

Nk Y] bYi Y @i Wk gY]a 'H\Øf]b[Yf 'K U`X. GWk f]hh]b 'Y]bY [fØbY 'Ni _i bZh

9fZU\fYb`G]Y`a Y\f`ØVYf`X]Y`YfZc`[fY]W\Y`5i gk]`XYfi b[`XYf @ W\gY`JfYb]`i bX`?]`]Ub`]a `H\Øf]b[Yf`K U`X`]a `F U\a Yb`XYg 5fhYbgW\i hndfc Y_hg` @ W\g`H\Øf]b[Yb "'9bhXYW_Yb`G]Y`X]Y : cfhgW\f]hhY`]b`XYf`@ W\gdcdi`Uh]cb`i bX`XYb`YfghYb bUW\[Yk]YgYbYb`BUW\ki W\g`gY]h`%)\$ *\J\fYb"'9]b`k]W\h][Yf GW\f]hh`ZØf`XYb`9f\U`h`X]YgYf`ZUgn]b]YfYbXYb`H]YfUfh`]b 8Yi hqW\`UbX°



9fZfYi`]WXY': cfhgWXf]hhY']a '5fhYbgWXi hn. @i WXgY']a 'H\Øf]b[Yf'K U`X'YfcVYfb']\fY <Y]a Uh'ni fØW_

 $= \frac{1}{2} \left(\frac{1}{2} b^{2} \right) \left(\frac{1}{2} b^$

j YfbYhnYb ž'XUg'V]g'ni a '\\f'&\\$\+'`Ài Zhž'n]Y`h'XUfUi Z'UVž'X]Y
Dcdi `Uh]cb'j cb'@ W\gYb']b'8Yi hgW\`UbX'i bX'A]hhY`Yi fcdU'ni
ghUV]`]g]YfYb'i bX'ni 'j YfbYhnYb"'6Y]'X]YgYf'\D]h]Uh]j Y'k i fXYb
_Øfn`]W\'nk Y]''\b[Y'@ W\gYž'J fYb]'i bX'?]`]Ubž'YfZc`[fY]W\']b'X]Y
: fY]\Y]h'Ybh`UggYb"'

8]Y 5i gk]`XYfi b[`XYf`VY]XYb @ W\gYž`X]Y `Ui g`Y]bYa
9f\U`hi b[gni W\hdfc[fUa a `ghUa a Ybž`]gh`Y]b `k]W\h][Yf`GW\f]hh`]b
F]W\hi b[`Y]bYf`[Ygi bXYb @ W\gdcdi `Uh]cb" \ fY`5i ZbU\a Y`]b`XYb
H\Øf]b[Yf`K U`Xž`k c`g]Y`j cb`9I dYfhYb`gcf[Z\A`h][`j cfVYfY]hYh
k i fXYbž`nY][h`XUg`9b[U[Ya Ybh'j cb`nU\`fY]W\Yb`\bgh]hi h]cbYb"
8]YgY`Ni gUa a YbUfVY]hž`X]Y`i bhYf`UbXYfYa `XYb`6I B8
H\Øf]b[Ybž`XYb`K K: 8Yi hgW\`UbX`i bX``c_U`Y`: cfghVY\ÒfXYb
i a ZUgghžii bhYfghfY]W\h`X]Y`; Ya Y]bgW\UZhg]b]h]Uh]j Y`ni f
K]YXYf\YfghY``i b[`Y]bYf`ghUV]`Yb`H]Yfdcdi `Uh]cb"

K]Y I a k Y`ha]b]ghYf`6Yfb\UfX`GhYb[Y`Y`VYhcbhž`]gh`XYf`: cfhgW\f]hh XYg`Dfc Y_hg`b]W\hibi f`Y]b`NY]W\Yb`ZØf`YfZc`[fY]W\Y
5i gk]`XYfi b[ga U» bU\a Ybž`gcbXYfb`Ui W\`ZØf`X]Y`FØW__Y\f`XYg
@ W\gYg`U`g`HY]``XYg`2 _cgmghYa g"`8]Y`VYfY]hg`]a `A U]`&\$&(
Ui g[Yk]`XYfhYb`@ W\gY`: f]YXU`i bX`J]cfY``\UVYb`g]W\`YVYbZU``g
[i h`Y]b[Y`YVhž`k]Y`X]Y`; DG!8UhYb`VY`Y[Yb"`=\fY`6YkY[i b[Yb`]a
K U`X`i bX`XUg`5i ZgdØfYb`j cb`6Yi hYh]YfYb`nY][Ybž`XUgg`g]Y`g]W\`]b
]\fYf`bYi Yb`I a [YVi b[`ni fYW\hZ]bXYb"`8Ug`JYf\U`hYb`XYf`H]YfY
a UW\h`cdh]a]gh]gW\ž`XUgg`X]Y`Dcdi`Uh]cb`]b`XYf`FY[]cb`bUW\\U`h][
k UW\gYb`_Ubb"

