

B Yi YghY `7C J =8!%- !NU\ `Yb `ZØf` ; fc» !
; YfUi . `=bn]XYbn `V`Y]Vh`b]YXf][`

5_hi Y`Y`7C J =8!%- !NU\ `Yb `Ui g`XYa `@UbX_fY]g` ; fc» !; YfUi
Ua `%+"\$* "&\$&) . `B Yi]bZY_h]cbYbž`=bn]XYbnYb`i bX
=a dZei chYb`ja ` , VYfV`]W`"



; fc» !; YfUi ž`8 Yi hgW\ `UbX`!`8]Y`7cfc bU!G]hi Uh]cb`]b`<YggYb
V`Y]Vh`Ui W\ `Ua `%+" ' ħ b] '\$& &) `j Yf[`Y]W\ gk Y]gY`ghUV]`"@Ui h`
**bYk g"XY`k i fXYb`ja `@UbX_fY]g` ; fc» !; YfUi `YX][`]W\`nk Y]
B Yi]bZY_h]cbYb`ja `J Yf[`Y]W\`ni a `J cfhU[`j YfnY]W\ bYh`" =b`XYb
j Yf[Ub[YbYb`g]YVYb`HU[Yb`g]bX`XYa bUW\`]bg[YgUa h`XfY]` : Ä`Y
b Yi ` \]bni [Y_ca a Yb`"8]Y`+!HU[Y! =bn]XYbn`]Y[h` \]Yf`VY]`%ž%`dfc
%\$%"\$\$\$`9]bk c` \bYf`"8]Yg`nY][hž`XUgg`X]Y`DUbXYa]Y`nk Uf`b]W\ h
j cfVY]ž`UVYf`[i h`_cbhfc`"]YfVUf`]gh`"**

=a `[YgUa hYb`'6i bXYg`UbX`<YggYb`g]Y\`h`X]Y`@U[Y`Ä` \b`]W\ `Ui g`
<]Yf`k i fXYb`%) `b Yi Y` =bZY_h]cbYb`fY[]ghf]Yfhž`k Ug`ni `Y]bYf`+!HU[Y!
=bn]XYbn`j cb`%ž%`dfc`%\$%"\$\$\$`9]bk c` \bYf`ZØ\`fh`"5i g`YfZfYi `]W\Yb
; fØbXYb`[]VhYg`ni XYa ` _Y]bY`bYi Yb`HcXYgZÄ`Y`ni `j Yfa Y`XYb`"

ϕg[YgUa h'k i fXYb'gY]h'6Y[]bb'XYf'DUbXYa]Y'&"- , %" * ('d'cg[h]j Y
HYghYf[YVb]ggY']b'<YggYb'Xc_i a Ybh]Yfh"

5`hYfgj YfhY]`i b[`XYf` ϕZY_h]cbYb

9]b'6`]W_`Ui ZX]Y'5`hYfgj YfhY]`i b[`XYf` ϕZY_h]cbYb`nY][h
]bhYfYggUbhY'8YhU]`g"8]Y'a Y]ghYb': Ä`Y`k i fXYb`]b'XYf
5`hYfg[fi ddY'XYf'%)!' (!Ä\ f][Yb'j YfnY]W\ bYhž'X]Y'a]h, * + "*" - '
: Ä`Yb'f) , ž' i' Ł'XYb'\ÖW\ ghYb'5bhY]`ghY`h"8]Y'J YfhY]`i b[`g]Y\ h
k]Y'Zc`[h'Ui g.

- \$!\$('Δ\ fY. ' + "% * \$) : Ä`Y'f&' ž' (' i' Ł
- \$)!%('Δ\ fY. ' (+ "(\$(: Ä`Y'f) * ž+' i' Ł
- %)!' ('Δ\ fY. ; * + "*" - ' : Ä`Y'f) , ž' i' Ł
- ')!) - 'Δ\ fY. '%%) , ") ,) : Ä`Y'f)' ž\$- i' Ł
- * \$!+ - 'Δ\ fY. (\$(" , + \$: Ä`Y'f&- ž* i' Ł
- , \$ž' Δ\ fY. '%& , "*" % \$: Ä`Y'f&- ž*) i' Ł

8]YgY'NU\`Yb'j YfXYi h]W\ Ybž'XUgg'X]Y'DUbXYa]Y'ØVYf'U`Y
5`hYfg[fi ddYb'\]bk Y[`k]f_hž'k cVY]?]bXYf'i bX'† b[Y'9fk UW\ gYbY
VYgcbXYfg'VYhfcZZYb'g]bX"8 Ug]gh'b]W\ h'bi f'Y]bY'ghUh]gh]gW\ Y
5i gk Yfhi b[ž'gcbXYfb'Ui W\ Y]bY'<YfUi gZcfXYfi b[`ZØf'GW\ i `Yb
i bX'9`hYfb"

