## ChhUk U'7ci bhm'D]W\_g'' '8]j YfgY': ]bU`]ghg Zcf'5Xa ]b]ghfUhcf'Fc`Y

Chhuk Uʻ7ci bhmʻbuffck gʻ7ci bhmʻ5Xa ]b]ghfuhcfʻWubX]XUhYg hcʻA Uf\_ʻ9]gYbVUfh\ž'; `YbʻGU`mYfžʻUbX`A ]WXUY``HfYa V`Um/ ]bhYfj ]Yk gʻ\$bY'%&"



%&&&\$::]``a cfYž'ChhUk U'7ci bhmž'A ]WX ][ Ubž'I G5'!'ChhUk U 7ci bhm']g'cb'h\Y'j Yf[ Y'cZ'g][ b]Z]WUbh'`YUXYfg\]d'XYW]g]cbg'Ug'h\Y gYUfWX'Zcf'U'bYk''7ci bhm'5Xa ]b]ghfUhcf'bUffck g'Xck b'hc'h\fYY WUbX]XUhYgž'Zc``ck ]b[ 'U'fYWYbh'j chY'cb' $\Rightarrow$  bY'("'H\Y'7ci bhm'6cUfX\Ug'hU\_Yb'U'XYW]g]j Y'ghYd']b'UXj UbW]b[ 'h\Y'dfcWYggž'Ug'fYdcfhYX\Vm'< c``UbX'GYbh]bY`"

 $H\Y`WUbX]XUhYg`k\c``UWWYdhYX`h\Y`cddcfhi b]hm`hc`]bhYfj]Yk``Zcfh\]g`d]j chU``fc`Y`UfY`Ug`Zc``ck g.$ 

- A Uf\_'9]gYbVUfh\ž'W'ffYbh`m`gYfj]b['Ug'Aig\_Y[cb'7cibhm 5Xa]b]ghfUhcf
- ; `Yb'GU`mYfž'8Ydi hm'7ci bhm'5Xa ]b]ghfUhcf'cZ'@YY'7ci bhmž

: `cf]XU

A ]WX UY``HfYa V`Umž`U`fYh]f]b[ '5fa m`cZZ]WYf`k ]h\ 'YI hYbg]j Y
YI dYf]YbWY`]b`a i b]W]dU``cdYfUh]cbg`UbX`k cf\_ZcfWV
XYj Y`cda Ybh

#bhYfYgh]b[`mžhk c'ch\Yf'WUbX]XUhYg'WkcgY'hc'k]h\XfUk'Zfca 'h\Y
]bhYfj]Yk'dfcWYggžh\Y]f'fYUgcbg'ibX]gWcgYXž'UZhYf'U'WcbhYbh]cig
a YYh]b['fY[UfX]b['Udd`]WUbh'WcbZ]XYbh]U`]hm''H\Y'6cUfX'\Ug'bch
]XYbh]Z]YX'h\YgY'WUbX]XUhYgž'k\]W\'UXXg'U'`UmYf'cZ']bhf][iY'hc'h\YgY`YWh]cb'dfcWYgg"

9]gYbVUfh\žk]h\ bYUf\mihk c XYWUXYg`cZ'di V`]WgYfj ]WY`i bXYf`\]g VY`hž\Ug`XYa cbghfUhYX`U`\_YYb`ZcW' g`cb`Z]bUbW]U``ghYk UfXg\]d UbX`ghfUhY[]Wd`Ubb]b[ "'<]g`UW\]Yj Ya Ybhg`]bWi XY`gYW' f]b[ `cj Yf\, ) `a ]``]cb`]b`[fUbh`Z bX]b[ža U\_]b[`\]a `U`ghfcb[`WUbX]XUhY" A YUbk \]`Yž`GU`mYf`a UbU[Yg`U`fcVi gh`[cj Yfba Ybh`Ybj]fcba Ybh k]h\`&ž-\$\$`Ya d`cmYYg`UbX`U`g]nYUV`Y``+' 'a ]``]cb`Vi X[Yh''<]g Yl dYf]YbW']g`dUfh]W'`Uf`m`fY`Yj Ubhž`\Uj]b[``YX`YZZcfhg`]b`7CJ =\& fY`]YZ`UbX`\i ff]WUbY`fYWcj Yfm'`HfYa V`Umž`cb`h\Y`ch\Yf`\UbXž Vf]b[g`cj Yf`&\\$`mYUfg`cZ`Yl YW'h]j Y``YUXYfg\]d`Yl dYf]YbW'ž ]bWi X]b[``U`g][b]Z]WUbh`fc`Y`cj YfgYY]b[``U``\%`V]``]cb`WUd]hU` ]a dfcj Ya Ybh'Vi X[Yh`k \]`Y`gYfj ]b[`]b`Gci h\`?cfYU"

