```
!
"#$%&'"(!)(&*$%+&,-!./!0"%&+!
"11234567!082971128:!
$32;2<431!5;=!#5;5>7<7;6!?7@586<7;6!
ABC!D87;7EE7!
CFGGC!05841:!/85;37!
,7E!H!IJJK!A!BG!LM!GLBG!
$<54E!H!974;N4;=78!O5P@Q98!
!
```

!

!

EDUCATION

```
1 **** 1 #
                                     $%&'()*+&#, -.#"$%&"'()*+,"-./0-1"(0-"2.3-..4"
                                     5"!"#$%&"%'()*#+, %*-).&*#/*#$0)*#1"%)(23--*4##*2##-567&30*#
                                     8 *2%& "-*#*\#9 &)*2\\"-*\"67\"
!"/!#
                                     8)/,09+\#":*;1)1<1."0("&09/+-+1)=.">+?"0("1@."A*)=.-;)1B"
                                     0("C+-);"::"
0(12#!"33#4#!"3"#
                                     &.-1)()D+1.;#"$+3<."ED+2.9B"0(":*1.-*+1)0*+,">+?"
0(12#4#.(5(6)#!"3/#
                                     &.-1)()D+1.;#"';1<2.*1"F"1.+D@)*3"G<+,)()D+1)0*7"
                                     :*1.-*+1)0*+,":*;1)1<1."0("$<9+*"H)3@1;"'I1-+;J0<-37"
                                     \mathbf{0}(9*6\#:;');9\#'<0::=\#A*)=.-;)1B"0(":,,)*0);\#\&0,...3."0("
0(7&#!"38#
                                     >+?"
                                     -@'A&1;9#;B#.9)6"'<-=.=>"'K+3*+"&<9">+<2.7"L-+2..B"
0(7&#!"3?#
                                     A*)=.-;)1B"
```

!"

!!!!

```
!
CDEF$GGHE I . J#$KC$DH$ I L$!
#
#
#
0@7 (@92#MN!?0P9&6&7)! "#$%&'()$(:#;32%&";\#2*(3\)"\)324\#
```

b"

```
F@11#MN!?0GP9*75#MN!3#################J&')(9&9\\\#Y\$ . : #1@ \[#6'A;;10\\\Y\@()&\\\$)(T&6\\
                                    . PP1*a (b&6#: (#:9;*)##
#
       #
                     #
                             #
                                    E*3.04E 9 .-)D+*"&0*1-+D1;"(0-"P"#"B.+-"",+?";1<2.*1;#
                                    Q-.*D@"$);10-B"1@-0<3@"Q-.*D@"e-)+,;"'D-.+1)0*4MU!b7"
GP9*75#MN!M###0##P9&6&7)"
                                    G&7*;9#1&')(9&9#@7T#D&6&@9'A&9#"'H:$CM!!Y$@L8:\@(1!#Z!
                                    C): (\%!0, )B') 1! [(8) $! / #$$8(1!7) B&'(1!#Z!+)^"#
                                    \&0990*">+?"\&0*1-+D1;"'D-.+1)0*7"(0-k"
                                    K+;1.-;\#"[<-);1.;\#8iE((+)-.;\#Q-+*D04E*3,+);4
                                    -+*2."%D0,."2."8-0)1"W`%8X"4T<sup>$%</sup>"+*2"b<sup>"#</sup>"B.+-";1<2.*1;"
F@11#MN!?#####0###GP9*75#MN!"#
                                    #
                     #
                                     , - . #C9;59@U#
                                    :*1.-*+1)0*+,"L<;)*.;;">+?"+*2"%1@)D;"
                                    Q)*+*D)+,"8);+;1.-;"'D0<-;."D-.+1)0*#"MU!b"7"
                                    J&')(9&9#4#, &UV&9#;B#0(9*&6W#$GLC#
MN!Z0MN!3#
                                    E;;;;1.2")*"1@."2.=.,0/9.*1"0("&0*1-+D1"9+*+3.9.*1"
                                    /-03-+9"(0-\%80"+*2"0-).*1+1)0*";/.+^{.-}")*"%80"D0*1-+D1"
                                    9+*+3.-"D0<-;..."I.-=.2"0*"+,,"1.+9"/-0R.D1"R<-)..;"'1"
                                    DBD,.;7"
G&P)#!"3/#Q#0(7&#!"3"#
```

