F UncfVUW_g'G\]bY'Ug': ci f'D`UmYfg'9Ufb 5``!5a Yf]WU'<cbcfg°

5f_UbgUg'VUgYVU``'WY`YVfUhYg'U'\]ghcf]WXUm'Ug'K Y\]k U'5`cm YUfbg'G97'D`UmYf'cZ'h\Y'MYUf'UbX'Zci f'd`UmYfg'UW\]Yj Y'5``! 5a Yf]WU'\cbcfg"



@Umhcbž:5f_UbgUgž:I G5:!: \pm 0:U:fYa Uf_UV`Y:X]gd`Um:cZ:hU`Ybh:UbX \UfX:k cf_ž:Zci f:5f_UbgUg:F UncfVUW_g:\Uj Y:UWX]Yj YX:5``!5a Yf]WU \cbcfg:Zfca :h\Y:BUh]cbU``7c``Y[]UhY:6UgYVU```K f]hYfg:5ggcW]Uh]cb h\]g:mYUf":H\Y:gY`YWhYX:d`UmYfg:UfY:K Y\]k U:5`cmž:7\Uf`Yg 8 Uj U`Ubž:?i\]c:5`cmž:UbX:NUWX:Fcchž:a Uf_]b[:'U:g][b]Z]WUbh a]`YghcbY:Ug:]h g:h\Y:\][\Ygh:bi a VYf:cZ:5``!5a Yf]WUbg:Zcf:h\Y dfc[fUa:]b:U:g]b[`Y:gYUgcbž:gi fdUgg]b[:'dfYj]ci g:mYUfg:k \YfY cb`m:h\fYY:k YfY:fYWc[b]nYX:]b:Vch\:&\$%-:UbX:&\$&%":K Y\]k U:5`cm ghUbXg:ci h:Ug:U:gYWcbX!hYUa::5``!5a Yf]WUbž:fYZYWh]b[:\]g]a dfYgg]j Y:dYfZcfa UbWY:h\fci [\ci h:h\Y:gYUgcb"

 $K Y \] k U 5 cm²k \ c' \ Ug' V Y Y b' X i V V Y X' H \ Y D f] n Y X' C b Y ž' \ Ug' \ U X' U g Y U g c b' h c' f Y a Y a V Y f'' 5 c b ['k] h \ '\] g' 5 ``! 5 a Y f] W U' f Y W c [b] h] c b ž' \ Y$

FYWcfX!GYhh]b[5WX]Yj Ya Ybhg

 $H\[g']\] a \ dfYgg\[j' Y'gYUgcb'Z\] [if Yg'Xcb h'ghcd'Uh'K Y\]k U'''<\]g \ Vfch\Yfž'?i\] c'5`cmž'k \c'gYfj Yg'Ug'h\Y'XYg\] [bUhYX'\]hhYfž'U`gc \YUfbYX'5``!5a Yf]\WU'\cbcfg'k]h\'U'VUhh]b['Uj YfU[Y'cZ'''' '$ž \Wcbhf]\Vi h]b['%' '\ca Y'fi bg'UbX'U'hYUa !`YUX]b['+$'F6<math>=$ g'' : ifh\Yfa cfYž'7\Uf`Yg'8Uj U`Ub'\Ug'a UXY'\YUX`]bYg'k]h\'U'''')) \VUhh]b['Uj YfU[Yž'Wca d]`]b['%('\ca Y'fi bg'k]h\ci h'Wca a]hh]b[Ubm'Yffcfg']b'h\Y'ci hZ]Y`X'''A YUbk \]`Yž'NUW\'Fcchž'h\Y'cb`m d]h\W\Yf'Ua cb['h\Y'\cbcfYYgž'\Ug'a U]bhU]bYX'U'gc`]X'9F5'cZ'''') - ž ghf]_]b['ci h'\%'- 'VUhhYfg'cj Yf'-&'&#']bb]b[g''

 $\label{thm:converse} $$H\YgY`UWWc`UXYg`UfY`dUfh`cZ`U`VfcUXYf`hfYbXž`Ug`5f_UbgUg XYZYbgY`VcUghg`h\Y`gYWcbX!VYgh`Z]Y`X]b[``dYfWYbhU[Y`]b``h\Y`bUh]cbUh'"-, ("``Gi W\`XYZYbg]j Y`ghfYb[h\`]g`Wf]h]\WU`ž`YgdYW]U``m`]b`\][\!ghU_Yg`[Ua Ygžci h`]b]b[``5f_UbgUg ``Wca dfY\Ybg]j Y`UddfcUW\`hch\Y`[Ua Y`h\]g`gYUgcb"$

5 cmg'=bX]j]XiU'FYWc[b]h]cb

$g_{\tilde{y}}^{\tilde{y}}$

±0. h\ Y. 5``!G97 'gY`YWh]cbgž'K Y\]k Už'?i\]cž'UbX'7\Uf`Yg'8 Uj U`Ub'U``
a UXY']h'hc'h\ Y':]fgh'HYUa ž'k \]`Y'7Ua '?cnYU`'^c]bYX'h\ Ya 'Ug'U
GYWcbX'HYUa 'gY`YWh]cbž'Zi fh\ Yf'XYa cbghfUh]b['5f_UbgUg
Xca]bUbWY']b'h\ Y'G97 'h\]g'gYUgcb"'Cj YfU``ž'h\ Y'F UncfVUW_g'\Uj Y
dfcj Yb'h\ Ya gY`j Yg'U'Zcfa]XUV`Y'ZcfWYž'k]h\']bX]j]Xi U``UbX
Wc``YWh]j Y'YZZcfhg'W'`a]bUh]b[']b'\]ghcf]WUW\]Yj Ya Ybhg'h\]g'mYUf"

g'WYUf'h\Uh'h\YfY g'gca Yh\]b['dfcZci bX'UVci h'h\]g'mYUf g'hYUa
UbX'h\Y]f'UWWca d`]g\a Ybhg"'F UncfVUW_'ZUbg'WUb'hU_Y'df]XY'Ug
h\Y]f'hYUa 'di g\Yg'h\Y'Vci bXUf]Yg'cZ'k \Uh g'UWX]Yj UV`Y']b
Wc``Y[]UhY'VUgYVU``"

8YhU]`g	
Cfh	@Umhcbž:5f_UbgUgž:IG5
EiY``Yb	k k k "Uf_UbgUgcb`]bY"Wca
	• k k k "i gUVUgYVU``"Wca
	Uf_UbgUgfUncfVUW_g"Wca

6Ygi WXYb G]Y i bg Ui Z. a Y]b!k]Yb bYh