## 6cUh'9ld`cg]cb'Uh'HUV`Y'FcW\_'@U\_Y @YUj Yg'CbY'GYf]cig`m'=b'i fYX

5 'VcUh'Yl d`cg]cb 'Uh'HUV`Y 'FcW\_'@U\_Y']b 'i fYg'U'+(!mYUf!c`X k ca Ub"'=bj Ygh][Uh]cbg'UfY'cb[c]b[']bhc'h\Y'WUi gY'cZ'h\Y |bW|XYbh"

5b'%, !mYUf!c`X'k ca Ub'dfYgYbh'Xi f]b['h\Y']bW]XYbh'gi ghU]bYX a ]bcf']b'f f]Ygž'Vi h'h\Y'ZcW' g'fYa U]bg'cb'h\Y'a cfY'gYj YfY WcbgYei YbW'g'Zcf'h\Y'c`XYf'j ]Wh]a "'H\Y'A ]ggci f]': ]fY'A Ufg\U`` g C ZZ]WY'\Ug'hU\_Yb'W\Uf[Y'cZ'h\Y']bj Ygh][Uh]cbž'U]a ]b['hc'i bWcj Yf h\Y'XYhU]`g'gi ffci bX]b['h\Y'YI d`cg]cb'UbX']hg'WUi gYgž'k \]W\'\Uj Y bch'mYh'VYYb'X]gWcgYX"

## FYWbhHfYbXgUbX5XX]h]cbU`=bW]XYbhg

 $H\ ]g']bW]XYbh']g'bch'Ub']gc`UhYX'WUgY''' \Rightarrow gh'k YY\_g'YUf`]Yfž'cb' \Rightarrow `m %' ž'Ubch\Yf'YI d`cg]cb'g\cc_'h\Y'k UhYfg'Uh'? ]b[ g'F]j Yf'A Uf]bUž `cWUhYX'UVci h'($'a]`Yg'k Ygh'cZ'6fUbgcb''' <math>\Rightarrow$ b'h\]g'YUf`]Yf'Yj Ybhž k\]W\'gUk''U'VcUh'ck bYf'ghfi [ [ `]b[ 'hc'ghUfh'h\Y]f'j YggY`'UZhYf fYZi Y`]b[ z'h\Y'YI d`cg]cb'fYgi `hYX']b'h\Y'XYghfi Wh]cb'cZ'h\Y'VcUhž XUa U[ Y'Uh'h\Y'a Uf]bU'Xc\\\_z'UbX']b'h\f\f]Yg'hc'Zci f'dUggYb[ Yfg''

5a cb['h\Ya'k YfY'?YbbYh\'UbX'J]f[]b]U'N]Y`]bg\_]ž'U`cb[g]XY Bcfa Ub'UbX': Y`]W]U'Hi Xcf"'H\Ub\_Zi ``mž'cbY'dUggYb[Yf'k Ug hfUbgdcfhYX'Vm'\Y`]WcdhYfž'hk c'a cfY'k Ybh'Vm'Ua Vi `UbWYž'UbX cbY'fYZi gYX'a YX]WU`'Ugg]ghUbWY'Uh'h\Y'gWYbY"'H\Y'`cWU`'Z]fY XYdUfha Ybh'Wca a YbXYX'Vch\'a Uf]bU'ghUZZ'UbX'VmghUbXYfg'Zcf h\Y]f'ei ]W\_'UWh]cb'i g]b['Z]fY'YI h]b[i]g\Yfg'UbX'UWh]j Uh]b['Zi Y` g\ih!cZZg'hc'a ]h][UhY'Zi fh\Yf'XUa U[Y"

