

# MATIK

ČÍSLO 1 – ROČNÍK 36

[matik.strom.sk](http://matik.strom.sk)



# Ahoj!

dqfC s- zS@bsz- Y@b q Wç- sbeS MATIK- FTC zb \ - zC \ - zS W sC S'-q fy- W VbQ  
q \ ~ s- ^- Vb^<SebYbW \ C @bsz- eqçç <b Vb%ô- <CY z @C >ebç- s Vbq Pb  
<- SC WeC <-4 f%o --U \ - f <P PSQj , WsSsC@ - W s\ - W- Y4b @CfS z- WLC  
eqS^C eqC zC4 Frz- ç f%çC S @f- ^-s fçS zb Vb> Vb Vb @bW- C g^Cf C@^ <P YbP>  
Vbq <P çC C^S ^- \ eb YC @f- Vj-z <- ebYbW \ %S P beq f \ C>- -W4-@ @bsz- Q  
zbç^C @b4q >\ C bç- Wf <-S W%o Vb ^S W%eqCz \ i, zb) zbç- sbeS C^C- UC  
Y^ seb \ ^- ^ YbP%o YC- Ueq fS Y+ yC \ Cs- ^- zfbLC çC C^S F

fC@ <SMATIK-

# Ako bude

## Lomihlav

y- W- Vb W @ çW- UzC zb çW^s ç- W- <- çS zW \ @C<C 4q s - Xb\ SPY fi  
TC zb s - zfbçY^ ^ <P @q szçf ~çC -eqC S Wb f sC@ Cp b - @CfS zCb ççQ  
^ W <-W @ <P WYf- Y4b eqsY ^ <P çç^ Vb f fS <çç^ <P L%o ^- Sg R P YbP-  
UC f%çC S çb ^- UJS < b JCE \ - zC \ - zS W <P YbP> J PY fbY \ bf - J P - @ ^S W r - S <S  
\ - U - ^ <- s- ^S çb ^bf ^- ~çS >ebçf^ - sfbLC sS% s bsz- z^ \ S- szçz^ W \ - Q  
q- zb f sb <-4b- f \ - zC \ - zS W yC zb çW s- s - Xb\ SPY f ~sW zbç^ f eS zbW  
\_ ic|i|ç| f eqçS zbç <P K%o ^- <S >, YCb f- c f Vb S S <Pi p CL szçf- s- \ Cç @b  
|Dicci|ç|i p CL szç ç^ Hbç \ - Yq- U4Y S S Hbç <-S b ç CL szç <-S s - S- UC eqC @Q  
<P - @ - U <S P çç^ Vb <P \ Cç ^- ç ^- P zes = w \ - zSW / szqb \ i s W s W Y b \ SPY- f w  
yC \ Cs- ^- f- s F

## Výlet

dqf f Yz zbPzb WbSWPb çW s- 4-@ Wb^ - f sb4bz- Dcç|ç|i, Yz UC ~çC  
eqf C z W <P - UC W Y C b ~ eq Y C S b s b- ^- zb >- 4% szC s- szçz Y s b sz- q \ SW \ - q z \ S  
< b s szçç C^ S - seb ^- Y b ^bf <Pi dç fS < S Hbç <-S s Y C @- UC ^- ~ .. C4 szç ^ Wi

# Pravidlá súťaže

VbqCeb^@C^ \ -z\ -zSW s\ S'-q MATIK Ucs - eqC S Wbf ui - \_i qpc^ W  
 <-WV@^ <P WYqsei sCV^@%o VV- q%bs\ qpc^ <P L%o^ ^-S - ci qpc^ W e^ qpc  
 ^ <P L%o^ ^-Si Š- eblS s- \ ~ -U\ Y@ S <S f s - S\ -U qf^ -W eb@ SC^W%o  
 - f Pb@%o W sSC@ - <S  
 V- @ qpc^ Webbsz-f < @fb<P s\ Gszqf <S ^ Pb - YZ^ Pb Wbq s <-W^Q  
 c^ \ -z\ -zSW\ s szqC^ \ eqC^ -UCe <P qC S Cbf TC@^ s\ Gszq s- sWV@-  
 < @fb<P s q>> Wbq <P W @-b4s-P-UC v YP seq fS^Y <bq @^ <P b@^ -U-P CU  
 eb^ -U- S-i

