 12 886 Kč

b) 12 450 Kč ... 100 %
12 886 Kč ... x %

x = 103,5 % oproti původní ceně zdražení o 3,5 %

(11) $1-\frac{3}{14}=\frac{11}{14}$ $2-1\frac{3}{17}=\frac{4}{17}$ $4\frac{9}{4}-2\frac{3}{5}=2\frac{11-12}{20}=2\frac{3}{20}$ $1\frac{9}{16}=1\frac{9}{16}$

$-2-\frac{5}{17}=-2\frac{5}{17}$ $-\frac{2}{11}-1=-1\frac{2}{11}$ $\frac{7}{16}+1=1\frac{7}{16}$ $\frac{5}{12}-1=-\frac{4}{12}$

(12) $\left(16+\frac{\square^2}{65}\right)\cdot 10=186$

úprava: $186:10=18{,}6 \rightarrow 16=2{,}6\cdot 65=169=\sqrt{169}=\pm 13$

řešení: $\left(16+\frac{x^2}{65}\right)\cdot 10=186$

$160+\frac{10x^2}{65}=186$

$\frac{2x^2}{13}=26 \mid \cdot 13$

$2x^2=338 \mid :2$

$x^2=169$

$x=\pm 13$

$3(\square^2-8)=24$

úprava: $24:3=8$, $+8=16$, $\sqrt{16}=\pm 4$

NEBO

řešení: $3(x^2-8)=24$

$3x^2-24=24$

$3x^2=48$

$x^2=16$

$x=\sqrt{16}=\pm 4$

$(0{,}2+\square^2)\cdot 0{,}5=1{,}72$

úprava: $1{,}72:0{,}5=3{,}44$, $3{,}44-0{,}2=3{,}24$, $\sqrt{3{,}24}=\pm 1{,}8$

řešení: $(0{,}2+x^2)\cdot 0{,}5=1{,}72$

$(0{,}2+x^2)\cdot\frac{1}{2}=1{,}72 \mid \cdot 2$

$0{,}2+x^2=3{,}44$

$x^2=3{,}24$

$x=\pm 1{,}8$

(13) $3 \cdot 9 - 7 = 20$

$3 + 9 \cdot 7 = 66$

$3 \cdot 9 + 7 = 34$

$3 + 9 + 7 = 19$

$3 + 9 - 7 = 5$

$3 - 9 + 7 = 1$

$55 : 11 \cdot \frac{2}{7} = 2$

$72 : 12 : \frac{3}{4} = 8$

$72 + 12 : \frac{3}{4} = 88$

$72 : 12 \cdot \frac{3}{4} = 9$

$72 - 12 : \frac{3}{4} = 56$

$72 - 12 \cdot \frac{3}{4} = 63$

$72 + 12 \cdot \frac{3}{4} = 81$

$55 - 44 \cdot \frac{3}{4} = 22$

XXIII

$$\frac{5s(2s-5)}{2} - \frac{5s(3s-1)}{3} = \frac{15+5s}{12} \quad /\cdot 12$$

①

$$30s(2s-5) - 20s(3s-1) = 5(3+s) \quad /:5$$

$$6s(2s-5) - 4s(3s-1) = 3+s$$

$$12s^2 - 30s - 12s^2 + 4s = 3+s$$

$$-27s = 3 \quad /:(-27)$$

$$s = -\frac{3}{27} = -\frac{1}{9}$$

Zk: $L = \frac{5\cdot(-\frac{1}{9})(-\frac{2}{9}-5)}{2} - \frac{-\frac{5}{9}(-\frac{3}{9}-1)}{3} = \frac{-\frac{5}{9}\cdot\frac{-47}{9}}{2} - \frac{-\frac{5}{9}\cdot\frac{-12}{9}}{3} =$

$= \frac{-5\cdot(-47)}{2\cdot 9\cdot 9} - \frac{-5\cdot(-12)}{3\cdot 9\cdot 9} = \frac{235}{2\cdot 9\cdot 9} - \frac{20}{9\cdot 9} = \frac{235-40}{2\cdot 9\cdot 9} = \frac{195}{2\cdot 9\cdot 9} = \frac{65}{2\cdot 3\cdot 9} = \frac{65}{54}$

$P = \frac{15+\frac{-5}{9}}{12} = \frac{\frac{135-5}{9}}{12} = \frac{130}{9\cdot 12} = \frac{65}{9\cdot 6} = \frac{65}{54}$ $\quad L = P$

