

¸ VYfZU```]a '6]Y`YZY`XYf'6Øf[YfdUf_. ⅓ [YbX`]WXY'CdZYf'jcb'5b[f]ZZYb

Nk Y]'%*! λ \f][Y'k i fXYb']a '6]Y`YZY`XYf'6Øf[YfdUf_'VY] Y]bYa 'FUi V'j Yf`Yhnh"'5b[fY]ZYf'ghU\`Yb'Y]bY'<ØZhhUgW\Y'i bX k i fXYb'ZYgh[Ybca a Yb"

GWkcW_g]hi Uh]cb^]a ^6Øf[YfdUf_.
FUi VØVYfZU``^Ui Z'> [YbX`]WkY'k]fZh^: fU[YbUi Z

±b 'Y]bYf'VYgcf[b]gYffY[YbXYb'9d]gcXY']b'XYf'BUW\h'ni 'A cbhU[']a 6]Y`YZY`XYf'6Øf[YfdUf_'kifXYb'nkY]'%*!'À\f][Y'≯b[Yb'CdZYfY]bYg', VYf[f]ZZgž'XYf'Y]bY'8]g_igg]cb'ØVYf'X]Y'G]W\Yf\Y]h ÖZZYbh`]W\Yf'CfhY'YbhZUW\hY"'8]Y'JcfZÀ``Yž'X]Y']b'XYf'8ib_Y`\Y]h ghUhhZUbXYbž'nY][Ybž'k]Y'[YZÀ\f`]W\'UiW\'jYfaY]bh`]W\'Zf]YX`]W\Y

8Yf5V`UiZXYf; YgWXY\b]ggY

; Y[Yb'\$\$.() 'I \f'\]Y`hYb'g]W\'X]Y'VY]XYb'\$ [YbX`]W\Yb [Ya Y]bgUa 'a]h'Y]bYf'6Y[`Y]hYf]b'Ui Z'Y]bYf'DUf_VUb_'Ui Z''5`g Y]bYf'XYf'VY]XYb'GW\Ø`Yf'g]W\'_i fnnY]h]['j cb'XYf'6Ub_'YbhZYfbhYž k i fXYb'X]Y'j YfV`Y]VYbXYb'\$ [YbX`]W\Yb'j cb'Y]bYf'; fi ddY''\ b[Yf A ÀbbYf'Ub[Y[f]ZZYbž'X]Y'g]W\'j cb'Y]bYf'VYbUW\VUfhYb'6Ub_ bÀ\YfhYb"'8Yf'nk Y]hY'%*!\$\A\f][Y'Y]`hY'gcZcfh'ni fØW_ž'i a 'gY]bYa : fYi bX'ni f'GY]hY'ni 'ghY\Yb"'@Y]XYf'fY]W\hY'Yg'b]W\h'Ui g.'8]Y 5b[fY]ZYf'gW\`i [Yb'ni 'i bX'fUi VhYb'Y]bYa 'XYf'\$\dot\b[Yb'X]Y < ØZhhUgW\Y"'\dot\b"DUb]_'j Yfgh\bX][hY'X]Y'6Y[`Y]hYf]b'X]Y'Dc`]nY]ž'X]Y qW\bY``Y]b[fY]ZYb'a i gghY'"

GWXbY``Y'9fa]hh`ib[Yb'ibX': YghbU\aYb

 $8 \ Ub_`XYf`n\varnothing[\][\ Yb`FYU_h]cb`XYf`Dc`]n]ghYb`_cbbhYb`bcW\`]b`XYf \\ B \r A \ Y`XYf`9``YfghfU\"Y']b`\%+! \r A \ f][\ Yf'i bX`nk Y]'\%, ! \r A \ f][\ Y`[\ YZUggh k YfXYb"'6Y]`XYf`: YghbU\\"a Y`k i fXYb`b]W\"h'bi f`X]Y`[\ Yghc\`YbY < \varnothingZhhUgW\"Y\"z'gcbXYfb`Ui W\"nk Y]`A YggYf`i bX`Y]b`GW\`U[\ ghc\"_g]W\"Yf[\ YghY``hz`k Ug`X]Y`dchYbn]Y``Y`; YZ\"A\f`]W_Y]h`XYf`5b[\ fY]ZYf i bhYfghfY]W\"h"`9]bY``YYfY`HUgW\"Yz`X]Y`ni j cf`XYb'\">[\ YbX`]W\"Yb [\ Yghc\`Yb'k i fXYz'k i fXY`YVYbZU``g`]a ``DUf_`[\ YZ\"bXYb''$