0"

 $\begin{array}{l} C.-)02)D+, B"(-0\,9"\,!\,dc\,U4\,!\,ddb"\,:"2\,.=\,.\,,0/\,.\,2"\,+*2"\,1+<3@1"\,D0<-\,;\,.\,;"0*"\,\underline{:*1\,.\,-*+1})0*+,"L<;)*\,.\,;\,;">+\,?\#"\\ \underline{E\,9\,.\,-})D+*"L<;)*\,.\,;\,;">+\,?\#"\&0\,9\,/+-+1)=.">+\,J0<-">+\,?\#"C<\,J\,,)D":*1\,.\,-*+1)0*+,">+\,?\#"e\,.\,D@*0\,,03B"+*2"\\ \underline{:*1\,.\,,\,.}\,D1<+,"C-0/\,.\,-1B",+\,?"+*2"Q-\,.*D@">+\,?"+*2"\,\$)\,;10-B}"+1"1@\,."(0\,,0\,?\,)*3"C+-)\,;)+*"+-\,.+"+D+2\,.\,9\,)D"\\)*\,;1)1<1)0*\,;k" \end{array}$

- ID@),,.-":*1.-*+1)0*+," A*)=.-;)1B" o' $S\&*:C\setminus UJ7$ " &0 9 /+-+1)=.">+J0-">+?" '+//-0=.2" JB":LE"(0-"EAC"J<1"*01"0((.-.27#"\&0 9 /+-+1)=.",+?"'H.3<,+10-B7Y""'\$34\#C\UJ74\\\ :*1.-*+1\)0*+,",+?"
- "%D0,." Z+1)0*+,." 2.; "C0*1; ".1" &@+<;; m.; "'KLE74:*1.-*+1)0*+, "L<;)*.;; ">

 $\#\%)*J)*2.-\#"83\&&70\%)32\#EL\&3''/^\#M\&3=\#832>-); \\ \%\#3\#83:90\%''\%)32^\#E\#83=0''\&)432\#3>\#M\&*2; +\#''2/\#E=*\&); \\ "2\#!''H\#''2/\#S\&'';\%); *\#":*1.-*+1)0*+, *&09/+-+1)=.\#'CO, DB"F"\%1@)D;">+?"H.=).?"':&C\%>7#""I/-)*3"MUMU#" \ 0,5"T#":;;<."T#"00141dd$"$

1 / !!

%)*J)*2.-#" G "44# F3 &%4^# B)407%*# T*43-7%)32#)2# M& "2; *# "2/#%+ *# `2)%*/# \$% "%*4:F+*# a)300# "2/# G*/) "%3 &# B "4*4# B3 = O "&*/#" D4 "2:*1.-*+1)D4." >+?" D5." D5." Md#" D5." Md#" D6." "A"7 | C*." MUMU"+1"P1P40b1"

11

L); 9 < 100% Y]*2.-\(||-40-1.\(||-500) ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||-400| ||

"

%)*J)*2.-#"F+*#T3-*#3>#%+*#Y2%*&=*/)"&@#L*%H**2#%+*#832%&";%#"2/#9H2*\#Y2%*&2"%)32"-#8324%&7;%)32# S&3b*;%4^# E# M&*2;+# 832%&";%3&c4# a)*H03)2%" \ 0,\$" !!" <u>e@." :*1.-*+1)0*+,</u>" <u>&0*;1-<D1)0*">+?"H.=).?"'E/-),"!ddb7"!1P4!cd</u>"

"