## $GhUh]gh]WU \rightarrow g][ \ hg cb 6cUh]b[ GUZYhm]$

 $\label{thm:complete} H\Y'l''G'''7cUgh'; i UfX'hfUW_g'j Uf]ci g'ghUh]gh]Wg'cb'fYWfYUh]cbU`VcUh]b['gUZYhmž'\ci g]b['YggYbh]U`'XUhU'h\Uh'WUb'\Y`d'[i ]XY'Zi hi fYgUZYhm'a YUgi fYg'''H\Y]f'Z]bX]b[g'UfY'Wfi W]U`'Zcf'i bXYfghUbX]b['h\Y gWcdY'cZ'VcUh]b['UVW]XYbhgž'k]h\'fYgci fW'g'Uj U]`UV`Y'Zcf'U'a cfY]b!XYdh\'`cc_'Uh'UWW]XYbhghUh]gh]Wg'Vm'ghUhY'''9I d`cf]b['hfYbXgZfca'h\Y'BUh]cbU``FYWfYUh]cbU``6cUh]b['GUZYhm'Gi fj Ymž'k \]W\]bWi XYg'bYUf`m'&* ž$$$'VcUh'cdYfUhcfgž'fYj YU`g']a dcfhUbhdUhhYfbg']b'cdYfUhcf'VY\Uj ]cf'''5XX]h]cbU``mž'h\Y']a dUWh'cZ'U`Wc\c` Wcbgi a dh]cb'cb'VcUh]b[']bW]XYbhg']g'U'ZUWhcf'h\Uh'WUbbch'VYcj Yf`cc_YX''$ 

5g'h\Y']bj Ygh][ Uh]cb']bhc'h\Y'\d\X]Ub'Dc]bh'A Uf]bU'VcUh'YI d`cg]cb Wcbh]bi Ygž'h\Y'`cWU``Wca a i b]hm']g'fYa ]bXYX'cZ'h\Y']a dcfhUbW'cZ gUZYhm'dfYWUi h]cbg'k \Yb'Yb[ U[ ]b[ ']b'VcUh]b[ 'UWh]j ]h]Yg"'K ]h\ gi a a Yf']b'Zi ```gk ]b[ ž'Ug'h\Y'k UhYfg'VYWca Y'Vi g]Yfž']hg'j ]hU``hc ghUm']bZcfa YX'UbX'j ][ ]`Ubh'hc'Ybgi fY'U'gUZY'UbX'Yb'cmUV`Y YI dYf]YbW'cb'HUV`Y'FcW\_'@U\_Y'''6cUh]b[ 'XcYg'U'[ ccX'XYU``Zcf gi a a Yf'fYWfYUh]cbž'Vi h']h'U`gc'fYei ]fYg'U'[ ccX'\UbX'UbX'UbX'U'\_YYb Uk UfYbYgg'cZ'gUZYhm'a YUgi fYg'''@Yhg'\cdY'h\Uh']bW]XYbhg``]\_Y h\YgY'dfca dh'[ fYUhYf'Uk UfYbYgg'UbX``YUX'hc']a dfcj YX'gUZYhm

dfchcWc`g`]b`cif'VY`cjYX`kUhYfZfcbh``Y]gifY`UWh]j]h]Yg"

 $: cf'a \ cfY'XYhU]'YX'ghUh]gh]Wg'cb'VcUh]b['UWW]XYbhgž'mci'WUb'WXYW\_cih'h\Y'I "G"'7cUgh'; i UfX g'fYgcifWYg"'@cWU`'ghcf]Yg'`]_Y'h\YgY gYfj Y'Ug'U'fYa ]bXYf'h\Uh'k \]'Y'VcUh]b[']g'U'WXYf]g\YX'dUgh]a Yž gUZYhm'g\ci `X'U`k Umg'VY'h\Y'hcd'df]cf]hm''A cfY']bZcfa Uh]cb'UVcih h\Y'`UhYgh']bW]XYbh']g'Uj U]`UV`Y'Uh'? M''UbX'Gdf]b[Z]Y`X 6i g]bYgg'<math>\approx$ i fbU`"

8 YhU]`g	
Cfh	⇒X]Ub Dc]bhA Uf]bUžHUV`YFcW_@U_Yž@UXm
	@U_YžA]ggcif]žIG5
Ei Y``Yb	• k k k "_m' "Wca
	• gV ^"b Y h
	• i gW[VcUh]b["cf[

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