

; fc»Y'6U\bVUi ghY``Y.'9]bgW\fÀb_i b[Yb nk]gW\Yb'FY[YbgVi f['i bX'=b[c`ghUXh°

6Ui UfVY]hYb nk]gWXYb FY[YbgVi f['i bX' ± b[c`ghUXh j Yfi fgUWXYb 6U\bY]bgWXfÀb_i b[Yb'j cb' → `]'V]g'GYdhYa VYf &\$&) "'GWX]YbYbYfgUhnj Yf_Y\f'Y]b[Yf]WXhYh"



=b[c`ghUXhž'8Yi hgWX`UbX'!'9]b'6`]W_'Ui Z'X]Y'6U\bj YfV]bXi b[Yb
nk]gWXYb'FY[YbgVi f['i bX'+b[c`ghUXh'nY][hž'XUgg'FY]gYbXY']b'XYb
_ca a YbXYb'A cbUhYb'a]h'i a ZUb[fY]WXYb'9]bgWXfÀb_i b[Yb
fYWXbYb'a ØggYb'''@Ui h'-8 C K 5 k YfXYb'nk]gWXYb'5bZUb['i**`]'i bX
5bZUb['GYdhYa VYf'&\$&) '6Ui UfVY]hYb'Xi fWX[YZØ\fhž'X]Y'b]WXh'bi f
XYb'Ni [j Yf_Y\f'VYY]bhfÀWXh][Ybž'gcbXYfb'Ui WX'X]Y'8cbUi VfØW_Y
]b'G]bn]b['VYhfYZZYb'''8]YgY'V`Y]Vh'j cb'('''**')'V]g'&'''GYdhYa VYf
&\$&) '[YgdYffh''

8]Y'6Ui ghY``Yb'XYf'86' \DZfU; C'5; 'n]Y`Yb'XUfUi Z'UV\Z'X]Y'GhfYW_Y
nk]gW\Yb'FY[YbgVi f['i bX'\D[c`ghUXh'ni 'a cXYfb]g]YfYb"'K \A\fYbX
X]YgYf'NY]h'YbhZ\A``h'XYf'Ni [j Yf_Y\f'nk]gW\Yb'FY[YbgVi f['i bX'BYi ghUXh'Ub'XYf'8cbUi 'gck]Y'nk]gW\Yb'FY[YbgVi f['i bX'G]bn]b[

j c``ghÀbX]["'FY]gYbXY'a ØggYb'g]W\`U`gc'XUfUi Z'Y]bghY``Ybž'XUgg g]Y']b'X]YgYb'NY]hfÀi a Yb'Ui Z'GW\]YbYbYfgUhnj Yf_Y\f'a]h'6i ggYb i a ghY][Yb'a ØggYb"

K]WX h][Y GdYffnY]hYb i bX 9fgUhnj Yf_Y\fY

8]Y 'gdYn]Z]gWXYb 'NY]hfÀi a Y 'XYf 'GdYffi b[Yb 'g]bX 'YbhgWXY]XYbX ZØf 'U``Y '6U\bbi hnYf" =a '8YhU]` 'VYXYi hYh'XUg.

- &- ", " '%"- "&\$&). '9fbYi hY'GdYffY'nk]gWXYb'BYi ghUXh i bX'FY[YbgVi f['< VZ/'GWX]YbYbYfgUhnj Yf_Y\f'k]fX Ub[YVchYb"

Ni gÀhn`]W\`ni `X]YgYb`< Ui dhgdYffYb`[]Vh`Yg`k Y]hYfY`nY]h`]W\\
VY[fYbnhY`9]bgW\fÀb_i b[Ybž`X]Y`YVYbZU``g
GW\]YbYbYfgUhnj Yf_Y\f`bÒh][`a UW\Yb.