%)*J)*2.-"

```
`-+1)1<2.")*"C-.(+D.#"\m-0*)G<."K+3*).-#"&VKCEHEe:\%"&VHCVHEe%"\V\%HZEZ&%"
 'MU!c7"
                                                                                                                                             MU!O"
 `-+1)!<2."._/-.;;.2")*"Z01.;"+;"9.9J.-"0("%I&C"D0*!-+D1"9+*+3.9.*1"1.+9#""1*"744"7%#
 8+*N&372<#F&*=L-''@#''2/#M37&;''/*<#!''#M3&=''\)32#/*4#832\\\\\\;\\\#G''2''(*&4\)E7\\$*\\?);*\#/*\#-''\#
S*&>3&="2; *# 832%&"; %7*--*#"#!5)2)%)"%)?*#6BMi6$8S#67&30*#"H.=<." 8." 8-0)1"2.; "E((+)-.;"
:*1.-*+1)0*+,.;#"Zq!#"MU!O#"!4Mb"+1"Mb$"
                                                                                                                                             _KC #
                      #
                                                                    # # #
                                     #
 -+1]<2.")*" C-.(+D.#" E*10)*." +-+/0*" F" C).--." I.-=+*4ID@-.)J.-#" 8\%E>I" 8\%" [AIe:&%"
 'MU!M7""
HIR$DgH$ d G#<C (V1*6A&T#;9#-9;@T'@6)&T>#@7T#,$:H.#.CC$.D.IL$G#
                                                                                                                                             _K_C#
 JB"E^{**}."CO-19+^{**}\#">\underline{.11-."+<}"[<-);\underline{1:;".1"}E=0D+1;\underline{\#}"K+)4E=-), MUM!\#"//\S!M4!b\#
                                                                                                                                            MU!d"
j")-*/#M3&*)(2#*0*;7%)?*#H+3#>*-\#>7--#>3&;*#3>#`$#1&)L*&@#-"H#"JB"$.*-)"E;1).-#"LL&""Z.?;#"
E/-)."MT"MU!d"
                    #
                                                                                      #
                                                                                                              #
                                                                                                                                             _KC]#
 S''2*-)4\%" ` 2*#;3\&\&70\%)32\%+)4\%3\&)f7*#" K+11@) . <"E-0*#"QHEZ&%4: Ze%H#" K+-D@"b#"MU!0"
                                                                                                                                             KKV#
 r += 0.-">...0 < /\# B) \& *; \%) 324 \# b7 \& ) / ) <math>f7 * 4^* \#; 3 = = *2 \% 45) 2\% ' ( \& *\& \# "7 \# = ) *70 \# e \# 432 \# *2 \% \& *0 \& ) 4 * \# h \# K 2 E "
 *qMO#" 8 . D . 9 J . - "MUU1""
                                                                                                                                             MUUb"
E = \frac{1}{2} \frac{1}{3} = \frac{1}{4} \frac{1}{3} = \frac{1}{4
```