## Registrácia

pLSzqpf @b s\ Gszq s- fSC f%qfbq^ \ ep^ Y ^ - ^ - CU..C4bfUuszq^W | -Q  
 sY@^C sS f%Y ebfS^ @ UC f ~ f-zCsW\ ep^ Y , W- Y bf ep^ Y f sCWS  
 req-f cz-i y Szb @ UC ebzqC4-UC G- 4%o\ C s- s zC4b- \ bPYS sW^z- Wbf- -U  
 f c- sC WY ^ SCsSf WY > feqe- @Ceb f ^S ^- s szqC^SC- zC >- 4%o\ C - \ bPYS  
 ~ fCqUS f ebq @ qC S Cbf - W- Y UC- szS\ S'-q-i d qPY-W UC ebfS^ - eqC f CzQ  
 W-P qC S Cbf s\ S'-q-i | - zCb szq^VC ^-UC - UsfbUC beq fC^ - b4b@bf- ^  
 qC C^S >- WSSP ebsCYC Wq^S^W%o  
 , 4%o\ CzSeqC s qLSzq- <S- f%Y C^S ep^ Y ^ - ^ - Cuszq^VC ~ - P cSS- f%qfbqS  
 s\ C^ - szq^VC s\ S^ - qi szqb\ i sW\ C@S- w-eYb- @w^ - fb@ e@HUC@ b@- <P ^-fb@

## Ako písať riešenie

YP%qC s- \ bsz- z^G ^Cb@eS-U- - ^S ^SW\ ~ ^C@-f Ub@eSbf- > eqCb C <- zb  
 4- @C CszqP-f 4b@%o sY@bW YP%o UVY UC seq-f^%o^ Csz- c i y fbUC qC C^S  
 \ ~s b4s-Pbf- eb@q4^ \ %oSC^ Wbf ebsz-e f%qfC^SC- - W sSeq qC C^  
 YP%ebsz-ebf- Y r Yf- \ SqPb@C^C Czq | G- 4 @ U C- W -4%ozfbUC qC C^S  
 \ -z\ -zSW%seq-f^G-z W\ ~s b4s-Pbf- eqC^ f ebqz%z- WC c sY > s Wbq \ S  
 ebqz- >^C ~ 4%o- bWj PY^ f^- eq- W eb- SC WY Y c W > Wbq - W @ Pb@bz-  
 sebqz- Y^ ^- ~qS ebqCz @Cs zS^ <P \ Sszg- Y4b b@ Cq ^ eq f zW\ i Š- epfC  
 beq fbf-zC \ ~s fC@SC sW^zqPbf- zfbUC qC C^S <- eqS Cq ^ c- s > z WC  
 eqS S cCCCC b ^bsz f%o s^ <P ebqz- qb\ ^C C CbPb@bzS eY \ ebqzb\  
 4b@bfj  
 pSC C^SCW @CU YP%e ^- s- \ bsz- z^ e-eSq Hq\ -z- , J>- WUC^ - fS <Cq <P YSQ  
 zb<P> <be^SSPi y C z%o- @ ^ b@eSbf- ^C \ ~s i V- @ qC C^S \ ~s \ - f PY fS VC  
 zfbUC \ C^b> zqC@-> WbY - c sY YP%qP SC^S ebsCY U^ - @CS- =

Š@q- C^SCrypa | >dG } dT TCS^ ^-I >CfC IJ Vb S&G

db@b@bsCYzC- ~fCj f q<^CMATIKI  
 pSC C^S \ C z- WEC ^-Pqf eb\ b-b- <- Y C^ Pb cz~ ^- ^- CU..C4bfUuszq^VC  
 \ -zSWszqb\ i sW, CzW%qC C^S \ C b@bf:@f @b|CCCC? 4-U^ - eqC^ @b@q  
 - ^S zCq\ ^- b@bf:@ ^S > cS~ 4- @C qC C^S ebsCY eb zb->- Y4b ^- Pqf <G

