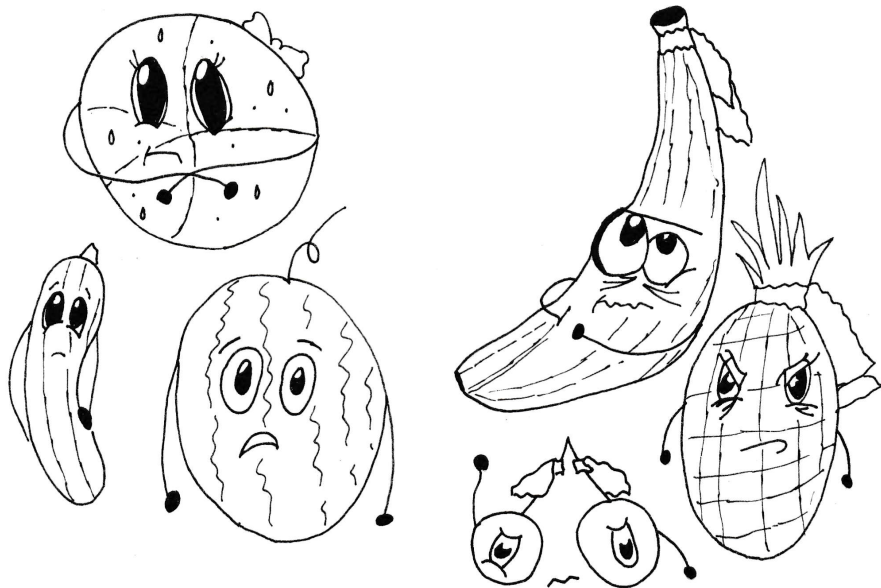


MATIK

ČÍSLO 6 – ROČNÍK 33

matik.strom.sk



Ahojte!

db @P <P z @ b<P Wdp^~eq+@S' s- eb\ -Y%4Y S y- YSC>- eqCb eqSP@- - U
 ebsY@^ c-sbeSi } s- ~qSC zC zC> C sS ^C4-@Cz\ ~sSC Y\ - PY f~ f-^SS
 Wf^c- zS%g^~@y- Y \ SeqW @W S- Y\ CzS- Wb-P- f sY@Wfb- YszS'b- ->WY
 <P<Cz> f^ bpf \ S qC C'S \ S r- \ b qU C ^G- 4-@SC sS ebx qC -Uf- C beq fC
 qC C'S - \ SY w^C \ SY Wb\ C'z- qSWb@^~si ? H \ G C f-s f YzC~fS@ \ C- ~qSC
 qC zC- Uj- YS s qG

f- S \ Sb f-^ fC@ <SMATIK-

Ako nebude

Sústreďenie

Vb^<b\ WbSWPb qW s- ^- f: Yz^b\ f-^W @b? - ^SbfSC<^Gs z%q^bs^ q 4%
 , zC@%f -WC zC^C4-@ \ < ebq- S>cb SP ~ b^C@Pb 4-@Cf CZWδ-e-U i 3~@C
 zb ebsY ^bs Wf U>Wbq f ^-sY@-U<U@b4C<-c^C f%@f zC ^-U \ %Y eY CUS
 ^-q @C'S i CzSC >WY sS4Y zb< eS SWmV zb zb W@%ebc~Fp 4%&- f- Web@ WC
 ^C4-@ bz-ε - sebYc^ \ SzCz YS \ Ss- S eb@ q <YbCISW \ ~ ^Yc^ Wf Seb\ <
 @ Wf U <@P^ >c \ <-ebq-Wf ^- SP @C@S' <P ^- ^bfb WeSz-YU , Wb zb f CZW
 ^- WbC @be-@C>bsz ^C~ Y^ f P- q b^SW<P q 4>Wbq <- 4G \ b<Sz-4%eqzS
 \ q<~ @q-P Pb sz-e - \ S^ @b p-z^-i

Ako bude

Sústreďenie

XCz^ s szq@C^SC [-zSW s- ^-eqWf CZWU^Cf Yebc-sS>eq\ C^YfCUW \ %
 - \ ~z-U<SP f q-sbf ~sWzbc^ i Š-zS f\ eqC q@\ Cz b Wb> Cs- 4-@CWb^ ^-
 cS qCfsYfb\ <-@SPbe fb~ b^Y' Cg ? -s bc- Wf > C f eqC4CP~ ^-sY@-U<SP
 z @ bf f%Yf U ^- ebfqP y- YSC eSW^z^ eb@p4^bszS z-WC sY@-UzC ^- ~
 ..C4bf szq^W>- 4%szC SP \ - YC zC zCe Yi

Tábor mladých matematikov

, Uzbzb Yzb \ C szqfS z @C eY <-4-f%δ W\ -qz\ S- s-eCq fC@ <S S^-
 y-4bc\ Y@ <P \ -z\ -zWf i [C s- zCS ^- ^Cbe- Wf- zC^ eqLq \ ><-4 f^C
 eb@^ \ -zW- eqL^ ^ sebYc^bs i
 y [[s- 4-@CWb^~ cvi | {i -~L-sz- f dC^S ^C eb@rS^b\ ^- dbc f-@Y^Q
 sWb\ U<Gc- UC~qC^ eqC4-@ <SP sSC@- Wf- 4-@ <SP @q-P-Wf ^- szq@^U
 WYGI Vb\ eYz^ S^Hbq <SC- UeqPYsbf^SC ^-UC ^- ^- CUszq^WU] C^G-P-f U
 sSeqPYs^C^S^ ebsY@ <P f ~>Y4b ebx Cz \ SCz UC b4\ @C^ i yC \ Cs- ^- zC4-i

Vzorové riešenia 2. série úloh letného semestra



beq fbf- Š? - ^b a ^@ - r-q K- e- pf-
 ^- Wq USC qC C S= | - zUV ^@qW

Jc qC C

Zadanie

[SP-Y^ - f W^ <CY çsYb \ S\ b sW\ b4 4C \ çsYb > -Ws- zzb çsYb
 eb f%-sb4C^ sfbU <fçq \ s çzb\ <fç ç @S- Wq-zi | SP-YP -@Y \ S\ b sW
 b4 4C çsY -> VÇy SP ^S W W^ - SY f CzW%SP \ C@SsC4b- f%-sb4SY- f%Yb
 \ ~ 532i , se^W f -W- 4~@bY Wbq çsY ^- SY Vzbq çsY zb 4bYs- WfSzc> C
 SP 4bYb fS <- W U@^bm

