

5`Ufa ghi ZY'Fch.'6fY]hYh'g]W\X]Y < UgYbdYgh']b'? O`b'Ui g3

⇒ '? Ò`b`k i fXYb 'hchY'? Ub]bWXYb 'YbhXYW_hž'k Ug'X]Y 6YZØfWXhi b['Y]bYf' < UgYbdYgh!5i gVfY]hi b['Ui Zk]fZh" 5bk c\bYf'g]bX'Ui Z[YZcfXYfhž'A Y`Xi b[Yb'ni 'a UWXYb"



Nc ``ghc W_ž? \dot{O} `b ž:8 Yi hg W `Ub X '! \Rightarrow '? \dot{O} `b 'a UW h'Y]bY VYgcf[b]gYffY[Yb XY '9bhk]W_`i b['X]Y 'Fi b XY . '5 bk c \bYf'Ui g Nc ``ghc W_ \UVYb 'hc hY '? Ub]b W Yb ']a 'J cf[YV]f[gd Uf_ 'i b X']a
Ÿi » YfYb '; $f \ddot{O}$ b [\ddot{O} fhY ``YbhXYW_h" '8]Y 'GhUXhj Yfk U`hi b['\Uh'VYfY]hg A U» bU\a Yb 'Yf[f]ZZYb 'i b X' X]Y 'hc hYb 'H]YfY 'YbhZYfbh" '9]b '5i [Y 'Ui Z X]YgY 'G]hi Uh]cb '\Uh'XUg' J YhYf]b Àfi bhYfgi W i b[gUa h'[Yk cfZYb Ž XU'X]Y 'GhUXh'X]Y '6 Y ZØfW hi b['\Ai * Yfhž' XUgg' X]Y '< UgYbdYgh'X]Y I fgUW Y 'ZØf'X]YgYg'a UggYb\UZhY '? Ub]b W YbghYfVYb 'gY]b '_\Obb hY'' \F UX]c '? \dot{O} `b 'VYf]W hYhž' XUgg'X]Y '< UgYbdYgh'Ui W 'ZØf'A YbgW Yb i b X' < i b XY '\ØVYfhfU[VUf']gh'i b X'g]W ']b ': cfa '`Y]W hYf
; f]ddYgma dhca Y '\Ai * Yfb' _Ubb'"

8]Y < UgYbdYghž'Ui W\ 'U'g'Hi `UfÀa]Y VY_Ubbhž'\Uh']b'8Yi hgW\`UbX

 $XUg`DchYbn]U`ž`gYi W.YbUfh][`Ui Zni hfYhYb"`<]YfVY]`` UbXY`h`Yg`g]W. i a `Y]bY`$\dangle ZY_h]cbg_fUb_\Y]hž`X]Y`Xi fW.`XUg`6U_hYf]i a `: fUbW]gY``Uhi`UfYbg]g`Ui g[Y`Ogh`k]fX"`<Ui dhgAW.`]W.`k YfXYb`: Y`X\UgYb`i bX K]`X_Ub]bW.Yb`U`g`, VYfhfA[Yf`[YbUbbh"`6Y]`H]YfYb`_Ubb`X]Y?fUb_\Y]h`[fUj]YfYbXY`Gma dhca Y`\Yfj cffi ZYbž`XUfi bhYf`XUg5bgW.k Y``Yb`XYf`@ma d_bchYbž`@YVYf!`i bX`A]`nj Yf[fO) Yfi b[Ybžgck]Y`Y]b`ni fØW_[Ync[YbYg`JYf\U`hYb"`=a `gW.`]a a ghYb`: U```ZØ\fhHi`UfAa]Y`]bbYf\U`V'j cb`HU[Yb`ni `Y]bYf`GYdg]gž`VY]`Yhk U`Y]bYa8f]hhY``XYf`i bVY\UbXY`hYb`H]YfY`YbXYhX]Y`$\dangle ZY_h]cb`hOX`]W.`?Ub]bW.Ybk]YgY"$

