



Q DGGLWLRQ WR VFRULQJZKWWGHIQWD UHRSRVLWRQ/ LEV  
FRQVLGHUDWLRQZHUHQFH JLYPSOLFLW\ RULJLQDOI

Calculators are NOT permi

7KH HTXDWR@UHSUHVHQWV D SDUDERODPRU DOO U

$$L f x \frac{x}{x} DQG f_n L f f_n x$$

nIRU « &RPSXWH ZLWK SURRI

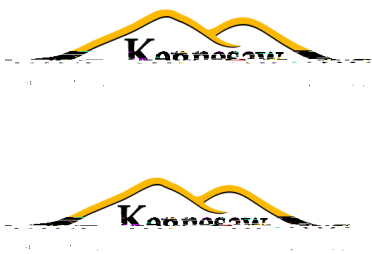
&RQVLGHU WKH WKUHHHQXP EHUWKHU D SRVLWLYH LC

D)LQG ZLWK SURRIHQZLYFDXHQ WKUHH QXPEHUV D

E3URYH WKDW WKHUH DUHQIZQLWIKQRDQRIRIYVQHW  
LV D SULPH QXPEHU

WKH FRUUHFW URRP NH\

,Q WKH ILJXUH \$%&' LV D V\$XDUH 0 LV WKH PLGSRI  
DQG 1 LV WKH%PLGSRQWQHUVHFW DW



THE 2012-2013 KENNESAW STATE UNIVERSITY  
HIGH SCHOOL MATHEMATICS COMPETITION  
PART II



SOLUTIONS

D ~~HWVRVKRWKDWKHUHLVRLQ y KLKSDVHVWVKURKDOSDBROD~~  
~~ZWKHTWLRQRIWKHIRUR~~  $\sum_{k=0}^n \binom{n}{k} a^k$  ~~HW mQ n~~

$\mathcal{B}$

$$x^{-1} - R \quad y^{-1} -$$

E  $\sum_{k=0}^n \binom{n}{k} a^k$

$$\sum_{k=0}^n \binom{n}{k} a^k = \sum_{k=0}^n \binom{n}{k} a^k 1^{n-k} = (a+1)^n$$

$$\sum_{k=0}^n \binom{n}{k} a^k = (a+1)^n$$

$$y^{-1} f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(x)}{k!} x^{-k}$$

$\mathcal{B}$

$$f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(x)}{k!} x^k$$

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«7A6' 15B6U1'

Ub X« AaD B' 15d 7' 1' " ' ' l g ] b [ ' e i UX f ] ` Uh Y f U` ' 6 A D B  
' 1' &&u"\$'

G] b ' 1' g U b f l & g \$ b U E ' + S d W c & U 1 \$ E W d b g &

K] h \ c i h ' ` c g g ' c Z ' [ Y b Y f U` ] h m ž ' ` Y h ' 7 6 ' 1' & ž ' g c  
Ub X ' 7 A ) " " 1'

l g ] b [ 8 Af 6 ] 7 [ ž \ U n g ' & b ' ' H \ Y f Y Z c f Y ž ' i g ] b [ ' h \ Y ' ' )

U d d f c d f ] U h Y ' X c i V ` U Y " " % b [ & g ] E ' & A e f Gal i! ' / " Ź ' " W c g &  
U' 1 ' % H \ Y f Y Z c f Y ' g ] b ' 1'

G] b W A Y Ub X B U f Y ' a Y X ] Ub g ' c Z ' h f ] Ub [ ` Y ' 5 6 7 ž ' d c ] b h  
c Z ' h \ Y ' h f ] Ub [ ` Y ž ' g c √) U \ U h ' 5 D ' 1' 7 D ' 1' ' 7 A ' ' 1'