Riešenie

[SP-Y^ - SYeqfp@C çsY>Wbq <Ps çS 4~@CI{|>- zC@ zCb çsY 4~@ @S C C
 I{|i ? C S C C I{| s = c > |> J > u > c J > c _ > | D { D uv > c { > | v > I { | i p - Y U f S \ C C
 eb f%-sb4C^ <fçq \ s çzb\ s \ S\ b sW çsYb <fç ç @S- Wq-z- eqzb 4~@C
 U Pb <fçq \ s çz c E Š @C S C b f I{| \ - U <fçq \ s çz c E S 4 çsY c _ > | D - I{|i
 VÇy C çsY 4bYb fS <- W U @ ^ b > \ b P S z b 4% Y çsY c _ - | D | - W ^ S < b f C q \ C C
 19 28 = 532 > z WC [SP-Y^ - SYeq f C z C z b çsY i

Komentár

y- W Cq eYCW @ \ ~ s- eb@ qb ^- š seq f^C qC C S > çb ^- s fC \ SzC i Šbe-q
 < f- s f - W seq f S b < P % - eq - W < b f ^ > C S @ C S qC C S ^ C C S z - U > eqe - @ C
 szC ^- zb eY C <- 4 - @ Š

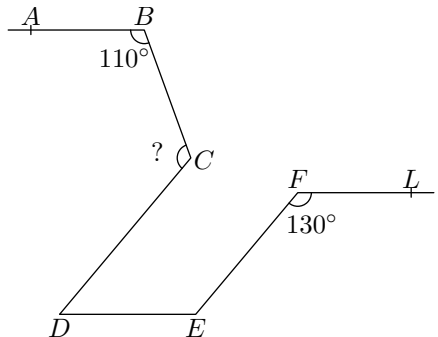


beq fbf- Š [S SO- ^~s- BqW] bf-W
 ^- Wq USC qC C S= OC^ qCz- , ^zb %o

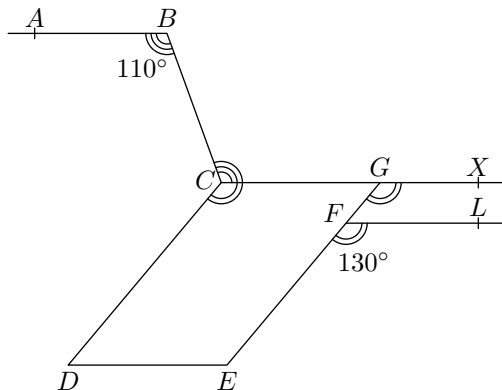
{ _ qC C

Zadanie

3b@%A>B>C>D>E>F>L s - W ^- b4Q
 q+Wi , CWs ~PY ABC U 110 sz-e bf
 - fCWs ~PY EFL U 130 sz-e bf
 dç \ W AB U çf^b4C ^-s eq \ W \ S
 FL - DE - < çfC U eq \ W CD
 çf^b4C ^-s eq \ W - FEi , W U fCWs
 ~PY BCDm



Riešenie



$\angle ABC = 110^\circ$
 $\angle EFG = 130^\circ$
 $EG \parallel BC$
 $\angle BCD = 360^\circ - \angle ABC - \angle DCG = 360^\circ - 110^\circ - 130^\circ = 120^\circ$

$$\angle BCD = 360 - \angle DCG - \angle BCG = 360 - 130 - 110 = 120$$

Komentár

y-W Cq eYcf Cz-SqC SCS > Wbq s @b YP%e~szSS U < fY@S f%qCS ^- @Cf°
 4b@bfj y \ zb < f-s eq U < G - 4%szC z-Wzb seC<P%- Y eqf ÿ-Yb\ ebç z ^ çb
 ^- Uç-szUSG, fCq \ G Cbsz-z^ s ^Scb ^-~çSS- ^- 4-@ <Czb @zS P^~ ^- çf^~ W
 @CfS zWi g



beq fbf- Sp b4b r- 4bfç W [SçW Obqf-zPbf-
 ^- Wq USC çC C^S = BfçW Vq UçSf-

{J çC^}

Zadanie

]- szYCs ^- <P-@- 20 ebWpf <P Cz ^bfj eC^-z q<- ; PYC4 ; <- qPq U Pq>
 f WbcUs- szç@ U f -Pb-P- q<<-ç ^-i TC@^ - P Ucb@Pb@C^C^U WPbebçz-
 Cz ^bfj a @Pb@S \ ~zb W Cz ^bf>Wb Ws f%4Cq > Ysz-Y^ ~sS b@Pb@S -seb
 U@C^ - ^SW@δC^ ~b@Pb@S ^-q< fS <- W ebWfS~ Cz ^bf>Wbq 4-@ <bsz-f
 ^- szYq dçPq-f U@Y> Wbq ~ ^CfS seq fS WçW^ -Pi TC \ b ^ >- 4%U@^b
 U@Y @b^ zSb zb @q-P sz-Y eqPq m, W^b>- Wm

