

7ci fgY^{*}Cj Yfj]Yk

GHJZ7cbHJWh8YHJ]`g

7cbj Ybcfg

BUa Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
7 Uti\`YYb`>]b	WUth YYb"/jb4 i bgk "YXi "Ui	VmUddc]bha Ybh cb`m		

Hi hcfg

BUa Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
5XY`Y`K U`_Yf	UXY`Y"k U` Yf4 i bgk "YXi "Ui	VmUddc]bha Ybh cb`m		

GWXcc`7cbHJWhi±bZcfa Uhjcb

GWkcc``cZ9Xi WUhjcb 5fhgž8Yg][b'UbX'5fWk]hYWhifY

; fci bX': `ccfž'A cfj Yb'6fck b'6i]`X]b['fl &\$Ł

H. 'Ž * %'f&Ł'- ' ,) '%- ++

9. YXi WUhcb4 i bgk "YXi "Ui

K. \hdg.#kkk "Ufhg"i bgk "YXi "Ui #YXi WUhjcb

5W_bck `YX[Ya YbhcZ7ci bhfm

7ci fgY 8YW] g

I b]hg cZ7fYX]h**

K cf_`cUX

%) \$`\ci fg`]bWi X]b[`WUgg`WcbHJWi\ci fgž`fYUX]b[gž`WUgg`dfYdUfUh]cbž`UggYgga Ybhž`Zc``ck`i d`UWhj]h]Ygž YHVI

Gi a a UfmcZh\Y 7ci fgY

 $YZd Zd R Yj ScZU T`fcdV \ddot{z}; eZd RgRZ[RS]V e`S`eY f_UVcXcRUfReV R_U a`deXcRUfReV def UV_ed \ddot{z} YV T`fcdV T`_eV_e UV]ZgVg R_U RddVdd^ V_eh Zj SV ZUV_eZR] Wc S`eY Xc`fad`Wdef UV_ed \ddot{z}$

ł '7 cj YfYX 'Xi f]b['h\Y 'Wci fgY

HYUWX]b[GhfUhY[]Yg

FUNCbUY.

 $\label{thm:conditional} $$H\Y'Wc ifgY'Wc bhYbhWc j Yfg'U'fUb[Y'cZYggYbh]U''UgdYWg'cZdYXU[c[mgdYW]JWhc'h\Y'hYUW\]b['cZ\\ @Ub[iU[Yg'ch\Yf'h\Ub'9b[`]g\']b'gYWc bXUfmgW\cc`g'''H\Y'hYUW\]b['UbX''YUfb]b['d\]`cgcd\mi bXYfd]bb]b[h\]g Wc i fgY']g 'cbY'cZUWhj Y''Yb[U[Ya Ybh''H\Y'Wc i fgY']g'\][\`m]bhYfUWhj YžfYei]f]b['ghi XYbhg'hc dUfh]WjdUhY'VmWcbhf]Vi hjb['h\Y]f'YI dYf]YbWYž_bck 'YX[Y'UbX'g_]``gž'WUffm]b['ci hfYgYUfW\ž]bj c'j]b[h\Ya gY`j Yg']b'X]U'c[i Y'k]h\'h\Y''YWhi fYf'UbX'ch\Yf'ghi XYbhg'Vch\']b'UbX'ci hcZWUggž'i bXYffU_]b['gY`ZfYZYWh]cb'UbX'hU_]b['fYgdcbg]V]`]mmZcf'h\Y]f'ck b'`YUfb]b['"H\Y''YUfb]b['hUg_g'dfcj]XYX'k]``VY'W\U''Yb[]b[\Z \\][\`mdfUWh]WU''UbX'fY`Yj Ubh'hc'h\Y'hYUW\]b['dfcZYgg]cb''$

HYUW]b[Ghf UhY[]Yg.