..C4 f<- b^GsWqC^SC zS 4~@C C szP-f 4b@%g , eqe-@C zC^P^S^W<P eqb4Y\ bf  
 ^- ^- Cuszq ^C ebsSYUqC^C^S ^- CQ -Sbf -@qS~ qSCsC^S- 2szqb\i sW s eqC@Q  
 \ Czb\ MATIK fb Hbq -zCd? G fW @ qC^C^S f s \ bsz-z^b\ s 4bcqg ^- U^GSwq  
 f@C zCq \ ^- s qC@b | CKEEpSC^C^S 4~@ eqfJz - beq fC^ Y^ f eqe-@C CzfBU  
 eqp^ YC W\ eYz^C f%@YC i

**Bodovanie**

3b@bf^SC YP<-fS b@seq-f^bszS- Wf- Y%qC^C^S - <- W @ YP~ \ CqC SC  
 < sW ^- UfS <- 4b@bf i 3b@%a C < sW -Uk- cS szb^ f%qC^C^S<- @ ^ <P YP>  
 eqCb s- ^C4bUebsY - UsfblC ^C eY qC^C^S i, W4~@ b4s- Pbf- @b4q ^-e- @%  
 q @S zS<- ^C @ \ C ^UW 4b@%  
 ? b <CWf P b ebq @S s- <- ebç z- f- U 4b@%z- Wb=

á @CfS z- <S Wf- qz- > eqf<S ^- e° qç^b\ L%o ^- <S = f CzW%of qC^C^S YP%o

á s\ - <S zCqS = e° ^- UCe SC f%qC^C^S <P YP eYs zfqz ^- U%o 4b@bf  
 <SW z <Pz eS zSP YPi

á sSC@ \ - <S sCW^@ = e° ^- UCe SC f%qC^C^S <P YP eYs @q-P ^- U%o 4bQ  
 @bf <SW z <Pz eS zSP YPi

dq\ ->S Ssz- <S- \ Y@ 4~@ Pb@^bzC^ qf^ - W - W sSC@ \ - <S  
 , eqe-@C C^SC ssebWU s 4b@bf \ bPb@^bzC^ \ sfbUPb qC^C^S>\ C ^-  
 @b @fb-P z @ bf b@q bsY^S qC^C^S \ - Sb\ ^- -@qS~ \ - zSWzsqb\i sW<- sY  
 s- ^bs - z-4~@CeC CzC^ +

**Príklad**

yq U 4q zS >@CfS z- W, Y@b> s\ - Wf- q - sSC@ - W | - q-CY f%qC^S S f CzW%o YP%o  
 eYC qf^ - W f<Pb@~ ^- P b@ Cg <- {>|>J>c>I - J 4b@%o, Y@b ebzb\ < sWY  
 3 + 2 + 4 + 1 + 5 + 4 = 19 4b@bf>T- q (3 + 2 + 4 + 5 + 4) + 3 = 21 4b@bf - [ - q-CY  
 (3 + 2 + 4 + 5 + 4) + 4 = 22 4b@bf i T-s^ >^Sm

**Riešenia po termíne**

, eqe-@C C sfbUC qC^C^S eb Y eb zCq \ ^C b@bf @ ^S > qC^C^S zS beq f \ CY^  
 f eqe-@C C ^- 4~@C b@q-çC^ @b z^q-P @^ b@zCq \ ^- s qfi, zb\ zbeqe-@C zS  
 <- b^GsWqC^SC szP^C C 4b@%3b@%s- szP-f U eb@- @ Wb\ C W^S ^- sYb@f^G