B Yi Y'7cfc bU!J Uf]UbhY`B]a Vi g

9]bY`k Y]hYfY'9bhk]W_`i b[ž'X]Y`X]Y ; Ygi bX\Y]hgYI dYfhYb'ja `6`]W_
\Uhž']gh'X]Y`bYi Y'7cfc bU!J Uf]UbhY`B]a Vi g'fB 6"% , "%Łž'X]Y'gY]h
Δ]bi Uf'&\$&) `VY_Ubbh']gh"8]YgY'J Uf]UbhY']gh'Y]bY'5Vk UbX'i b[`XYf
Ca]_fcb!J Uf]UbhY'i bX'k]fX'j cb'XYf'K Y`h[Ygi bX\Y]hgcf[Ub]gUh]cb
fK <C Ł'U'g' J Uf]UbhY'i bhYf'6YcVUW\ hi b[`Y]b[Yghi žh'5i W\ k Ybb
Yg'_Y]bY'<]bk Y]gY'Ui Z'gW\ k YfYfY'?fUb_\Y]hgj Yf'Äi ZY`[]Vhž'V`Y]Vh
X]Y'G]hi Uh]cb'XmbUa]gW\ i bX'YfZcfXYfh'k Y]hYf\]b'K UW\ gUa _Y]h"

⇒ a dZghUhi g'i bX`B YVYbk]f_i b[Yb

ϕ'6Yni [`Ui ZX]Y`a dZi b[Yb'd`Ubh'<YggYb'gc[Uf'k Y]hYfY

A U»bU\ a Ybži a 'X]Y'æ dZei chY'ni 'Yf\Ø\Yb"5_hi Y``g]bX'+*ž 'i
 XYf'6Yj Ò`_Yfi b['[fi bX]a a i b]g]Yfh"@Ui h'Y]bYa '6Yf]W'hj cb'
Włfc bU!]b!nU\`Yb"XY'g]bX'Yg']bg[YgUa h*' "(- ' "&*, 'DYfgcbYbž
 X]Y'j c`ghÅbX]['[Y]a dZi'g]bX"8 UfØVYf'\]bUi g'\UVYb'+ž- i 'XYf
 6Yj Ò`_Yfi b['a]bXYghYbg'Y]bY'æ dZi b['Yf\U'hYb"

8]Y'æ dZ_Ua dU[bY'\UhigY]h'6Y[]bb'XYf'æ dZi b[Yb']a '8YnYa VYf
 &\$\$ '\$[fc»Y': cfhgW'f]hY '[Ya UW'h"8]Y '[YgUa hY'NU\`XYf
 j YfUVfY]W'hYb'æ dZcgyb']b'8Yi hgW`UbX'VY`Åi Zhig]W`Ui ZYhk U
 %, , 'A]`]cbYb"8]Yg'nY][hžXUgg'X]Y'?Ua dU[bY'bUW`k]Y'j cf']b
 j c`Ya ; Ub[Y']ghž'i a 'Ui W`X]Y`YhnhYb'Nk Y]ZYf'i bX'NØ[YfYf'ni
 ØVYfnYi [Yb"

æg[YgUa h'nY][hig]WłžXUgg'X]Y'7cfc bU!@U[Y']b'<YggYb'i bhYf
 ?cbhfc`Y']ghž'Ui W`k Ybb'XYf'6`]W`Ui ZX]Y'bYi Yb'J]fi gj Uf]UbhYb
 i bX'X]Y'æ dZei chY'k Y]hYf\]b'cVYfghY'Df]cf]hÅh'\Uh"8]Y
 b]YXYfgWłk Y``[Yb'æ dZUb[YVchY'i bX'æZcfa Uh]cbg_Ua dU[bYb
 g]bX'bchk YbX][ži a 'X]Y'6Yj Ò`_Yfi b['[i h'Xi fWł'X]YgY'NY]hni
 ZØ\ fYb'i bX'X]Y'F]g]_Yb'gc '[Yf]b['k]Y'a Ò[`]Wł'ni '\U'hYb"

8YhU]`g	
C fh	; fc»!; YfUi ž'8Yi hgWł`UbX
E i Y``Yb	<ul style="list-style-type: none"> • k k k "bYk g"XY • k k k "Włfc bU!]b!nU\`Yb"XY • XY"ghUh]ghU"Wł a

6Ygi WłYb'G]Y'i bg'Ui Z.'bU[!\YggYb"XY