 $(-10^{\circ})^{\circ}$ $(-10^{\circ})^{\circ$

!U"

```
LEIF$D$IL$G#G$, HI.DG#RD.HIHIS0#GP&@e&9hC@7&1*6)h, ;T&9@);9#
                                                             #
                                                                                          #
                                                                                                                         #
                              #
                                                                                                                                                        #######_K_C#
#
                                                             #
                                                                                   #
                                                                                                                         #
 $0*"N*&\(\dagge E\) 83=0"&"\(\)?\(\dagge !\)"H\(\dagge S\)\(\dagge 40\)\(\dagge !\)\(\)?\(\dagge 32\)F\(\dagge ''242\)\(\dagge 32\)\(\dagge E\)\(\dagge 83\)\(\dagge 83\)\(\dagge 62\)\(\dagge 3\)\(\dagge :\)\(\dagge 22\)\(\dagge 132\)\(\dagge 132\)\(\dagg
 E^{**}<+, "K . . 1*3"0("1@. "E 9 . -)D+*"IOD). 1B"0("&0.9/+-+1)=.">+?"@0:1.2"'0*.)*. 7"JB"1@."A*)=.-:)1B"
O("n);D0*;)*")*"K+2);0*#"VD10J.-"!b#"MUM!"
 $0*"N*&\(\pi T*b\(\disp\)32\(\pi T*4)4\(\disp\)2:\(\disp\)1 T*432"2:\(\disp\)4 T*:\(\disp\)2:\(\disp\)4 M&\(\disp\)2:\(\disp\)4 T*40324\(\disp\)4 \(\disp\)3 \(\disp\)5 T*40324\(\disp\)4 \(\disp\)6 T*40324\(\disp\)6 T*40324\(\disp\)7 T*40324\(\din
 83\&\&70\%)32\#G*"47\&*4\#"2/\#S+"\&="\#P8-"44\#";\%)324Q\#G"44\#F3\&\%4(\#Q0-.)3*"+*2":*1.-*+1)0*+,
 &099)11.."0("1@."&@)D+30"L+-"E;;0D)+1)0*"'\)2.04&0*(.-.*D.7#"I./1.9J.-"!b"##"MUM!" "
 $0*"N*&\# 644*2\\)"-#\\+\*=\*4#\>3&\#\Y=0-\*=\*2\\)2(#\\33-4\#\\+\"\\#\\*2"L-\*\#\Z\*0\\\#\!\*?\*-\#\SS\$54\\\"\\\"\n\0-\.2\"
 E; (0D)+1)0*" 0(" CCC" A*)1;" +*2" CCC" C-0(.;;)0*+,;" <math>\forall n ECCCX" E**<+," &0*3-.;;#" '=)2.04
DO*(.-.*D.7#"`.*.=+#"[<*."!b"##"MUM!"
$0*"N*&\(\psi k *\@\psi 832; *44)324iSSS\(\psi 8 - \begin{align*} \text{7} \\ \psi \\ 
  \underbrace{\&.*_{1-...} \mathbb{W}CO,DD.:}_{\#} = +?; +*_{2...} +*_{2...} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1} +*_{1
 -...;), -...1" COCCC" /-0R. D1; /4" Q)(10": *1.-*+1)0*+, "AZ%&%" Q0-<9" 0*" C<J, D4C-)=+1. "C+-1*.-;@)/: "
    )2.04&0*(.-.*D.7"`.*.=+#"E/-),"MO#"MUM!"
 $0*"N*&;#T*4*"&;+#S&*4*2%"%)32#%3#E`$#6;323=);4#"2/#G"2"(*=*2%#;3--*"(7*4;#83=0"&"%)?*#
M&*2:+#"2/#E=*&): "2#!"H#"2/#S&":\): *^#83&&70\\)32#EL&3"/#"2/#G"44#F3&\\4"'=\)2.07"E/-\."c#"
MUM!"
#
                                                                                                                                                                                        _K_ K#
 $0*"N*&#T*40324"L)-)%'4#8)?)-*4#*\#S'2"-*4#/*4#B)&)(*"2\\dagge #\!!'()4-"\\)32#E='&);")2#AM8SER\#
 $0*"N*&#!"#(*4%)32#/*4#(&"2/4#;32%*2%)*70#"7#4*)2#/*4#*2%&*0&)4*4#^;3==*2\\#;32;)-)*&#-*4#
 )2\%' \& 1\%4\% h \& E; (0D)+1)0*" 2.; "C-0(.; (0)**., "/0<-", "&0*1.*1).< "%D0*09)G<.".1" Q)*+*D).-#""
 'C+-);7#"[+*<+-B"MM#"MUMU"
                                                                                                                                                                                      KC \ #
 \$0*"N*\&\#F"L-*\#\&32/*\#47\&\#-5*2f7l\%*\#)2\%*\&2*\#>+"H.;/0*;+J),)lm"2.;"C.-;0**.;"K0-+,..;\#"
00-9+1)0*"D0*1)*<."2.;"K+3);1-+1;\#" \underline{\%D0},."Z+1)0*+,."2.;"K+3);1-+1;\#"C+-);\#"8.D.9J.-"!c\#"MU!d"
 \$0*"N*\&\#G"4\%*\&;-"44\#)2\#G*\&(*\&4\#"2/\#E;f7)4)\%)324\#":*1.-*+1)0*+,"\&@+9J.-"0("\&099.-D."i:\&\&i\#")
C+-);#"8.D.9J.-"b4P#"MU!d"
 $0*"N*&#83=0-)"2; *#*#[37?*&2"2; *#^#-*#; "4#E-4\3=<#I&:\Z&\"CV"E,<9*)\#C+-):#"VDl0J.-"
Mb#"MU!d"
 $0*"N*&# G"44# F3&%4^# B)407%*# T*43-7%)32# )2# M&"2; *# "2/# %+*# `2)%*/# $%"%*4:F+*# a)300# "2/#
 G*/)"\%3&#8"4*4#83=0"\&*/\(#E**<+,"9..1)*3"0("1@."E9.-)D+*"IOD).1B"0("&09/+-+1)=.">+?"
 (0):1.2"JB"10."A*)=.-:)1B"0("K)::0<-)483-7=L)"437&)49:3L*&#CV4# KC\#
```