Riešenie

a < ^ - ç \ C s S f Y P C e b U b \ e q P q f U < e b < S z W > f W b q U 4 - y e q P q \ C f z C @ ^ C f S \ C s e q f S e b f b Y ^ - P g - Y 4 b ~ 4 b f b ^ \ - P b \ s e s b 4 \ G C s e C q 4 - @ C f b f ^ R q f U < U e b < S i d b U b \ f ^ R q f U < e b < S z W > f W b q U f S \ C s e q f S z W - P > C s e C q 4 - @ C f e q P q f U < U e b < S f - W s < e q P q f U < U e b < S ^ C f S C y - Y U e b P ^ > z - W e q P q Y e Y C g j

d b x q S C s ^ - z z b Y P ~ b @ W ^ < i , W s ^ - s z b Y ^ - P - @ - ~ S 4 - 1 C z ^ > f S \ G C z C ^ P q e > W b q \ ~ < b s z Y e q P q > e q C z b C f @ % \ ~ s \ C < b 4 q - s e b 1 C z ^ > - Y ^ S W @ % ^ S C f S < - W e b Y f S ~ > ç b U 1 / 2 C z ^ - > - z b U C s e b q 1 C z ^ U C z \ e - @ b \ e q P q f U < e b < S f e Y C e b s Y @ ^ - g j

d q @ 1 C z ^ b \ s ^ - s z b Y \ ~ s C S ^ - P - @ - e q f C 2 C z ^ % f - W 4 % S P z \ 4 b Y f S < z - W 4 % s \ C s ^ - 1 ^ C f C @ C S @ b s z > Y 4 b 4 % s \ C S P \ ~ s C S : b 4 q f S < - W e b Y f S - g < W b q < P f S \ C < b 4 q e q f C 1 C z ^ i 2 C z ^ % s f ^ R q f U < b ~ e b < S b - i , W 4 % s ^ - s z b Y ^ - P - @ - Y 3 C z ^ % o z - W 4 % s ^ - \ ~ s C Y e b z S P ^ ~ 1 > ç \ 4 % s \ C s - @ b s z - Y ^ - 2 C z ^ % o y b U C f ^ R q f U < e b < S > e q C z s 3 C z ^ % e q P q f U < e b < S i

Š b 4 6 C z ^ b f s - f @ % f S \ C @ b s z - s e ^ - 3 C z ^ % a c S C z S z b e b ç z % s f ^ R q - Q f U < C e b < S i

p - Y U s - e b q S \ C ^ - 7 C z ^ b f i Š b 7 C z ^ b f f S \ C f @ % e b z S P ^ ~ Y ^ z - W e b ç C z f 1 - 3 g - 4 % s \ C s - @ b s z - Y @ f ^ R q f U < U e b < S i y C ^ z b e b ç C z U C e b < S ~ e q P q - Q f U < b - i

] - 7 C z ^ b f s - f S \ C @ b s z > - W 4 b Y e q C z \ ^ - s z b Y \ S S - Y C 8 C z ^ b f f 7 + 1 g ^ b \ - † S - Y C 14 C z ^ b f f 7 2 g V G y C e b < S 7 C z ^ b f 4 b Y e q P q f U < > e b < S C 8 14 C z ^ b f \ ~ s S 4 % o b e ^ f ^ R q f U < G , 4 % s \ C s - ~ ç S C @ b s z - Y ^ - 8 14 C z ^ b f > z - W e q @ z \ z b - P b \ S P \ ~ s C b ^ - s z b Y 4 % o e q f C 15 f 15 f S \ C e b z S P ^ ~ 1 - 7 C z ^ b f - @ b s z - s ^ - 8 14 g , U e b ç C z 15 C z ^ b f e - z q \ @ S e q P q f U < C e b < S i

d q @ 15 C z ^ \ S s ^ - s z b Y \ b P Y ^ - P - @ - ^ - U C ^ U 16 C z ^ b f f 15 + 1 g - ^ - U f S < 20 > ^ - W e W z b U z b W C z ^ b f > s W W \ S \ C < - ç ^ - Y a @ z S 16 20 C z ^ b f s f ^ R q f U < C e b < S i , W e b z b \ < - ç ^ - \ C ^ - 20 C z ^ b < P > f S \ C f @ % f ^ R q > - z b z W C ^ - U e q f s S < b Q 4 C f \ C 5 C z ^ b f - 4 C b P - @ ^ - e q z P q e ~ 4 C q \ C y - Y U ^ - e b ç z % a u } > c > W e C ~ @ q - P P q e ^ C s e q f - P > Y 4 b ^ C \ - W i e C ^ - z q < \ - f P b @ - e q f P b P q e f < - ç ^ - f b f ^ R q f U < U e b < S - s e C q f S C f @ % @ b s z @ b e q P q f U < U g - f S C f @ % @ b ^ z S ; < - q e q P q i

Komentár

r \ C f C \ S q @ S C f ^ ç S ^ - < f - s Y P ~ f C \ S @ b 4 q < f Y @ Y - z C @ s \ C \ - Y \ ^ b s z f b _ 4 b @ b f < P q C C ^ i , C - < < P 4 s e b ç f - Y f z b > C s z C s S : - @ ^ S C ^ Y e q ç z z Y - e q C @ e b W @ Y s z > C z C ^ > W b q < b 4 C f C e b s Y @ ^ C z ^ > f ^ R q f i a W C \ z C z b f - W 4 b Y < P 4 \ S S ~ \ i



beq fb f SX-U- [Sbzf- T- ^cSpSP^ - fsW
 ^- Wq USC qC C S=yb\ - V~4qW

37 qC C

Zadanie

p cW \ - Y zf- q cf^bszq ^^ Pb zcpUpbY W ABC>W@c^ - szq ^CBC Y 4b@Fi
 a 4s- P zcpUpbY W ABF UC zcWq-z f^c - W b4s- P zcpUpbY W ACF - q @CY
 b4fb@bf z <Pzb @fb<P zcpUpbY Wof UC 5i } qzC@ W szq ^%zcpUpbY W ABCi