 $HYUWX]b[\ ghfUhY[\]Yg "i gYX"Xi f]b[\ hXY"Wci fgY"k]^\]bWi XY.$

- Ga U```[fci d'WccdYfUh]j Y'`YUfb]b['hc'i bXYfghUbX'h\Y']a dcfhUbW'cZhYUa k cf_']b'Ub'YXi WUh]cbU` WcbhYl hUbX'hc'XYa cbghfUhY'h\Y'i gY'cZ[fci d'ghfi Wfi fYg'Ug'Uddfcdf]UhY'hc'UXXfYgg'hYUW\]b['UbX `YUfb]b['[cU`g"
- 91 d`]WjhhYUW.]b[z`]bWiX]b["YWhifYgžhc"XYa cbghfUhY"Ub"i bXYfghUbX]b["cZghiXYbhgfiX]ZZYfYbh UddfcUW.Yg"hc"YUfb]b["UbX"h\Y"i gY"cZU"fUb[Y"cZhYUW.]b["ghfUhY[]Yg"hc"ZcghYf"]bhYfYghUbX gi ddcfh"YUfb]b["
- Glfi Wi fYX'cWWJg]cbg'Zcf'fYZYWjcb'cb"YUfb]b[žgi WX'Ug'hXY'i gY'cZ`YUfb]b['ĉi fbU`gž'hc'U`ck ghi XYbhg'hc'fYZYWiWf]hjWJ`micb'UbX']a dfcj Y'hYUWX]b['dfUWjWY''
- 91 hYbg]j Y cddcfhi b]hjYg Zcfik \c`Y [fci d'UbX ga U``[fci d'X]U`c[i Y UbX X]gW gg]cbž'U``ck]b[
 ghi XYbhg h\Y cddcfhi b]hmhc XYa cbghfUhY h\Y]f WUdUW]hmhc Wca a i b]WUhY UbX``]U]gY k]h\ h\Y X]j YfgY
 a Ya VYfg c ZUb YXi WUh]cb Wca a i b]hmž UbX hc XYa cbghfUhY h\Y]f _bck `YX[Y UbX ii bXYfghUbX]b[cZ
 a Yh\cX WcbhYbh'
- Cb`]bY``YUfb]b['Zfca 'fYUX]b[g'cb'h\Y'6`UW_VcUfX'- 'k YVg]hY"

H\YgY`UWjj jhjYg`k j```cVW\f`jb`U`WUggfcca 'Wja UhY`h\Uhjg`gi ddcfhjj Y`UbX`jbWi gjj Y`cZU```YUfbYfg"

5ggYgga Ybh

5ggYgga YbhhUg_	K Y][\h	8iY'8UHY	7 ci fgY`@YUfb]b[Ci hWca Yg`5ggYggYX
%"'GWcdY'UbX'gYei YbW			

I g]b['h\Y'gWcdY'UbX'gYei YbW'dfYdUfYX'Zcf'5ggYgga Ybh%'UbX'h\Y'ZYYXVUW_'fYW']j YXz'dfYdUfY'U'i b]hcZkcf_Zcf'GHJ[Y'*'k\]W\Ycj Yfg'Uddfcl]a UhY`m\U'Zh\Y'hYfa "'\±bX]WUh]j Y``Yb[h\.'' \$\$\$'k cfXg"

5 ZYYXVUW_g\YYhk]``VY'dfcj]XYX"

5XX]h]cbU`XYhJ]`g

H\Y'i b]hcZk cf_'g\ci `X']bX]\WhY'\U'j \Uf]\YmicZ'\Zcfa \Uh]j Y'\Ugg\Ygga \Ybhg\f\Uh\[]\Yg'k \]\W\'k]\``dfcj]\XY qh \XYbhg'k \h\ \ZY\X\U\W_\U\ci h

U"'k \Uh'h\Ym'WUb'U`fYUXm'Xc'k Y``

V"k\Uhh\Ymgh\``bYYX hc]a dfcjY

W"\ck 'h\Ym'WUb 'YZZYWf]j Y`m'WcgY 'h\Y'[Ud 'VYhk YYb 'U 'UbX 'V"

±bWi XY'U``'UWfj]hjYg'UbX'fYgci fWyg'hc'gi ddcfhighi XYbh`YUfb]b["'H\YfY'a i ghVY'Uh``YUgh

' "K f]hY`U`ZYk```]bYg`h\Uh`Wci`X`VY`]bWiXYX`]b`U`a]X!mYUf`fYdcfh`WcaaYbhihc`dUfYbhg"