\$0*"N*&<#

```
G3/*\&"\%3\&\#6=0)\&);"-\#!*("-\#$\%7/)*4\#E**<+,"K...1)*3\#"ED+2.9B"0(">.3+,"I1<2)..;")*"L<:)*..:#""
K0*1-m+,\#"E<3<:1"!U\#"MU!d"
$0*"N*&\(#SJ^#E#`\$#S*&40*;\(\)\?*^#;32?*&\(*2;*#H)\(\)+#S\SSS^\#E88!#SJ#g+)\(\)*#S"0*&\(#C.0/,.\)\[0]-;\\
)*"/-+Dl)D.k"l@."*.?"AZ%&%":*D,<;)=."CCC"8..)=.-B"(0-9"+*2")1;"9<,1)/,).-")9/+Dl"0*".((.Dl)=."
<u>AZ%&%":*1.-*+1)0*+,"&.*1.-;"0("%_D.,,.*D.</u> (#S"%)4(#E0&)-#C!"(#_KC\#
$0*"N*&#!"#T*0324"L)-)%'#$'2"-*#/*4#B)&)(*"2%4#*\#E2"-@4*#/*4#4"2:%)324#/7#`$#B*0"&\=*2\#
#
                                                                                     KCV: KCU#
                                                    #
$0*"N*&\(\pi \) 60\(\lambda\)"\(\circ\) \(\delta\) \(\d
2i\%*1-./-); .; "Q-+*p+); .; "'E[Q\%7""I./1.9J.-"MU#"MU!c"]
$0*"N*&\#B"2(*&374\#B&7(4\#"2/\#83=0"&"\\)?*\#!"H\\#F+\\#a)300\#"2/\#G\\*/)"\\3&\#8"4\\4\KLEE"
:*1.-*+1)0*+,"&0*(.-.*D.#"K)2?.;1"ED+2.9B"0(">.3+,"I1<2).;")*"L<;)*.;;#"'_&@)D+307#"E/-),"MU#"
MU!c"
EZ8"$: IeVHf#""L-+2,.B"A*)=.-;)<math>IB"'C.0-)+#":,,)*0);7#""E/-),"!M#"MU!c"
E = *\&); "2\#! "H\#"2/\#S\&"; \&); *&\#E**<+, "K...1)*3\#" e@." ED+2.9B"0(">.3+, "I1<2).;")*"L<;)*.;; &\#E**<+, "K...1)*3#" e@." ED+2.9B"0(">.3+, "I1<2).;")*"L<;)*.; &#E**<+, "K...1)*3#" e@." ED+2.9B"0(">.3+, "I1<2).;")*"L<;)*.; &#E***<+, "K...1)*3#" e@." ED+2.9B"0(">.3+, "I1<2).;")*"ED+2.9B"0(">.3+, "I1<2).;")***
$"?"22"+<#["\#E7(74\\#V\# KCV\#
                            #
                                         #
                                                                      #
                                                                                     KC 1#
S"2*-)4%# G7-%)0-*# S*2"-%)*4# T)4N#)2# E2%); 3&&70%)32# S&34*; 7%)32^# Y4#%+*&*# &*"-#; 33&/)2"%)32#
E=32(\#E(*2;)*4h\#:*4@0<;.\#0<*;.,\#n0-,2?)2.\#I<9.9)\#@0;1.2\#B\#E0[\%\#C+-);\#VD10J.-\#b\#
MU!O"
$0*"N*&# 832; *44)324# *\# $$$S^\# \forall 2\% \('\&\)\\"# *\\# F&"240"\&*2; *\("\&\@\)\*.;.#\"0=.-*9.*!+."\Z+!)0*+."
8 = ..0/9 \cdot *1" + *2"H \cdot (0-9"\&099);;;)0*#"K+);0*"2<"L+--.+<#""C+-);#"[<,B"M!#"MU!0"]
(0-"I<;1+)*+J, 8.=.,0/9.*1"1@-0<3@".((.D1)=.#"/.0/,.4()-;1"C<J,)D4C-)=+1."C+-1*.-;@)/;#"
  `.*.=+#"K+-D@"TU#"MU!O"
                                                                                     " KCm#
\$0*"N*\&\#S\&"\%)f7*4\#/*4\#832\%\&"\%4\#)2\%*\&2"\%)32"70\#*2\#8+)2*\#\&0*1-+1;":*1.-*+1)0*+,;"^8)((m-.*1;"2*1.-*+1)0*+,;"^8)
<u>E / / - OD@ . ; "D<,1<- . , . ; " . 1 "R<-)2)G< . ; #":&&#"C+-); #""E / -), "MT#"MU!P""""</u>
WC-m;)2.*1"2."Im+*D.X"+*2"K02.-+10-#"n0-^)*3"2)**.-"(0-";...D1"3-0</"0("3.*.-+,"D0<*;...;"+*2"
,+?B.-;"@0;1.2"JB"L<;)*.;;"+*2">.3+,"Q0-<9"0*"1@.";<JR.D1"0("\%*G<s1.;">0<-2.;4D0--</1)0*"
.1"D0*D<--.*D.\#"C+-);\#"[+*<+-B"MO\#"MU!P"]
                                                                                     MU!b"
```