6i ]`X]b[ 'h\ Y ': i hi fY

 $H\Y'di\V']Wa\YYh!UbX![fYYh'k]h\''h\Y'Z]bU`]ghg`]g'gWXYXi\ `YX'Zcf' \not\Rightarrow bY$ 

%% Zfca ''.'\$!).'\$'d"a "'Uh'%&&&\$:]``a cfY"'H\]g']g'U'[c`XYb
cddcfhi b]hm'Zcf'fYg]XYbhg'hc Yb[U[Y'k]h\'h\Y'WUbX]XUhYg'VYZcfY
h\Y']bhYfj]Yk g'Wca a YbWY'k]h\'U'7]h]nYb'K cf\_'; fci d'cb'\$\dot\bY'\%\dot\bY'\\dot\bY'\dY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\\for\bY\for\bY\\f

## K \ Uh g Uh GhU\_Y 3

 $\label{thm:convex} $$H\Y']bgd]fUh]cb'VY\]bX'h\YgY'g][b]Z]WUbh'YUXYfg\]d'W&c]WYg'Uf]gYgZfca'h\Y'dfYj]cig'UXa]b]ghfUhcfg'X]ga]ggU``Ua]X'a]gWcbXiWhU``Y[Uh]cbgž'fYgi`h]b[']b'U'`%-$ž$$$'gYhh`YaYbh'Zcf'h\Y'Wcibhm'K]h\''-'WUbX]XUhYg']b]h]U``m'Udd`m]b['Zcf'h\Y'dcg]h]cbž'bUffck]b[]h'Xckb'hc'h\fYY'Z]bU`]ghg'fYZYWhg'U'f][cfcig'gY`YWh]cb'dfcWYggh\Uh'aUbm'\cdY'k]``'Vf]b['ghUV]`]hm'VUW_'hc'ChhUkU'7cibhmgUXa]b]ghfUh]cb''$ 

I`h]a UhY`mžh\Y`Wca a i b]hm`Uk U]hg`U`ZfYg\`dYfgdYWh]jY gca YcbYk\c`k]```bch`cb`m`a UbU[Y`Vi X[Yhg`UbX`ghUZZ`Vi h`U`gc`Ya VcXm`h\YjU`i Yg`cZ'ChhUk U`7ci bhmžk\]W\`df]XYg`]hgY`Z`cb`[ccX`[cjYfbUbW\UbX`gYfj]\WY`YI WY``Yb\W'"`5g`fYg]XYbhg`dfYdUfY`Zcf`h\Y`i d\Wca]b[]bhYfj]Yk g`UbX`a YYh!UbX![fYYhžh\YfY g`U`dU`dUV`Y`gYbgY`cZUbh]\W]dUh]cb`UVci h`Z]bX]b[`h\Y`f][\h`dYfgcb`hc`[i]XY`ChhUk U7ci bhm`]bhc`h\Y`Zi hi fY"

8 YhU]`g	
Cfh	%&&&\$::]``a cfYž'ChhUk U'7cibhmž'A]WX][Ubž
	I G5
EiY``Yb	<ul><li>k k k "\c``UbXgYbh]bY`"Wca</li></ul>
	• k k k "Xci V`Y\Ui `gc`i h]cbg"Wca
	• k k k "a `]j Y"Wca

6 Ygi W Yb G]Y i bg Ui Z a Y]b!k ]Yb bYh