②

1. d 0,35 z 1200
2. d 0,4 z 1200
3. d x

celem 1200

$420 + 480 + x = 1200$

$x = 300$

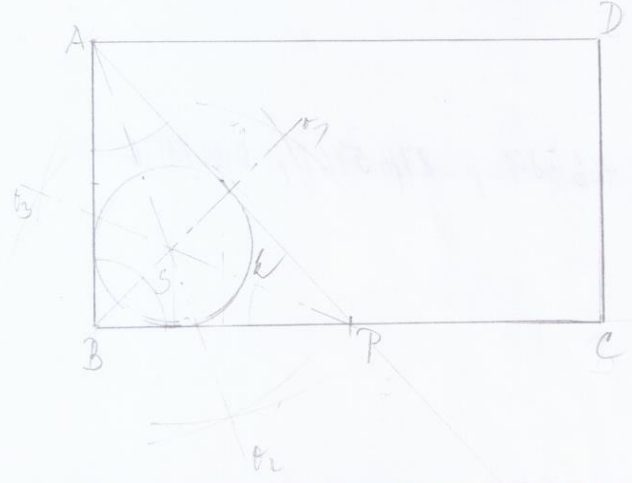
③

$d = 3\,cm = r$

$S = \pi r^2$

$S = 28{,}26\,cm^2$

④



konstrukce kružnice vepsané $\triangle ABP$

TEST

① a) $\left(\frac{x}{2}+\frac{3}{4}\right)^2 = \frac{x^2}{4}+\frac{3x}{4}+\frac{9}{16}$ b) $(0,1x^2-0,5)^2 = 0,01x^4-0,1x^2+0,25$

② $=3m^2-2m^3+4m+12+m^2+2m^3-3m = 4m^2+m+12$

③ $9\square 5$ $\square 50$ (musí být dělitelné 2 i 3 zároveň)

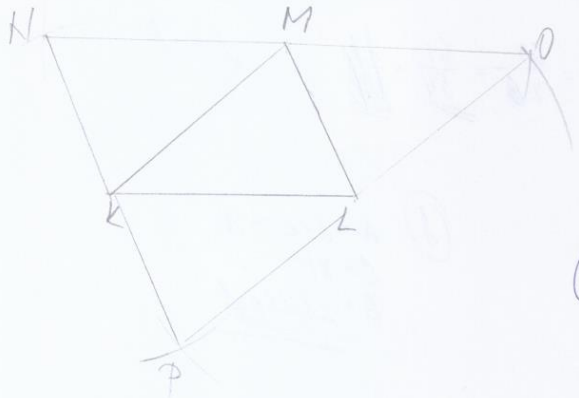
$1,4,7,$ $1,4,7$

④ $= 3^2+8\cdot 0,2\cdot 5 = 3^2+8\cdot 1 = 27+8 = 35$

⑤ $\beta_1 = \beta' = \alpha_1 = 60°$
$\delta_1 = 120°$

⑥ protější strany mají stejně dlouhé a rovnoběžné (čtverec, obdélník, kosočtverec, kosodélník)

⑦



⑧ $S = \frac{a\cdot v_a}{2} \Rightarrow v_a = \frac{2S}{a}$

$v_a = \frac{12\cdot 2}{21} = 12\,(cm)$

⑨ $S = \pi r^2$
$S = 3,14\cdot 15^2 = 706,5\,m^2$

⑩ $V = S_p\cdot r$
$V = a^2\cdot r$
$V = 16\cdot 10$
$V = 160\,(cm^3)$

⑪ 2,613 ; 2,289 ; 0,2933

⑫ 466489 ; 274576 ; 0,007396

XXII.

① $\frac{2x+1}{x+3} + 1 = \frac{3x+16}{x-3} \quad / \cdot (x^2-9) \qquad x \neq \pm 3$