! M"

```
KKU#
$0*"N*&# 8*&\")24#*2\\&*0&)4*4#32\\:\*-*4#\&'744\)#e#&'/7\\&*#-*4#\:3r\\4#/*#0\&3/7:\\)32#*\\#/5"2"-@4*#
 /*4#0&*7?*4#'-';%&32)f7*4#-3&4#/572#''&L)%&''(*#)2%*&2''%)32''-<#>.;"/-.<=.;"m,mDl-O*)G<.;"2+*;"
<u>,iE-J)l-+3.":*1.-*+l)0*</u>+,#":&&#"C+-);#"8.D.9J.-"!U1@#"MUUc"
S'''^2 - \frac{1}{4} = \frac{1}{2} - \frac{1}{4} = \frac{1}{
(-+*p+);".1".*"D0990*",+?#"&0<-"2."&+;;+1)0*".1":*;1)1<1"2."$+<1.;"%1<2.;"I<-",+"[<;1)D."
5": $%["6#"C+-);#"VD10J.-"MU#"MUUc"
 k *@23%*# $0*"N*&<# T*>-*:\%)324# 32# 17)-/)2(# \%+ *# 83&03&"\%*# ! *("-# B *0"&\= *2\\$4# T*07\\"\\)32\#
     `.*.-+,"&0<*;.,"H0<*21+J,.4E**<+,"%_.D<1)=."H.1-.+1#"C+-);#"K+-D@"!T"##"MUUc"
 S"2*-)4%# 1*@32/# !*("-^# E# 174)2*44# E00&3";+# %3# 83&03&"%*# [3?*&2"2;*#" &0-/0-+1."
 `O=.-*+*D."+*2"eO-1#"e-)+,"+*2":*;<-+*D."We:CIX"9..1)*3#"E9.-)D+*"L+-"E;;OD)+1)O*#"MUUc"
 'D@.D^"2+1.7;.=.-+,",.11.-;"
                                                                                                                                                                                      !ddd4 KKV#
  [7*4\|# $0*"N*&\|# E-4\|3=^\|# /*\|# f7"4):>")--)\|*\|# e\|# 72*\|# 43;)'\|\"\|# \@2"=)\|f7*\|# \"24\|\-5)2>\\\"4\\\&7;\|7\\&*\|
C+*...; 1#*>13+10-; i**Q0-<9**(0-*&0-/0-+1.*&0<*;...,4K+R0-*::;<...;*(+D)*3*10.*:*4$0<;...*&0<*;...,k**
>+?"()-9"K+*+3.9.*!#"E110-*.B4&,).*!"C-)=),.3.#"E*1)4&0--</1)0*#":*1.-*+1)0*+,"L+-"
E::0D)+1)0*"E**<+,"K..1)*3#"&@)D+30#"I./1.9J.-"MU#"MUUO"
 k*023\%*\#$0*"N*\&\#"F+*\#832\%\&"; \#G"2"(*\&\#"2/\#\%+*\#!"H0*\&:g3\&N)2(\#F3(*\%+*\&\#I/-)*3\#K..1)*3"
\underline{0("Z\ f"D@+/1.-"O("l@."E\ 9.-)D+*"E\ ;;0D)+l)0}*"0("\&0*l-+Dl"K+*+3.-;\langle\#HOD@.:;l.-\#"Z\ f\#""\lceil<*."!b\#"
MUUP""
$0*"N*&\(\delta\) 832\(\delta\)";\(\nabla\)"-\(\delta\) A\(\delta\) G"2"(\*=\*2\(\delta\)"2/\(\delta\)-)=)\(\nabla\)\(\delta\)324\(\delta\) 2\(\delta\)"-\(\delta\)\(\delta\)47\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)24\(\delta\)"-\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\(\delta\)24\
B'' = "(*4#)447*" & 0*1-+D1:" < 2.-" & 0.990*" > + ?#" : *1.-*+1)0*+, "0+D<, 1B" (0-"% .D<1)=. ; "':0%7#" : *1.-*+1)0*+, "0+D<, 1B" (0-"% .D<1)=. ; "':0%7#"
L-<::..:#"VD10J.-"MM#"MUUT"
 $0*"N*&\(\dagge !)"L)-)\(\text{M}\) \(\dagge 3\\ \dagge T")-\(\dagge B\) \(\dagge 4\\ \dagge 4\\ \d
\% + \# G'' 27 '; \% 7 \& \& \& \& \& \& E ** < +, \& 0* (.-.*D."0("eHE:ZIE0%#" \ +,.*D)+#"I/+)*#"[<*."T#"MUUM"]
$0*"N*&#832%&";%7"-#&)4N#="2"(*=*2\#"2/#-)=)\%"\%)324#3\#-)"L)-)\@^#S&";\%); *#)2#\+*\$T*"-#g3&-/5#
\&0*1-+D1:"A*2.-"\&0990*">+?#"
```