á ? b | J Pb@^ ~ @C ~ U C | w 4b@bf <- bWj PYC^ ^- P b qj

á , S<- W | J Pb@^ - @b z^q-P @^ = cw 4b@bf <- bWj PYC^ ^- P b qj

á , S<- W z^q-P @^ S- qC^C^S ^C beq f- U G

, b f ^S bç^ <P eqe-@b-P \ C C 4b@%s- qC^C^S ^G^ Si

**Odpisovanie**

3b@s s \ b cU C 4G f ^S W%szp-f U -Uk- b@eSsf ^SI dcf b@eSsf- ^ cp Q  
Y~U Ceb@b4^ dC C^S febcz 4b@bf @CA Cebczb\ < c-sz^C^ <P- <-bWj PYS C  
^-@bY- „z-W Cq WeS^>Wbq bsz-f U 4G 4b@-i, Wf^Pb@-g^U@CzC YP- dCQ  
C^ f YCq z cQ~fGyzC^~bf>~zbq - szq ^->S- WfSWUzC szq z- 4b@bf <- b@Q  
eSsf ^SCfUC f -WebzqC^ ^-e s -Us- \ bz^ dC C^Sg

**Webová stránka**

, W\ — ^CUW bz~W%^- ^-s- Y4b Wk- @ ^S \ >z- W^Cf-P- U^- f z fS ^- C..C4bf  
szq^W%dqW @U YPCUC@SWsS>Wbq-sY S^- zb>-4%SS- \ bPbYbe z- ^- ^CQ  
Us^bszSbP-@b\ <-@ ^ i p-Y S \ b ^bs >- W ^-s W^z- Wbf- >UC \ -SB\ ^- -@Cs-  
\ -zSVszqb\ i sW

**Sústredenie**

r szq@C^SCUC b@ C^b- eqC^ -UCe <P>eqYC Sbs b~ ^-~cS s- ^Scb ^bf - szqz^  
s- s bsz-z^ \ SqC SC\ S r szq@C^SCUC~qC^ ^-U ° eqC sC@ - Wbf - @CfS z- Wbf  
^- <-W @^ <P WbY<P f- S Wbf <b@ebfC@ U <SP qC^ Wbf ^- fS <qC^ <P L%o ^-Q  
<S<Pg\ Y@ S<S\ ~4%oebx f ^ -W ^-Pq @^ <S, eqfb\ q @Cs ebx f ^ f -<S  
Xb\ P Y f - z qC SC S MATIK->Wbq < sWYS f sC Gszf- seb {CE4b@bf i p-Y  
c-sz^ <S ebx f ^ eb@- ebq @S Xb\ P Y f i, eqe-@C^ <WPb ebcz- dC SCbf  
UC\ b ^ ebx f ^- s szq@C^SC- UqC SCbf < S~YPb sC Gszq eb@- ebq @S -Y4b  
qC SCbf>Wbq ^C@bsS P Y Pq ^S~ {CE4b@bf i  
c-s ^- s szq@C^ UCeb@ SC^C— c-s b~ ^- <CU@ WCzqf ^S s szq@C^S i a eqQ  
e-@^ f ^S W UC ^~z^ eb S @ Wj^z W^ bsb4- CQ -SB\ -Y4b f eqP Y sbf <b\  
Hbq ~Yq Vb^z W^~bsb4- z zb S @bs ebs @S- f cb ^- UYS b\ c-sC<- YC b@ebQ  
fGyi, eqe-@Cebq- C^S zUz b eb@ SC^W%a ~bqL ^S-zbcf c-sz^ W ^Ceb f ^-  
^- UYS SCs szq@C^SI

**Zadania 1. série úloh zimného semestra**

2023/24 | Matematika 4 | 40 | 100

Nezabudni si vytvorit či aktualizovať profil na [www.zadania.sk](#)

**Úloha 1**

1.1. Vypočítajte hodnotu výrazu  $\frac{1}{2} \log_2 \frac{1}{4} + \log_2 8 - \log_2 2$

a)  $-\frac{1}{2}$

b)  $-\frac{3}{2}$

c)  $\frac{1}{2}$

d)  $\frac{3}{2}$

1.2. Vypočítajte hodnotu výrazu  $\log_2 16 - \log_2 4$

**Úloha 2**

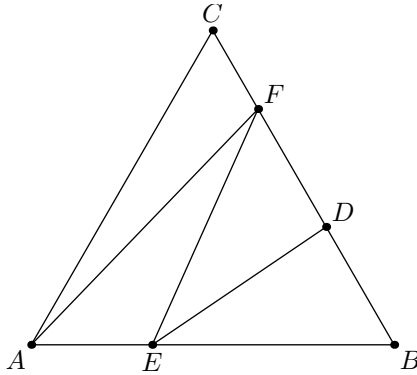
2.1. Vypočítajte hodnotu výrazu  $\log_2 16 - \log_2 4$