GdYW]Z]W7 f]HYf]U	···flŁ—	 	 2fŽŁ
: Ua]`]Uf]lmk]h\ UbX`fY`Yj UbW\cZdfcZYgg]cbU``UbX#cf`fYgYUfW\ `]hYfUh fY`i gYX`hc`gi ddcfhfYgdcbgY			
• I bXYfghUbXg`YZZYWhjjY`UggYgga YbhdfUWhjWYg			
• I bXYfghUbXg YZZYWhjj Y UggYgga YbhdfUWhjWrg			
Glfi Whi fY'UbX'cf[Ub]gUh]cb'cZ'fYgdcbgY			
•			

`YWi fYfg`a Um'U`gc`WcbhYl hi U`]gY`UbX#cf`Ua YbX`h\YgY`gdYW]Z]WWf]hYf]U"`<u>H\Y`fYWca a YbXYX`[fUXY`]g</u> hYbhUhjj Y`cb`mžgi V`YWihc`ghUbXUfX]gUhjcb`dfcWYggYg`UbX`Uddfcj U``Vmih\Y`GW\cc``cZ9Xi WUhjcb`@YUfb]b[UbX`HYUW\]b[`7 ca a]hYY'"

GdYWJZJW7f]HYf]U	''flŁ		 2fŽŁ
XYM]``k]Mci hdfcj]X]b['Z```d`Ubg			

6dYW J ZJW	WEIGHMUZIW7 f]HYf]U	``flŁ	-2fŽŁ
	; YbYfU`Wca a Ybhg#YWca a YbXUh]cbg'Zcf'bYl hh]a Y.		

"flt-----2f\(\bar{p}\) k

5 hmyb XUb WY F Yei]fYa Yb hg

GW.cc`cZ'9Xi WUh]cb'5HYbXUbWYFYei]fYa Ybh

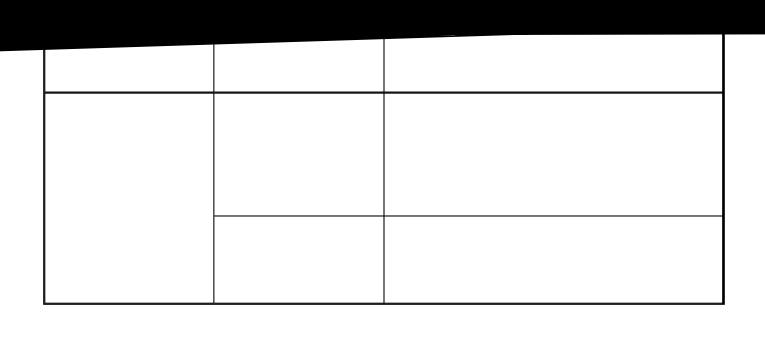
H\Y`GW\cc``cZ9Xi WUhjcb`fG98EfYei]fYgʻghi XYbhgʻa YYhUʻa]b]a i a `UhhYbXUbW\fYei]fYa YbhcZ, \$i `cZU`` gW\YXi `YX`WUggYgʻf]"%"`YWhi fYgž'hi hcf]Uʻgž'k cf_g\cdgž'gYa]bUfgE'Zcf`U```Wci fgYg"`5hhYbXUbW\f]b`dYfgcb`]g fYei]fYX`Zcf`hi hcf]Uʻgž'gYa]bUfgž'UbX`k cf_g\cdg`k \Yb`Wci fgY`UfY`XY`]j YfYX`]b`ZJ\W\fa cXY\f\f]b`dYfgcb`]g fYei]fYx`Zcf`hi hcf]Uʻgž'gYa]bUfgž'UbX`k cf_g\cdg`k \Yb`Wci fgY`UfY`XY`]j YfYX`]b`ZJ\W\fa cXY\f\f]b\f\Yf\Ym YYWfcb]Wa YUbgʻcf'j]U`Ub`UhhYbXUb\W\fY[]ghYf"`5hhYbXUb\W\f)]b`cb`]bY`cf`V`YbXYX`a cXY`k]```VY`UggYggYX h\fci [\X][]hU`": i fh\Yf`]bZcfa Uhjcb`WUb`VY`Zci bX`\\fYf\"