Rieszenie

, S ^S CsS C- UzcpUpbY WABF> UzcpUpbY WACF \ - U cf^ - W f W ff W
 ^- szq ^~ BC f zcpUpbY W ABCg a 4s- P zcpUpbY W s- ebcz- W a v/2>W@c
 a UC szq ^- zcpUpbY W - v UC f W ^- z zb szq ^~i a 4s- P ABF UC zcWq-z f^c
 - W b4s- P ACF>- Wq Cs- SP f W%CY S >SP b4s- P%4-@ <b f bq< <-fSSC Y^
 b@<-W@ z <Pzb zcpUpbY Wof>zC@ BF f zcpUpbY W ABF - CF f zcpUpbY W
 ACFi a 4s- P ABF UC zcpU-sb4^C f^c >^~ - Uszq ^- BF 4-@C zcpU-sb4^C f^c S
 - W CF>cb fS\ C f%W@cq - Uz Wb=

$$S_{ABF} = 3 S_{ACF}$$

$$\frac{jBFj}{2} = 3 \frac{jCFj}{2}$$

$$jBFj = 3 jCFj$$

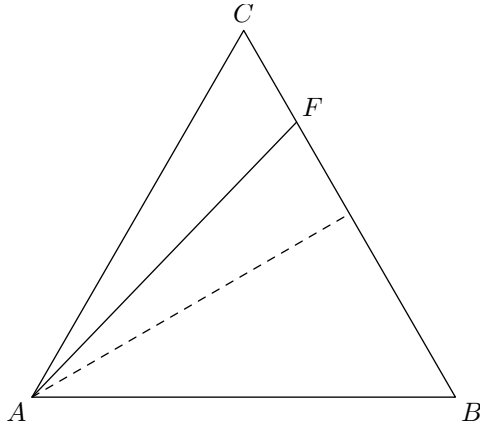
a 4fb@ zcpUpbY W ABF UC jABj + jBFj + jFAj - b4fb@ zcpUpbY W ACF UC
 jACj + jCFj + jFAj, S@ \ G Cszq ^~ FA \ - U zCb zcpUpbY W sebyc^ >cS CU
 @ W UC f b4b<P cf^ - W i ycpUpbY WABC UC cf^bszq ^^ >jABj = jACj i a 4fb@%
 s- zC@ 4-@ Y S Y^ f szq ^~<P BF - CFi BF UC zcWq-z @P S - W CF - eqfC
 q @CYz <Pzb @fb<P szq^ \ ~s 4%I>eqCb CUC^ < b4fb@bf \ -4%b I @P i
 VGy CUCBF UC @P S - W CF>z WCF 4-@Cb I Wq z S - W BFi db @s- @C @b
 eq@P-@ - U <Ucf^SC @bsz-f \ G C

$$jCFj + 5 = 3 jCFj;$$

$$5 = 2 jCFj;$$

$$jCFj = \frac{5}{2};$$

] b- Wq CjBFj = 3 jCFj>z WfYsz^C4-@CjBCj = 4 jCFj>cS CjBCj = 4 2; 5 = 10i
 ? W szq ^%zcpUpbY W ABC z W ~s 4%10i



Komentár

, C \ S f C W \ ^ b szfb qC S C b f f b s f b U \ qC C ^ P ^ G y b @ < - c S z W z f q @ S b > C b 4 f b @ A B F U C b I f ^ o c - W b 4 f b @ A C F > c b s - f < - @ ^ f - W ^ C e s - Y b > @ b s z - Y s \ C Y ^ S H b q \ S - > C U @ C ^ < b 4 f b @ b f U C b I f ^ o c - W b @ q - P i ? f b @ b f \ b P Y b 4 % ^ S W b W f z - z b S H b q \ S - s - @ Y f C \ S S ^ z - S f ^ C < s W - e b f - b f - < - < q U \ - Y 4 b s - @ Y e q @ e b W @ > C d x @ S Y f b 4 f b @ b - P U C f z W \ e b q @ > f - W \ s - f C @ C ^ z c b U - Q P b Y W % f < - @ ^ < - s C 4 b - g y - W z b @ \ ^ S f - ^ S C s - U C f - W P % 4 ^ > e q z b C e z b \ q C C ^ S ^ C \ - s 4 % W b \ e Y z ^ i d q S z - W \ z b @ \ ^ S f - ^ s - f 4 C < ^ C - f - ~ U C C ^ - @ \ b ^ b s b - > C 4 % b 4 f b @ A C F \ b P b Y 4 % b I f ^ o c > e q f b \ > - W 4 % z b z - W ^ - P b @ - \ b P Y b 4 % @ \ b P Y 4 % s \ C @ b s z - ^ C U W e Y C S ^ \ b ^ b s @ W % s z q ^ % z c b U - P b Y W i , e b @ b 4 ^ < P Y P - < P z - W f C \ S - P W b f S C C e q s b e b Y f S - s e q f ^ C p b q C C ^ S > c b W ^ S C - W ^ < b f ^ C \ C 4 % W b \ e Y z ^ i V G y C @ f b @ b f z - W P z b - f - b f - ^ S \ b P Y b 4 % ^ S W b W - z - z b f - P - U C < C W \ f S S C ^ - > d x P b @ Y s \ C s - < - z - W z b ~ q C ^ S C ^ G s - Q P b f - 4 b @ % , f - W ^ - U C e S C U C s - z - W \ ~ ~ q C ^ S - f ^ B ^ f - W ^ ^ - e q W @ f ^ - b \ q C C ^ > \ W b q P b U C U s ^ > C Y ^ U C @ C b 4 f b @ \ C 4 % @ P - W b @ q - P g - Y 4 b q z - s W @ - \ b ^ b s b - i

] - Y s - U ^ S W b W b q C S C b f > W b q e q P Y s S S > C b 4 f b @ A B F U C b I f ^ o c - W b 4 f b @ A C F > e q z b C c \ f ^ o c b 4 s - P z \ z \ f ^ o c b 4 f b @ i y b f - W e q z c b U - P b Y W b - P ^ - b x - U ^ G e Y z > - s \ C s S S z > C s - \ S f C \ S q < P Y b ^ - U C z C e q W @ % @ f b - P z c b U - P b Y W b f > W b q \ S z z b z f z q @ C ^ S f ^ o f q z S G t g d b z b \ 4 b Y ^ S W b W b q C S C b f > W b q ^ \ ^ C f % s f C z S S e q C b \ ~ s 4 % B F z q W i - z @ P Q S C - W b C F f q C C ^ ^ C 4 b Y - ^ S Y C ^ \ S C ^ W b z b \ > C z S z b z c b U - P b Y W b \ - U c f q ^ - W f W i 3 b Y b f - W f C \ S @ Y C S z ^ C ^ z b H W f % s f C z Y > V G y C U C z b U C @ C ^ < e S S C b f s e q f ^ C p b q C C ^ S i y - W z b q C C ^ S s - \ b q U C C ^ \ b P Y 4 % b P b @ b z C ^ e Y \ e b c Q z b \ 4 b @ b f i