**Úloha 3**

3.1. Vypočítajte hodnotu výrazu  $\log_2 16 - \log_2 4$

**Yp- J**

, sz-e @b, ^@CpfUUsW%C \ -zf q pf^bszq ^^ Pb zpU PbY W ABC sb szq ^b-  
@Pb- JDsz ei | - szq ^CAB YC 4b@E - ^- szq ^CBC YC S ebsz-e^C4b%D - F  
z W C bAs P%zpfU PbY Wbf AFC>AEF>EDF - EBD s pf^- Wi , %ebçz- UC  
f sbe- P s çç @ bW sççWjEBj+ jDBji



**Yp- I**

] Cb- , ^@Cqs\ %s @fCq <^CW@^ <CY çsYi r ççz SP ^- U°ç SPb sebYç^ Pb  
@CSC- - ^- U C^ SPb sebYç^ Pb ^-sb4W UC pf^ { |i , W @fbUççsCYsS } Cb  
- , ^@Cq\ bPYS\ %sCm] -UCçf CzW%a b ^bszS- @bW-zç> CS^ ^CçSz-Ui

**Yp- v**

, ^@Cq- y-Yç es Y @b eSsW çsY ^-sYçbf^ \ se sb4b\ =Š-ç Y @fb\ S ~4bQ  
fb^ \ SçsY\ S- W @ y-Y çY^ f^SMY- Wb s ççz <S Cq eqç@P-@- U<SP @fbP  
çY^bfj] - eqW@- W-ç^C CsçsY\ SI - Dz W-çS zbWébsz-e^bszSf%ççz-z Wb=  
5;8;13;12;7;10;:::

-g? bW-zç> C- Wéqf @f çY^%ebsz-e^bszSs ~4bfb^ çsY \ C^ SC- Wb \ SS^>  
z Wézb\ zfqç - UeS z%çY^ UC \ C^ - Wb cEE

4g? bW-zç> C- Wéqf @f çY^%ebsz-e^bszSs ~4bfb^ çsY \ C^ SC- Wb cEE  
z Wf ebsz-e^bszSççSz-UC çY^ z W> C f CzW%- ^ \ ^-sYç@-U<CçsY s  
\ C^ SC- Wb |ci

<g? bW-zç> C- Wéqf @f çY^%ebsz-e^bszSs ~4bfb^ çsY \ C^ SC- Wb cEE  
z Wf ebsz-e^bszSççSz-UC- UçY^ z W> C f CzW%- ^ \ ^-sYç@-U<CçsY s  
\ C^ SC- Wb c\_i

### Zadania 2. série úloh zimného semestra

pSCAS eb YSC^- UGSWq@b | D ^bfC 4q | C|

#### YB- c

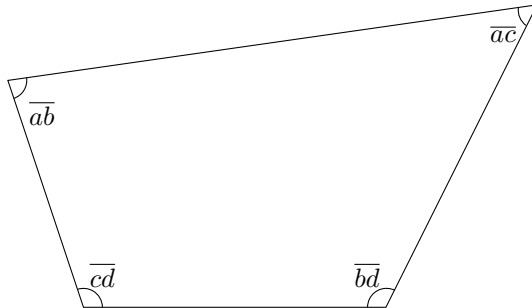
aP^SW zfq b4@ ^SW ABCD \ -sq ^- AB @P { sbe%o sq ^- BC @P  
c sbe-i 3b@E UC f@S Y^ ebYsbe%b@ sCfW%CD>Y^ \ S b b4@ ^SW ABCD  
- jCEj = jDEji, W-UC fCWs ~PY AEBm