!P"

" " " " !ddc4!dd1" # \$0*"N*&<#T)4N#E--3; "%)32:

```
C \setminus J:C \setminus K\#
 0*"N*\&\#F+*\#;32\%\&";\%3\&54\#0*\&40*;\%)?*\#H+*\&*\#M+*\#0\&3b*;\%\#)4\#)2\#"\#;3=32\#-"H\#b7\&)4/);\%)32\#"2/\#
H+*\&**/\#/4=2#''; ??-#-''H\#b7\&A/; \%32\#:*1.-*+1)0*+,"L+-"E; (DD)+1)0*#"Z. ?"V-,.+*;#"VD10J.-"!b#"
 !ddT""
\$*44)32#:*1.-*+1)0*+,"8.=.,0/9.*1">+?":*;1)1<1."':8>:7#" I 1+1."L+*^"0("\).1*+9"+*2" K)*);1-B"
\underline{0("[<;1)D."0("\setminus).1*+9"1-+)*)*3";..;;)0*"\$+*0)\#"[<*."TU4[<,B"!4M\#"!ddT"]
$0*"N*&\(\pi Z*(3\))\("\)32\(\pi 3\)\("\)\(\pi 832\\\dagge\("\)\(\pi 4\)\(\pi 00-9+1)0\(\pi 0-+\pi 0)\(\pi \)\(\pi - .\)\(\pi \)\(\pi - .\)\(\pi \)\(\pi \)\(\
 $0*"N*&#832\\&"\\#E='\&\;"\)24\#Z'(3;\)"\\\\32\#*\#832\\*2\\\)*70#"O0-9+\\0\*"O-+*D\\;">.(. J=-. #"C+-);\#"
Mc''E/-),#"!ddT#"K+-D@''!O1@#"!ddT''+*2''[<,B''T#"!ddU''
 I/.+^{-}.-^{\#} !" 2+B" 1-+)*)*3" ;. 9)*+-" 0*" :*1.-*+1)0*+," L<;)*.;;" >+?" (0-" ;.*)0-" +*2" 3.*.-+,"
 . ^ C#"C+-);#"[<*.#"!dd!"
CDEF$GGHEI.J#.LRHgHRH$G##
Y2\% * 2'\% 32'' + 600 * 8\% ''2 / 13'' 8 / # = * = L * 8 # \% / . -1" e . + 9" : * (-+; 1-< D1<- . "C-OR . D1; "'% e : & 4CCC7#" : #
>.+2.-k#!"H#"2/#!*()4-"%)32#"AZ%&%"&O*D.;;)O*;gCCC"&.*1-."O("% D.,..*D."'MU!T4/-.;.*17"
 13"&/#3>#E/?)43&4#"%II%&"'C+-);"K+;1.-;")*">+?"+*2"L<;)*.;;4W8E:KX"o'!ddd4"/-.;.*17"
 K.9J.-\#(\$;)*2\%); \#83==)\%\%**\#">+?"+*2"L<;)*.;;"Q0-<9#"WL>QX"C+-);"'MUU14"10"/-.;.*17""
 S7L-); "%)324#83 = 0 | "**#" e-+*; (0-1+1)0*">+?#">03); 1)D; "+*2"C0, DB"H.=). ? "'MU!M4/-.;.*17"
 aS\#E/?3:":@\#60*:7\%)?\#83==)\%**\#"2/\#13"\&/\#=*=L*\&\#"E::OD)+1)O*"O("E9.-)D+*"H.:)2.*1:"
 V = .-; .+; "'EEHV7"'MU!04/-.; .*17""
 83:;+")&#":*1.-*+1)0*+,"L+-"E;;0D)+1)0*" I<JD099)11..."0*"&0*1-+D1"Q0-9;"+*2" I.D<-)1B"O("
C.-(0-9+*D."'!dd14MUUU7"
 E*1)4&0--</1)0*"&099)11.."0("1@."E9.-)D+*"L+-"E;;0D)+1)0*"'MU!M4/-.;.*17"
 :*1.-*+1)0*+,"+*2"00-.)3*">+?"&099)11.."0("1@."&@)D+30"L+-"E::0D)+1)0*"'MU!!4/-.:.*17"
 G = L \cdot \ell = L \cdot \ell = 1.3 
 T*0\&*4*2\%'\%)?***3\&\#M\&''2;**\#\&0*1-+D1"n0-^)*3"`-0</"0("1@."%<-0/.+*":*1.-*+1)0*+,"&0*1-+D10-;"
W%:&X"'!dcd4!ddc7""0*"Q:8:&":*1.-*+1)0*+,"D0*1-+D1"(0-9;"
V^*."0("P")^*1.-*+1)0^*+,"._/.-1;"'!)")432#;3==)%**7"
```