, C b 4 C ^ C f - W Y P - > - W b f s @ z C f b f s C @ W f U Y S z ^ C > @ b e - @ Y @ b 4 C > Y 4 b 4 b Y q Y z f ^ C U @ ^ b @ - P i

I $\frac{beq\ fbf\ \mathcal{S}[- q\mathcal{S} [- sq^{\wedge} - - [- z [- sq^{\wedge} -] - W\mathcal{U}\ \mathcal{U}\mathcal{S}\ \mathcal{C}\mathcal{C}\ \mathcal{C}^{\wedge}\mathcal{S} = y\mathcal{C}\mathcal{S}\mathcal{R}z\ \wedge bf \rightarrow B@b\ \mathcal{G}\mathcal{C}@bcq\ \sim W}{|J\ \mathcal{C}\mathcal{C}\ \mathcal{C}^{\wedge}}$

Zadanie

] - b4fb@CP%[^]bzS\WPb Wq\ P~ UC f%^o- cC[^] <P Cs @CsS z 4b@bf> < Wbq <P zcfes- UC <- Hq4C[^] <P ^- cCqfC[^]b> @f @s- UC <- Hq4C[^] <P ^- \ b@cp - @Cs- UC <- Hq4C[^] <P ^- <CC[^] bi y Szb 4b@%^oq\ @C~U Wq\ ^s~ ^- Cs @CsS z b4Y W\fi V- @ \ ~ < z <Pzb b4Y W\fi UCeqf@CC[^] c sYeb@- Hq4C\WPb Wq\ <bf <P 4b@bf=b4Y W \ @S cCqfC[^] \ - <CC[^] \ 4b@ SUCeqf\ @C[^] c sY 1>b4Y W \ @S cCqfC[^] \ - \ b@q \ 4b@ SUC eqf@CC[^] c sY 2 - b4Y W \ @S \ b@q \ - <CC[^] \ 4b@ SUC eqf\ @C[^] c sY 3i a 4Y W \ @S @fb \ - 4b@ S c f^ - WUHQ4%^odC b x^ - cC[^] c sY \ 0i , W UC ^- U^o c \ b ^ s cZ f CzW <P c sYeqf\ @C[^] <P b4Y W \ m

Rieszenie

V- @ b4Y W\fi S\ C f%^od @f Hq4\ SUCPb Wq\ U <P 4b@bf i dbcZ%^ob4Y W\fi aS > ael > [S > aae > [[> S S ^- b4fb@C Wq\ P~ sSb ^- c\ C ebsz-e^C a>b>c>d>e>f i db y \ C s zCq < W W @CUHQ4C 4b@bf f%^od @f > f W W <P b4Y W <P ^- b4fb@C s- ^- <P @- U i y c4- s s~ fC@b \ S > C - W \ \rightarrow C b4Y W bPq ^S c[^] 4b@ S zC U S zC U Hq4%^o < q-z \ C Pb @f- Wq\ z feqC W @ < z <P 4b@bf q < g aCqfC[^] 4b@%^o s- zC@ ^- <P @- U f a + b + 2d b4Y W <P > \ b@q f b + c + 2e b4Y W <P - <CC[^] 4b@%^o f a + c + 2f b4Y W <P i

V- @ 4b@UCs c-s b~ eq fC@fb <P b4Y W\fi > UC[^] Pb f s \ Cq CPb@S bf <P q-c S S CWb@ ^CPb- @q-P Pb eqzS \ Cq- Pb@S bf <P q-c S S CW aCqfC[^] 4b@%^o 4-@ zC@ s c-s b- 2 30 = 60 b4Y W\fi > \ b@q 4b@%^o 4-@ s c-s b- 2 20 = 40 b4Y W\fi - <CC[^] 4b@%^o 4-@ s c-s b- 2 10 = 20 b4Y W\fi dbcZ%^ob4Y W\fi > f Wbq <P s- ^- <P @- U 4b@%^o dC@ bzYf <P Hq4 > s \ C s S zC@ f%^o U @f S @fb \ Sse sb4 \ S , S\ CzC@ < bszqb S c f^ S C=

$$\begin{aligned} a + b + 2d &= 60 \\ b + c + 2e &= 40 \\ a + c + 2f &= 20 \end{aligned}$$

yCq < sSeb y \ C <- e s- s cZ Pb@ z Wbq \ - U f CzW%^ob4Y W%^o ^- b4fb@G a 4Y W aS \ - Pb@bz- c > b4Y W ael \ - Pb@bz- | > b4Y W | S \ - Pb@bz- { - b4Y W %^o aae > [[- S S \ - U Pb@bz%^o C E y C@ < C W\fi s cZ f b x ^- c \ C Pb x g f S \ C <- e s- - Wb

$$x = a + 2b + 3c + 0(d + e + f) = a + 2b + 3c:$$

; P < C C S z S > c b \ ~ s- z b z b c f ^ + d c z b s- f q z S \ CW z q \ f%^o S C ~ f C C[^] \ c f ^ S Q < S \ ^- f%^o d @C[^] S C e b c z- b4Y W\fi > Wbq <P UC @ ^- Hq4 s c-s b-i S @q-PCU c f ^ S C s S \ C C f%^o d @f b- < z c z C U c f ^ S C s S \ C C f%^o d @f ai ? bsz ^ C C=