7ci fgY GWX YXi `Y

J JYk 'WUqq'Ha YHUV'Y

H]a YHJV`Y

8UhY#AcXi`Y	Hmd Y	7cbhYbh
%	@YWhifY	GtV[Y'*' '6Y[]bbYfg#7cbh]bi Yfg'Wci fgY
		I bXYfgHJbX]b['h\Y'gm``UVi g



F Ygci fWYg DfYgWf]VYX F Ygci fWYg

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

Hi fb]h]b Gi Va]gg]cb

☐ Inc i YbWci bhYf U'dfc V`Ya ik \Yb 'UrhYa dh]b['hc 'gi Va]hmci f 'Ugg][ba Ybhth\fci [\ 'Hi fb]h]bž'd`YUgY

HY 'Yd\cbY'9I hYfbU``Gi ddcfhcb'-',) '' ' ' %cf 'Ya U] 'th\Ya 'cb'YI hYfbU'hY'hgi ddcfh4 i bgk "YXi "Ui ""'Gi ddcfh
\ci fg'UfY', .\$\$Ua '-'%\$.\$\$da 'cb'k YY_XUmg'UbX'-.\$\$Ua '-') .\$\$da 'cb'k YY_YbXg'fl *) 'XUmg'U'mYUfŁ"' ☐ mci
UfY'i bUV'Y'hc 'gi Va]hmci f'Ugg][ba YbhXi Y'hc'U'ZUi 'hk]h. 'Hi fb]h]b'mci 'a Um'Udd'mZcf'Ub'YI hYbg]cbž'Vi hmci

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

D`U[]Uf]ga `]g`i g]b['h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX`dfYgYbh]b['h\Ya `Ug`mci f`ck b"`=hWJb`hJ_Y`a Ubm Zcfa gžZca `XY`]VYfUhY`W\YUh]b['hc`UVW]XYbhJ``mWcdm]b['Zfca `U`gci fWY`k]h\ci hUW_bck `YX[Ya Ybh'

IBGK [fcidgdu[]Uf]ga]bhch\YZc``ck]b[WUhY[cf]Yg.

 $\begin{tabular}{ll} \hline \textbf{7.cdm}b[...] g]b[...] MY cf'j Yfmg]a] ``Uf'k cfXg'hc'h\Y'cf][] bU``HYI hcf']XYU'k]h\ci h`U\W_bck ``YX[]b[...] b[...] MY cf'i g]b[...] bU``HYI hcf']XYU'k]h\ci h`U\W_bck ``YX[]b[...] b[...] MY cf'i g]b[...] a UhYf]U`gž']XYUg'cf'WcbW'dhg'\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]WY\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '`U'Vcc_\bar{Z}Ufh]\bar{Z}ca '``U'Vcc_\bar{Z}Ufh]\bar{Z}ca '``U'Vcc_\bar{Z}Ufh]\bar{Z}ca '``U'Vcc_\bar{Z}Ufh]\bar{Z}Ufh]\bar{Z}Ufh]\bar{Z}ca '``U'Vcc_\bar{Z}Ufh]\bar{Z}U$

5 WUXYa]W + DZcfa Uh]cb

8 i Y 'hc 'Yj c'j]b['UXj]\W 'VmBGK '< YU't\ ž'ghi XYbhg'a i gh'\W.Y\<u>V</u>'Zcf'i dXUh\YX']bZcfa Uh]cb 'fY[UfX]b['cb`]bY 'YUfb]b['Zcf'U``'5fhgž'8Yg][b 'UbX'5f\W.]h\Y\ni fY '\wci fgYg't\]g't\Yfa 'f]]U'A ccX`Y'cf'\wci fgY']bZcfa Uh]cb dfcj]\XYX"Ł

: cf`YggYbhJU``gh XYbh`]bZcfa UhJcb`fY`UhJb['hc.

- fYei YghgʻZcfʻYl hYbg]cb/
- `UhY gi Va]gg]cbg [i]XY`]bYg/
- fYj]Yk cZa Uf_g/
- I BGK '< YU`h\ 'UbX'GUZYhm'dc`]W]Yg/
- YI Ua]bUh]cb dfcWYXi fYg/

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