#### YB- |

} | G ^- ^- f@C^SbfUbsYfCs <PYeS- @Cfç-z- W@ s W@ \ s 4-j  
ebx ^-> Y4b ^Ceb ^-fUCzb f^-W ^ g, S C C^- bsYfCUC| <PYe<bf- W@  
< ^SP ebx ^-v @Cfç-zi ySC fS C CW @ @Cfç- ebx ^-pf^-W ebçZ <PYe<bf  
- Wbsz-z^ @Cfç-z+Vb WUC^- bsYfC@Cfç-zm| -@SCf CZW% b ^bszS- @bW-zC  
CS ^CS i

#### YB- {

Vb ~ S- < \ - \ ~z \ -zf q zfbq-PbY Wi, CWszS-PYbf zfbq-PbY W s çsY  
< Y C ^ < S Cq a; b; c; d - W ^- b4q-Wi | -@SCf CZW% b ^ fCWszS-PYbf - f%  
sfCZSCeqçbS fCWszS-PYbf ^Cf%Pbf-Ui a 4q-bWCS- S-szq ç^ i



#### YB- J

y-Y< s, ^@Cp\ s <- \ - Y ^- @ @\ <b- YPb < \ - zC - zSW%O - @ Yf CZW%  
eqfbçsY> Wbq s ^@ Y <- e s - W s çZ @fb-P < Y C ^ < P çsCY db\ zCS SP  
^ - @bW-zC C S @Cj- YSC ^CfSz-Ui

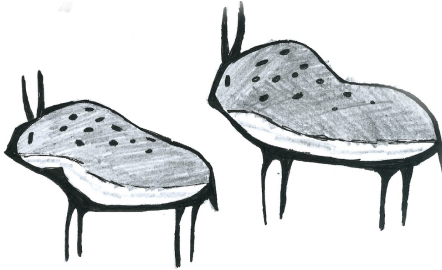
#### YB- I

] Cbs fBY^UWçsYki | -sY^CWUsW%UzC^CeçSçY-Y<- ^- e s Y^UW-P  
k + 2 q < %P W@ ^ < P < Y < P çsCY ? bW-zC C \ @SçsY \ S ^- szC^Cs ~çSC  
^ - < P @ - 4-j @fbs- çsCYs çx @CB \ @OSC ^ \ 2k > - Y4b @fbs- çsCYsbs çzb \  
@SC ^ \ 2ki



**Yp v**

Odpz, ^@CpfPbb zCe- WCzf q zpbPbY WABC>V@C@ W sCçW%AC WC| e- Ybf  
- fCVIs ~PY ACB UC120 sz-e bfi as zbPzb ~PY eqZ ^- szq ^~ AB f 4b@CDi  
y- V&C fSA G CjAEj = jECj = jCBj>V@CE UCszq@szq ^%ACi Vb Vb e- Ybf \ -  
sCçW CDm? W UCebzq4^ f%W@f eqS^G- zC@ 4G eb\ b-Sç%bf ^Si





] →bf=            MATIK    WqC eb^@C^c^ \ - z\ - zSW s\ S'-q  
                       æsYb c á rCez\ 4Cq|E| á ŠS ^ s\ CszCq{vi qç^ W  
 „ C4=                \-zSWszqb\i sW  
 BQ - S≠             \-zSVšszqb\i sW  
 pSC C^S =          dqJ\ - \ Cb@bf:@ ^ \ ^- ..C4Ceb zb~ - Y^ feqe- @Cebq-<P%o  
                       ^- -@qSc qSCsC^S- 2szqb\i sW  
  
 a qL ^S -zbq=     } ^šfCq Š- d- fY TbxCH -HešW f Vb SŠ <P>  
                       dqq@bfC@C-WHWY> q4-qf- |>Eic IJ Vb SC  
                       Š@q C^SCrypa | >TCsC^I>Eic IJ Vb SC

Organiza ný poriadok korešponden ných matematických seminárov Malynár, Matik,  
 STROM je zaregistrovaný na Ministerstve školstva, vedy, výskumu a športu Slovenskej  
 republiky pod ísлом 2017/13750.2-10B0.