$$b = 40 \quad c = 2e;$$

$$a = 20 \quad c = 2f:$$

y b z b z C q < @ b s - @ \ C @ b c p f ^ S C e c C x i

$$x = 20 \quad c = 2e + 2(40 \quad c = 2f) + 3c$$

$$x = 20 \quad c = 2e + 80 \quad 2c = 4f + 3c$$

$$x = 100 \quad 2e = 4f$$

yC^zbs cCz <P < C \ - †S - Ybf - i VGy Ce - f f%W @q-U ebçz%b4Y Wf [[- ŠŠ>
z- Ws zb ^G - e b q ^ < C Y ç s Y > e q z b z C ^ f q < 4 - @ C \ - \ - †S - Y ~ P b @ ^ b z ~ f z C @ %
W y e - f 4 - @ c p f ^ C E , z C @ % x = 100 \ 2 e = 4 f = 100 \ 2 0 \ 4 0 = 100 i [- †S - Y %
s c z > - W z b c z s W % f S \ C @ b s z - > U z C @ c C E - z b f z C @ % W y ^ C 4 - @ C \ - S @ C
b 4 Y W % f [[- ŠŠ> z - W C S @ ^ C @ f - \ b @ q - Y 4 b @ f - < C C ^ 4 b @ % ^ C 4 - @ f C @ - s C 4 - i
y q C 4 ^ - \ f - W C z C ~ W - > C z W z b c p \ S s z ^ C ^ S C 4 b @ b f ^ - b x - U C † S z - U i] - e q Q
W @ W y @ b W j - P ~ @ S - W j z - s C 4 b ~ < b e - W U C C e b s z - e ^ b s 4 b @ b f a a a a e e Š [i
, Y 4 b W y W @ @ q - P 4 b @ @ - C C q f C ^ - \ C @ S ^ C P b - S U W \ b @ q - < C C ^ i
, W @ b \ < z < P z b @ f b < P e q W @ b f e b - S C \ C { C E ç C q f C ^ < P > | C E \ b @ q < P - c C E C Q
Y C ^ < P 4 b @ b f > ^ S W C ^ C 4 - @ C \ - @ f - < C C ^ - ^ S @ f - \ b @ q f C @ - s C 4 - s c z
4 - @ C ^ - b x - U c C E

Iné riešenie

] - z C z b Y P C s - @ - e C W C f S S C > C ^ S W @ % ^ - \ S ^ e b P - @ @ b W - C q C C ^ S C
^ S W W W ^ - s b 4 ^ C \ U @ ^ b @ - S i , z b \ z b e q e - @ C 4 - @ C \ C ^ - ~ P Y e b P - @ ~ s e b ç f -
f z b \ > C ^ - \ S z s z s Y C b f ^ S > W W W 4 b @ b f ^ - \ @ - W b q - @ f b S - 4 b @ b f > s - e b q C C
^ - z b > W W W 4 b @ b f ^ - \ @ - W b q W ^ W j z ^ % 4 b @
[\ C C s f S ^ > C e b W s s - s C @ ^ 4 b @ % q ^ C z W ç C q f C ^ 4 b @ \ - f W @ U
@ f b S S P b @ ^ b z - 0 > \ b @ q 2 - < C C ^ 1 f - W s S - U z z b ^ C f S ^ C \ C P ^ C y > @ - s ^ - z b
e q s f % W @ q ^ \ < z c p < P c p f ^ < f < - @ ^ c + z = 1 > c + m = 2 - m + z = 3 g
T C @ S e q 4 Y \ ^ - s z ^ C - W - \ f C @ - s C 4 - @ f - \ b @ q - Y 4 b @ f - < C C ^ 4 b @ % f z C @ %
z b S s z q z S P b @ ^ b z - i] - - s z C e b ç z % 4 b @ b f s z - W > C z b \ ~ z b f S C C - 4 q ^ S
^ - e q W @ z W C W @ @ q - P 4 b @ 4 - @ C ç C q f C ^ i
d b x q C s - z C @ > W W W 4 b @ b f f S C C @ b s P ^ ~ \ - \ C 2 0 \ b @ q < P 4 b @ b f > W @
< ^ S P U C f @ f b < P b 4 Y W ^ < P - f W @ b \ < ^ S P \ - P b @ ^ b z ~ @ f - 4 b @ % y C @ - < - \ b @ q
4 b @ % a - \ C 2 0 2 2 = 8 0 4 b @ b f i Š C C ^ < P \ - \ C 1 0 > W @ < ^ S P U C f @ f b < P b 4 Y W ^ < P
- \ - P b @ ^ b z ~ @ f - 4 b @ % z C @ @ b W e % d 0 2 1 = 2 0 4 b @ b f i y b U C @ b W e % d 1 0 4 b @ b f
f 8 0 + 2 0 = 1 0 0 g

Komentár

V seq f ^ C \ ~ f s Y C W s z C s - @ b e q < b f - Y z - W C q f C z - S O b q S z b 4 b Y s @ b W < b Q
f - ^ \ > C f S < 4 b @ b f s W z b c ^ C ^ U @ C < s W i y b U C f @ % @ Y S - ç - s q C C ^ S f C z Q
W < P Y P > - Y C ^ ^ b P < f - s s S - ^ S ^ C - f C @ b \ S S - C U z c 4 - ~ c 4 S i d q @ W < C ^ C z - ç
e b f C @ ^ b @ c p Q C C ^ b 4 Y W @ - f ^ - U s < 4 b @ b f > ç S C z < P < P < C \ - c b ^ - U s <

Y4b ebzb\ zb ~qSC 4-@C ^- UGe SC qX Yb C'SSi ? fb@LCU@^b@-P z- Wzb eqQ
fbyY^bf eqsz-e f 4C< ^C ~s fSs Wseq-f^C ~ qC C'S-i ab- W4%0- [Š b4YW
4bYbI 4bcbf - <- ael - UaeŠ b4Y Wéb{ 4b@%ma eYz s- -Uf zb\ eqe-@C~q4S qb
^- Ujs< [Š b4Y Wbf>eqCb CUC<- ^C^- Ujs< 4bcbf mOS'z=a @ebfGy ^SCUC^big

V beq fbf ŠyS W r< W sbf— [S-P- Y| -sq^- { | qC C
^- Uq USC qC C'S=X~W ; PY@—

Zadanie

rzqCC< <fS;SyzqC 4- ^- eS<-i, szq@C eS<C 4bYb WbYCSWb Wb4-s%0 <f%bWeS<C
4bYebWq% s%q\ i rzqCC< f%szqOSY@f-@s- Wq-zi VGy s- zq "Y@b Wb4-s%0x sWY30
4bcbf>Wqy s- zq "Y@b q- szS-V@CUCs%q< sWY18 4bcbf>- Wqz "YbWq UeS<C< sWY
6 4bcbfi [bPYb s- sz- -Uzb> C s- -^S@b eS<C^Czq "Y- ebzb\ ^G sWY S@C
4b@] - sfbU\ <CWbfb\ sWqC sSf S bY CUPb eqC Cq^ 4bcbf <ŠW- zq H^SC
s- @b eS<CUC 17 4bcbf fszqC%0\ S b eS<C @b eqC Cq- ^Cebq z Yj Vb Wb ^- Ujs<
& bPbYszqCS 4bcbfm