- '%"\$+"ž'\\U"'&\%'I\f'V]g'\\$\%"\\$, "ž'\\U"') 'I\f. FY[YbgVif["\dagger [c`ghUXh"
- %' "\$, "ž'\\U"'\&\%'I \f'\V]g'\\(("\\$, "\ž'\\\U\\"') 'I \f. \FY[\Y\b\g\Vi\f[\ \B\Y\i\g\U\\"']
- &, "\$, "ž'WU"'&%'I \f'V]g'&-"\$, "ž'WU"') 'I \f. FY[YbgVif[
 '⇒[c`qhUXh"

6YgcbXYfY'<]bkY]gY'ZØf'FY]gYbXY

8 Yf 6 U\b\c Z 5 V Y bg V Y f['k]f X 'V]g 'ni a ': U\fd`Ubk Y W gY`]a
8 Yn Ya V Y f' bi f'a]h Y]b Ya '6 U\bghY]['\Y f Ui g[Y f Øgh Y h g Y]b ž k Ug
V Y]gd]Y`gk Y]gY`Ui W 'ZØf X]Y`N Y]h 'X Y g';]``Ua ccg'j cb'("'V]g', "
GYdh Ya V Y f' Z Ugn]b]Y f Y b X Y' < Y f Ui g Z c f X Y fi b[Y b'a]h 'g]W 'V f]b[h"
5 i W 'X Y f' 6 U\b\c Z F Y[Y bg V i f[!D f Ø Z Y b]b['V`Y]V h 'j cb' X Y b
9 f g Uhn V i gg Y b' i b V Y f Ø W g] W h][h"

 $: \emptyset f `X] Y `Y b] [\ Y b \check{z} `X] Y `U i \ Z `X Y b `GhUXhV i \ g `U b [\ Y k \] Y g Y b `g] b X \check{z} `[\] V h `Y g Y b `GhUXhV i \ g `U b [\ Y k \] Y g Y b `g] b X \check{z} `[\] V h `Y g Y b `g Y b `g] b X \check{z} `[\] V h `Y g Y b `g Y b `g] b X \check{z} `[\] V h `Y g Y b `g Y b `g] b X \check{z} `[\] V h `Y g Y b `g Y$

 $\begin{tabular}{ll} [ihY'BUWXf]WXhYb.'Acf[Ybg'ibX'a]hhU[g'kYfXYb'nigÀhn`]WXY & <U`hYghY``Yb'Ub'XYf'; cYh\YghfU»Y'ibX'HUI]gghfU»Y'VYX]Ybhžia'X]Y'FY]gYbXYb'VYghaÒ[`]WX'ni'ibhYfghØhnYb''+bZcfaUh]cbYb\]Yfni'g]bX']a'9fgUhnZU\fd`Ub'ni'Z]bXYbž'XYf'fYWXhnY]h][jYfÒZZYbh`]WXh'k]fX''+bhYfYgg]YfhY'_ÒbbYb'g]WX'XYb'U_hiY``Yb'D`UbUiZ'g]bn]b[''XY'\YfibhYf`UXYb''$

: Un]h'i bX'=bZcfa Uh]cb

8]Y'VYj cfghY\YbXYb'6Ui UfVY]hYb'nk]gW\Yb'FY[YbgVi f['i bX
\displays [c`ghUXh'YfZcfXYfb'Y]bY'[Yk]ggY': `Yl]V]`]hÀh'i bX'; YXi `X'j cb
XYb'FY]gYbXYb''K Yf']a 'NY]hfUi a 'j cb'\displays `]'V]g'GYdhYa VYf'Ui Z
X]YgYb'GhfYW_Yb'i bhYfk Y[g'gY]b'a OW\hYž'gc``hY'g]W\'ZfØ\nY]h][
ØVYf'XYb'GW\]YbYbYfgUhnj Yf_Y\f'i bX'a O[`]W\Y'ŸbXYfi b[Yb]bZcfa]YfYb''8]Y'VYghYb'\displayzcfa Uh]cbYb'XUni '[]Vh'Yg'Ui Z'XYf
cZZ]n]Y``Yb'K YVg]hY'XYf'2 66'\]Yf''

 $9g`V`Y]Vh`ni ``\cZZYbž`XUgg`X]Y`6Ui UfVY]hYb`YZZ]n]Ybh`Xi fW [YZØ\fhk YfXYbž`gcXUgg`U``Y`FY]gYbXYb`VU`X`k]YXYf`fY]Vi b[g`cg`Ui Z`]\fYb [Yk c\bhYb`GhfY\w_Yb`n\O[][`i bhYfk Y[g`g]bX"$

8 YhU]`g	
Cfh	±b[c`ghUXhž8Yi hgWX`UbX
EiY``Yb	• k k k "]Xck U"XY
	k k k "g]bn]b["XY
	• k k k "cYVV"Uh

6Ygi WXYb G]Y 'i bg 'Ui Z. 'bU[!VUmYfb "XY