$(2x+1)(x-3) + (x^2-9) = (3x+16)(x+3)$

$2x^2 - 6x + x - 3 + x^2 - 9 = 3x^2 + 9x + 16x + 48$

$-6x + x - 9x - 16x = 48 + 3 + 9$

$-30x = 60 \quad / : (-30)$

$x = -2$

Zk: $L = \frac{-4+1}{1} + 1 = -2$

$P = \frac{-6+16}{-2-3} = \frac{10}{-5} = -2$

$L = P$

② 360 Kč $\xrightarrow{+25\%}$ 450 Kč $\xrightarrow{-4\%}$ 432 Kč

100% je 360 Kč

1% 3,6 $\Rightarrow$ 432 : 3,6 = 120% $\Rightarrow$ zdražení o 20%

③

vepř (108)	x	108x	
hrn (116)	y	116y	
celkem	10 kg	1128 Kč	

$x + y = 10$

$108x + 116y = 1128$

$x = 10 - y$

$108(10-y) + 116y = 1128$

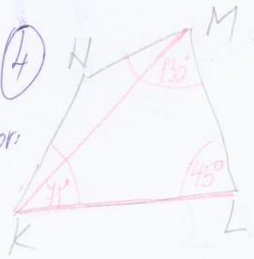
$1080 - 108y + 116y = 1128$

$8y = 48$

$y = 6$ (kg) hrnčí

$x = 4$ (kg) vepřové

④



Rozbor:

$\triangle KLM$ (sus)

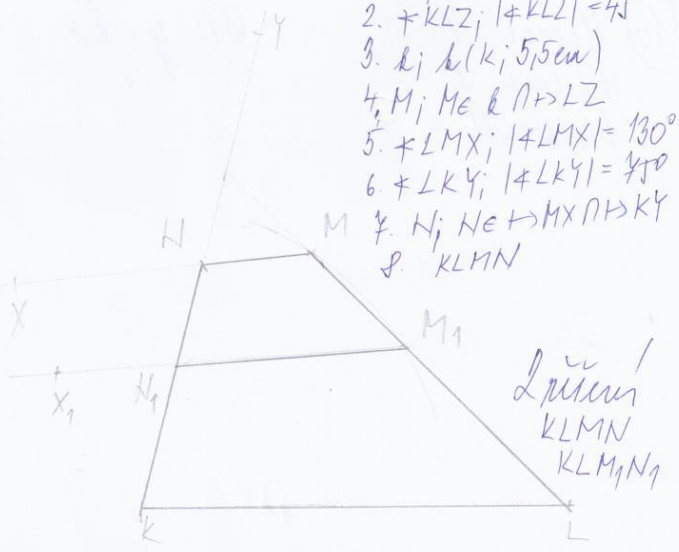
$|\sphericalangle LMX| = 130°$

$|\sphericalangle LKY| = 75°$

$N \in \mapsto MX \cap \mapsto KY$

Postup konst.

1. k; $|KL| = 7,5$ cm
2. $\sphericalangle KLZ$; $|\sphericalangle KLZ| = 45°$
3. l; $l(k; 5,5$ cm$)$
4. M; $M \in l \cap \mapsto LZ$
5. $\sphericalangle LMX$; $|\sphericalangle LMX| = 130°$
6. $\sphericalangle LKY$; $|\sphericalangle LKY| = 75°$
7. N; $N \in \mapsto MX \cap \mapsto KY$
8. $KLMN$



Důkaz:

$KLMN$

KLM_1N_1

TEST

① 1; 0,1

② 0,0004; 0,002; 0,045

③ $34\square$ 2;
$\square 21$ 6;

④ $nsn(24,14) = 168$ $D(24,14) = 2$

$24 = 2\cdot 2\cdot 2\cdot 3$
$14 = 2\cdot 7$
$\Rightarrow 2\cdot 2\cdot 2\cdot 3\cdot 7 = 168$

$nsn(21,16) = 336$ $D(21,16) = 1$

nesoudělná čísla $\Rightarrow 21\cdot 16$

⑤ $\frac{1}{5}\cdot 125 = \frac{1}{1}\cdot 25 = 25$

$\frac{9}{4}\cdot\frac{96}{100} = \frac{9}{1}\cdot\frac{24}{100} = \frac{216}{100} = 2,16$

⑥ $x + y = 25$
$x - y = 5$
$2x = 30$
$x = 15$ $y = 10$

⑦ $(-4a + 5b)^2 = 16a^2 - 40ab + 25b^2$

$(3xy + \frac{3}{4})^2 = 9x^2y^2 + \frac{9xy}{2} + \frac{9}{16}$, $\left[(2\cdot 3xy\cdot\frac{3}{4}) = \frac{9xy}{2}\right]$

⑧ $= [12 + 24 + 3]\cdot 0 = 0$

⑨ $\frac{5}{12}$ z 24 = 10 k vzhůru je 14 krav

⑩ úseček 4
úhlů 2
trojúhelník 0

⑪ $y = k\cdot x$; $k \in \mathbb{R}$