Riešenie

] - UqWq s- <- \ %Š C^- @z \ >qb UC zb eqC Cq^ sWqI TC zb ebqCz 4bcbf>Wbq
szqCC< < sWY eqC@C^ ebqzb\ szqC>Wbq \ Szq "YeS<-i yb<^- \ C^-> C<CWbfb
ebqCz 4bcbf UC s qS^ ebqz~ <-s Pbf eS<C- eqC Cq^ Pb sWqI aESC-W<P<C C
fC@S \ - †S -Y%ebqCz 4bcbf>eqCb\ eqC Cq^ sWqC \ -> C "†^ >z W<P<C C
fC@S \ - †S -Y%ebqCz <-s Pbf eS<C

pocet bodov = pocet zasahov 17

, S ^S CsS> CebqCz 4bcbf <- zq H^SC eS<CUC f @%@CS^ Sszs S a @S - U
s qz szqCkbf <P 4bcbf f -f-szq ^- qf^S-Cg 4-@C @CS^ Sszs S VGy s- ebq
<qC C^- @q-P szq ^- qf^S-C\ ~s 4%- Uz-@CS^— Sszs S 17 UC eqfbq sYb>
z-WCUC@S—y-YS fC< ^- zCzb szq ^C>ebqCz <-s Pbf>\ ~s 4%@CS^— Sszs S
rzqCC< s- z \ e-@b\ zq "Y18>12 -Y4b 6 q+i

dbx q C s- zCq <^- zb>qbs sz- ^C- Wqf^S- eqC@CY C6i dbqz%4bcbf>Wbq szqCC<
< sW f UC@bzšf <P <-s P<P> s- \ C^ S ^- GzS~ -f-szq ^- 4-@C s czb\
^SCW W<P q sCY5>3 - 1 f^- \ Sszb e fb^ <P 30>18 - 6g, CzW%zCz ^bf Pb@bz%
s ^Ce-efC q sY - ~W- Šs\ CsS> CSP ebqCz fqb UC ebqCz <-s Pbf UC e-efC q sYi
r qz @fb<P ^Ce-ef%P q sCYUC e-ef%0- zC@ -Us qz ~4bfb ^ Pb e-efCPb ebqz-
^Ce-ef%P q sCY4-@Csz-YCe-ef%dqzb -f-szq ^- UC-Ueb eqC@C^ Sszs Se-efC
q sYi

] - eq fUCszq ^C eb eqC@C^ Sszs S @bsz- ^C C s qS^ 17 - UC@ Pb < q sCY3>2
- 1 f e fb^ <P 18>12 - 6g r qS^ @fb<P ^Ce-ef%P q sCYUC f @%>Ce-ef%0UC@S
eqe-@Wq UC eb eqC@C^ Sszs S-Ueq f-szq ^- e-efC q sYb UC>ebW szqCC<
<-s PbfYeS<~ @f-^s Wq-zi

Š-zS s\ Cs- @beq <bf- YWz\ ~> CUC@S f- ^- Uf°ç gebçCz 4b@bf>Wbq \ bPbY
szqCC< @bsS P^~ > UC 12 17 = 204i ? YC Sž UC f -W-W← > C szqCC< s- WzbQ
\ ~zb ebçz~ 4b@bf ^- bx-U\ bPbY@beq <bf- çb UC sWzbc^C eq f@ > Y4b \ b ^b
UC@^~s Wq-z zq " Ys%q- q< zq " YbWq U

Komentár

, °ç S^ < f-s seq f^Cb@P- Yf eqf @CS^bs zb> CebçCz szqCY ~s 4%oo@CS^C ^
SszS S ? q-P-ç-s ~W← > eqçb s- ^C@-ebsW@ 18 17 = 306 ~ 4bY ^-Q
qç^CUSi æ-szb szC s- ebW - Y^ - UC@^b\ eqW@C ~W← > Cs- zb ^C@-@bsS PQ
^~ > -f -W@bsz-zbç^ @ W< sS f%o @-UC f z W\ zb ebsz-eC f%e s- ^-bx-Uf CzW%
\ b ^bszS] - < fCq^~s CzCzC > CszCebf°ç S^C^G-4 @ Y^ - W^ zq-WS f-W\ bQ
PbYszqCC< < sW eb -@bf ^ ebçCz 4b@bf> Wç C z-UC fC\ S @ YC Sz~ s ç-s b-
qCC^S - zqC4- ^- ~ \ %YCi g

, ~zbçf: bçbf <P qCC^ =, SW ç 3qC Sbf->T-W4KC^çS [-qS [-sq^->] -qQ
zS [P-YWVçsz ^- [SY^bf->? -^SYa ^@ > -^Cz- rC\ -^SSbf->] -qS zCfW