8]Y 5i gk]f_i b[Yb Ui Z'X]Y ; Ya Y]bgW UZh

 $8] YgY`JcfZA``Y`k YfZYb`Y]b`@]Wkh'Ui Z'Y]b`[fO) YfYg`DfcV`Ya..`X]Y \\ G]Wk Yf\Y]h`]b`ghAXh]gWk Yb`DUf_gž`X]Y`cZh'U`g`FØW_ni [gcfhY`ZØf $$ [YbX`]Wk Y`VYhfUWkhYh`k YfXYb"`9`hYfb`i bX`5bk c\bYf`g]bX $$ j YfghAbX`]Wk Yfk Y]gY`VYgcf[h`ØVYf`X]Y`; YZU\fYbž`X]Y`]b`XYb `YhmhYb`A cbUhYb`\Ai Z][Yf`ni `VYcVUWkhYb`g]bX"`8]Y`: fU[Y`V`Y]VhZk]Y`gc`Wk Y`5[[fYgg]cbYb`i bX`, VYf[f]ZZY`]b`Ni _i bZh'j Yf\]bXYfh k YfXYb`_ObbYb"`Ni XYa `ZcfXYfb`j]Y`Y`5bk c\bYf`Yhmh'Y]bY j YfghAf_hY`Dc`]nY]dfAgYbn`]b`X]YgYb`6YfY]WkYb"$

8]Y'[Ygi bX\Y]h`]W\Yb': c`[Yb'ZØf'X]Y i [YbX`]W\Yb

 $8]Y VY]XYb "j Yf YhnhYb" \downarrow [YbX`]WXYb" Ui g"XYa "CYh_YfdUf_a i gghYb" ni f"6Y\UbX`i b["]b"Y]b"? fUb_Yb\Ui g"[YVfUWXh'k YfXYb" Gc`WXY'Ya ch]cbU`Yb" i bX'd\mg]gWXYb"JYf`Yhni b[Yb"\UVYb"b]WXh bi f"_i fnZf]gh][Y"5i gk]f_i b[Yb"Ui Z'X]Y" $\forall b[Yb"6YhfcZZYbYbž gcbXYfb"_\ObbYb"Ui WX"\Ub[Zf]gh][Y": c`[Yb"ZØf"]\fY'dgmWX]gWXY; Ygi bX\Y]h"\UVYb""8 Ug"9f`YVb]g"k]fX"a \O[`]WXYfk Y]gY"Gdi fYb \]bhYf`UggYb" i bX'XUg"G]WXYf\Y]hg[YZØ\`"XYf" $\rightarrow [YbX`]WXYb VYY]bhf\AWXh][Yb"$

: Un]h'i bX'5i gV`]W_

8 Yf', VYf[f]ZZ']a '6]Y`YZY`XYf'6Øf[YfdUf_']gh'b]W\h'bi f'Y]b 9]bnY`ZU``ž'gcbXYfb'HY]`'Y]bYg'VYi bfi \][YbXYb'HfYbXgž'XYf 6Øf[Yfa Y]ghYfž'G]W\Yf\Y]hg_fÀZhY'i bX'X]Y'; Ya Y]bgW\UZh'ghUf_ VYgW\ÀZh][h"' ±0.5bVYhfUW\h'XYf'Øb[ghYb'9fY][b]ggY'a ØggYb j YfghÀf_hY'A U»bU\a Yb'ni f'DfÀj Ybh]cb'i bX'ni a 'GW\i hn'XYf 6Øf[Yf']b'6YhfUW\h'[Ync[Yb'k YfXYb"'9g'V`Y]Vh'ni '\cZZYbž'XUgg gc`W\Y'JcfZÀ``Y'b]W\h'ni f'Bcfa 'k YfXYb'i bX'X]Y'≯[YbX`]W\Yb'VU`X k]YXYf'g]W\Yf']b']\fYa '[Ykc\bhYb'I a ZY`X'i bhYfkY[g'gY]b _ÒbbYb"

8 Y hU] `c

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'X]Y!bUWX f]WX hYb "b Yh