9]bY'ZfYi X][Y', VYffUgWXi b['ZØf'X]Y'Dfc'Y_hj YfUbhk cfh']WXYb'k Uf X]Y'_Øfn']WX'Xc_i a Ybh]YfhY'@ WXg]b'a]h' \Rightarrow b[h]YfYb"'8]Yg']gh'X]Y YfghY'bUWX[Yk]YgYbY'FYdfcXi_h]cb'gY]h'ØVYf'%) \$' \Rightarrow U\fYb']a H\Øf]b[Yf'K U'X"'Gc'WX'Y]bY'YfZc'[fY]WXY': cfhdZUbni b['XYi hYh XUfUi Z'\]bž'XUgg'X]Y'@YVYbgVYX]b[i b[Yb'ZØf'@ WXgY']b'XYf FY[]cb'[Øbgh]['g]bX"' \Rightarrow 0f[Yb'6cXXYbVYf[z'@Y]hYf'XYg'GUWX[YV]Yhg K U'XbUhi fgWXi hnž'g]Y\h']b'X]YgYf'9bhk]W_'i b['Y]bYb'6Yk Y]g'ZØf X]Y'K]f_gUa_Y]h'XYf'Xi fWX[YZØ\fhYb'A U» bU\a Yb"

 $A]h``YX][`]WX`&ž-`A]``]cbYb`9ifc`ghUUh`]WXYf`IbhYfghØhnib[`ibX`XYfA]h\]`ZY`jcb`YifcdA]gWXYb`A]hhY`b`nY][h`XUg`Dfc^Y_h`@iWXg$

H\Øf]b[Yb 'Ui W\ž'k]Y'k]W\h][']bhYfbUh]cbU`Y'Ni gUa a YbUfVY]h']a BUhi fgW\i hn']gh"'9g']gh'HY]`'XYg'Yi fcd\A]gW\Yb'BYhnk Yf_g'ni f JYfbYhni b['j cb'@ W\gdcdi `Uh]cbYbž'XUg'@ W\gY'U`g'K UbXYfh]YfY]b'j YfgW\]YXYbYb'@YVYbgf\Ai a Yb'a]hY]bUbXYf'j YfV]bXYh"

8]YgY = h]h]Uh]j Y \ Uh b]W h b i f 5 i gk]f_i b [Yb Ui Z'X]Y H]Yfk Y h z gcbXYfb Ui W Ui Z'X]Y c_U Y 6 Y j O _Yfi b ["8]Y F ØW__Y \ f XYf @ W gY _ObbhY]a : f Ø \ U\f & \$ & (ni Y]bYa 5 bgh]Y [XYg 2 _chci f]ga i g ZØ \ f Y b z k Ug k]Y X Y f i a X Y f f Y []cbU Y b K]f h g W UZh ni [i h Y _ca a Y b k Ø f X Y " 9 g]gh Y]b Y 7 \ Ub W ZØ f X]Y A Y b g W Y b j cf C f h z] \ f Y B Uhi f b Y i ni Y b h X Y W Y b i b X U _h j ini a 5 f h Y b g W i h n V Y]ni h f U [Y b "

5VgWX`]Y» YbX``Agghig]WX`gU[YbžiXUgg`XUgʻDfc'Y_h`@WXgH\Øf]b[Yb 'Y]b`6Y]gd]Y``ZØf`[Y`i b[YbYb`5fhYbgWXi hn`]ghžiXUgnY][hžik]Y`Xi fWX`Ni gUa a YbUfVY]hž'9b[U[Ya Ybhii bX`: cfgWXi b[Y]b`k]WXh][Yf`GWXf]hhini f`K]YXYf\YfghY``i b[`XYf`V]c`c[]gWXYbJ]Y`ZU`h`[Y`Y]ghYh`k YfXYb`_Ubb"`8]Y`gdØfVUfYb`dcg]h]j Yb5i gk]f_i b[Yb`Ui Z'XUgʻ²_cgmghYa `k YfXYb`gck c\``j cb`XYb: UWX`Yi hYb`U`g`Ui WX`j cb`XYf'; Ya Y]bgWXUZh`a]h`: fYi XYVYcVUWXhYh"

8 YhU]`g

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