Jcfg]Wkhi]ghi[YVchYb

8]Y 8]U[bcgY Y]bYf Hi `UfÀa]Y]ghb]W h [Ubn i b_ca d`]n]Yfh i bX YfZc`[h]b XYf FY[Y`bUW Y]bYa VY_UbbhYb ?cbhU_h ni K]`Xh]YfYb cXYf VY] JYfXUW h Ui Z'X]Y 9f_fUb_i b["6`i hi bhYfgi W i b[Yb_ObbYb XUVY] \Y`ZYbž Yf\O\hY @YVYfk YfhY cXYf UbXYfY \DXYfY \DXYfY

: \emptyset f 5 bk c\bYf]b ? O`b k]fX [YfUhYbž hchY ? Ub]bW Yb i a [Y\YbXni a Y`XYb" 8]Y I bhYfY \$U[XVY\OfXY \UhXUni gdYn]Y``Y? cbhU_h]bZcfa Uh]cbYb VYfY]h[YghY``h 8]Y < ch`]bY]gh i bhYf \$&&\%\&\%\&\%' + i bX !&) %, % YffY]W VUfž k A\fYbX Y]bY 9!A U]``Ub i bhYfY! \$U[X!Z]gW YfY]VY\cYfXY4 ghUXh!_cY`b"XY [YgYbXYh k YfXYb _Ubb" A]h X]YgYb \$\darklet Zcfa Uh]cbYb a OW\hY X]Y GhUXh X]Y 5 i gVfY]hi b[`XYf a O[`]W Yb \$\darklet ZY_h]cb Y]bXAa a Yb i bX X]Y; Ygi bX\Y]h XYf 6 \emptyset f[Yf gW \emptyset hnYb"

; YbYfY``Y DfÀj Ybh]cbga U»bU\a Yb

Hi `UfÀa]Y '_Ubb']b'XYf'I a [YVi b['k cW\Yb`Ub['ØVYfXUi Yfbž XU\Yf'gc``hYb'5bk c\bYf'VYgcbXYfg'j cfg]W\h]['gY]b"'<m[]YbY'i bXXYf'J Yfn]W\h'Ui Z'?cbhU_h'a]h'K]`Xh]YfYb'g]bX'YbhgW\Y]XYbX"'9gk]fX'Ya dZc\`Ybž'<i bXY']b'VYhfcZZYbYb'; YV]YhYb'Ub'XYf'@Y]bY'ni

ZØ\fYbiibXi_Y]bYiDZUbnYbicXYfi: i hhYfiUi giVYhfcZZYbYbiNcbYbini YfbhYb"i9gi]ghik]WXh][ini iVYhcbYbžiXUggiYgi]bi8Yi hgWXiUbXi_Y]bY =a dZib[i[Y[YbiHi iUfÀa]Yi[]Vhžik Yg\UiViX]YiDfÀj Ybh]cb
VYgcbXYfgik]WXh][i]gh"i8]Yi6Yj Òi_Yfib[igciihYig]WXi]biX]YgYb
6YiUb[Ybi]bZcfa]YfYbiibXiGWXi hna U»bU\a YbiYfbghibY\a Yb"

X]YgYf'_f]h]gWXYb'NY]h']gh'XUg'6Yk i gghgY]b'ZØf'X]Y'Y][YbYb
; Ygi bX\Y]h'gck]Y'X]Y'XYf'H]YfY'i bYf`Agg`]WXži a 'X]Y'dchYbn]Y``Yb
5i gk]f_i b[Yb'X]YgYf' #bZY_h]cbg_fUb_\Y]h']b'XYb'; f]ZZ'ni
VY_ca a Yb"'6`Y]VYb'G]Y'gYbg]V]`]g]Yfh'i bX'a Y`XYb'G]Y
j YfXAWXh][Y': i bXY'i a [Y\YbXži a 'Y]bYb'k Y]hYfYb'5i gVfi WX'ni
j Yf\]bXYfb"

8 YhU]`g	
Cfh	Nc``ghcW_ž'?Ò`bž'8Yi hgW\`UbX
EiY``Yb	k k k "fUX]c_cY`b"XY
	_Ub]bW\Ybk]YgY"XY
	• k k k "`[`"VUmYfb"XY

6Ygi WXYb G]Y i bg Ui Z a Y]b!_cY`b"bYh