Konečné poradie letného semestra 33. ročníka

dbq @SC	[C^b - e@C fSWb	p bC^ W	WBY	dr ci	i {i Ji Ii vi	; r
ci	X-<S ; PY @^—	ŠD	K, [æ 3,	IJ	- - - - -	c OD
i	SY^ Tb×HdbWq^	Šu	KTO Ooy	I CE	- - - - - { - -	c CH
{i Qvi	3- q4bq 3- YbfS;bf—	Š_	K, YUVB	I	- - - - - v -	c CE
	a ^@CUV q- SW	ŠD	K, YUVB	J_	- - - - - { - -	c CE
	, Cq^SW , b@S;Wbf—	ŠD	K, YUVB	J_	- - - - - Q -	c CE
	Bf^ Vq U;Sbf—	Šu	K, YUVB	J_	- - - - - - -	c CE
ui	pSP- q@ , b@S;W	ŠD	K, YUVB	Ju	- - - - - Q -	c CE
Di	Rf^ ^- , - qS^%bf—	Š_	K3S'3,	J_	- - - - - I -	- -
_i	OC^qCz , ^zb %o	ŠD	ŠVqJVB	JJ	- - - - - - c	_D
c CE	r- \ ~CYa s- sW o	Š_	Š? qI? ,	I	- - - u - c -	_v
cci	, Y4Cz VY S C^zbf—	Š_	ŠX bJVB	Ji	- - - - - { - -	-
c <i>i</i>	3q ^S;f TCS	Š_	Ša Vb r	I CE	- - - - - J	-
c <i>i</i>	yCq <S rz ^bf—	Š_	BKT, VVB	{u	- - - - - - -	_c
c <i>Ji</i>	, Y@S q rY^S'	ŠD	ŠVqJVB	J CE	- - - u - Q -	_b E
cli Qcvi	yb\ - V-4q SW	ŠD	ŠVqJVB	{I	- - - - - Q -	D_
	V- z q^ - G- q4- Ybf—	ŠD	K, YUVB	{u	- - - - - D I -	D_
cui QcDi	3S ^W K - q SW	Š_	K, YUVB	JJ	v - - - - -	DD
] - z- S yW ebf —	Šu	ŠXCfbr	Ji	- - - - - v c c	DD
c_i	? - S V CeS	Š_	K, YUVB	{v	D - - - - J -	DJ
CE Q ci	[- qS' \ SY -W	Š_	K, YUVB	J_	v - - - - Q Q	D
	, @CY Obqf- zP bf —	Š_	Š? ^CeVB	Ji	D - - - v Q I	D
i	X-W- T- Wb	ŠD	ŠVqJVB	J CE	- - - v c J	Dc
{i	B@- q@GC@bq- W	Š_	BKT, VVB	{I	u - - - - - Q	uD
Ji	d- -Y^ - yW ebf —	ŠD	ŠXCfbr	{D	D - - - - c c	uI
Ii	p- @bf- ^ [S S ^	Šu	ŠVqJVB	{c	v - - - - v J	uJ
vi	V- Sz rC\ - ^ bf —	ŠD	Šr dcOB	Jc	- D { v c {	u
ui	[- qS' ? - @UW	ŠD	r Y@d	D	- - - - - CE J	u
Di Q _i	~@ SY Vq- ebf —	Šu	ŠVqJVB	{	v - - Q - J	uc
	T- W4 æ ^ W	Šu	K, YUVB	v	- - - - - Q Q	uc
{ CE	a ^@CJy zP	Šv	K, - q Š,	{c	- - - u Q Q J	v_
{ci Q{i	T-^ 3q Uq W	Š_	Š \ Cqda	{ CE	- - - CE c I	v
	Bq W Tb- P \ - ^	Š_	K, YUVB	{J	- - - CE v Q I	v
	S\ b^ rz ^b	Šu	BKT, VVB	cu	- - - - - c Q	v
{Ji	V- z q^ - , @ \ bf —	Šu	Šd- e S T	{	- - - Q { Q Q	I{
{Ii	[- q W Obqf- zP	ŠD	KVb^ da	cD	- - - Q v Q D	ICE
{vi	yb\ - ? - b	Šu	Š? q- VB	j	v - - Q { Q Q	J_
{ui	, q- q d- ^W- P	Šu	K, YUVB	Jv	Q Q Q { Q Q	Jv
{Di	[- zC UV ~^@qW	Š_	ŠVqJVB	c	- Q - - Q Q Q	{_
{_i	XG K- e- bf —	Šu	K, 3Cq;	{D	Q Q Q Q Q Q	{ D
J CE	, S S \ V- qYV-4 S -q	ŠD	Ša Vb r	cJ	v - - Q v Q Q	{ I
Jci QJ i	a sW q; - <- q	Šu	ŠVqJVB	{c	Q Q Q Q Q Q	{ c
	[- z XS4-W	ŠD	K, YUVB	{c	Q Q Q Q Q Q	{ c
J <i>i</i>	[- zCU, - W	Šu	ŠVqJVB	v	Q Q Q Q Q Q	v
J <i>Ji</i>	, Y@S q r W C^ -q	Š_	Ky, - ^rX	c{	u Q Q Q Q Q I	I
J <i>Ii</i>	yb\ - O- <- P	ŠD	K [O_X	{	u Q Q Q Q Q Q	{
J <i>vi</i>	yb\ - K- U	Š_	ŠVqJVB	cI	u Q Q Q Q Q Q	{
J <i>ui</i>	? ~ - ^ Rf^ ^	Šu	ŠVqJVB	cD	Q Q Q Q Q Q	cD

dbq @C	[C^b - eqC fSv	p bç^ W	WY	dr	ci	i { i Ji Ii vi	; r
JDi QICE	B\ - XbY W\ 4-çf-	ŠD	ŠVçJVB	cu	Q	Q Q Q Q Q Q	cu
	S\ b^ 3bçfsw	ŠD	Š; -@ç,	cu	Q	Q Q Q Q Q Q	cu
	[S:P- YV- W	ŠD	ŠVçJVB	cI	CE	CE Q Q CE	cu
Ici	[- †S SS^ - GCç^ <bf-	ŠD	Ša Vb r]	c	Q	_ Q J Q Q	cJ
I i	? -fS@ K%ç	Šu	ŠVçJVB	c	Q	Q Q Q Q Q Q	c
I{i	3bL@ ^- rz~@C^Wçf-	Šu	ŠVçJVB	cc	Q	Q Q Q Q Q Q	cc
IJi QIi	GSSe GCçW	ŠD	ŠVçJVB	D	Q	Q Q Q Q Q Q	D
] - z-S dbS çSçf-	ŠD	ŠVçJVB	D	Q	Q Q Q Q Q Q	D
Ivi	S\ b^ rzçe- U	Šu	ŠVçJVB	J	Q	Q Q Q Q Q Q	J
Iui	[- zCU, bçz- ^ W	ŠD	ŠVçJVB	{	Q	Q Q Q Q Q Q	{
IDi	pS:POYC, ^@q-ss%çf-	Šu	ŠVçJVB	CE	Q	Q Q Q Q Q Q	CE