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\mathbf{0^{\wedge}:S}\$\#.\ \mathbf{I}:\#\ ,\ \$\ ,\ -\$D\#\mathbf{EF\#0^{\wedge}D}\mathbb{H}\$G"
```

 $\begin{array}{l} K.\ 9\ J.\ -"0("[<-B\#"5"C,<9\ ."2.">j\%D0*09).".1"2<"8-0)1"6""R0<-*+,);\ 9"+?+-2;"+1"+**<+,"L<;)*.;;"+*2">.3+,"Q0-<9"9+)*".=.*1")*"9)24"VD10J.-"'MU!P4!0"F"MU!c7"$

 $[<23.\#"[.;;</":*1.-*+1)0*+, "K001"&0<-1"&09/.1)1)0*\#"MU!M4!0"Q-.*D@"*+1)0*+, "-0<*2;")*"C+-);" \\ +*2"MU!c":*1.-*+1)0*+, "-0<*2;")*" n+;@)*310*#"8&"" \\ "$

 $K.9 \ J.-"0("[<-).;\#"e.+9"-./0-l;"(0-"D.-l)()D+l)0*\#"\% \ 8 \ Q4\% \ I \& C"\&0*l-+Dl" \ K+*+3.9.*l"C-03-+9" \ 'MU! \ T4MU! \ 17"$

K.9J.-"0("[<-B#"Km90)-."

! c"

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#
D$gH$ d #EF#C$$D#CDEL$$:HISG#. I:#C^-JHL.RHEIG#
E-1)D, : "'17"/-0/0; .2"(0-"C<J,)D+1)0*")*"MUMU"(0-"1@."E9.-)D+*"[0<-*+,"0("L<;)*.;;">+?"
\underline{\phantom{}}'/<\!J,)\!D+1)0*"0("1@."ED+2.9B"0(">.3+,"I1<\!2).;")*"L<;)*.;;7""
E^{**}<+, "K...!)*3"0("1@."ED+2.9B"0(">.3+, "I1<2).;")*"L<;)*.;;"MU!1"C-OD..2)*3;#"I+=+**+@#"
  ` .0-3)+""
 K)2?.;|"ED+2.9B"0(">.3+,"I1<2).;")*"L<;)*.;;"MU!1"C-0D..2)*3;#"&@)D+30""
 <u>. d . D : G</u>#
$\$\;32\#0\&\)t\$\#8\"\\*(3\&\@"4\*4\"\L-)4+\*\#\";\"\*=\);4\#\WIeVC\\&VHHACe:VZ\"E?+-2\"\-.;.\*\1.2\"JB\"
C-...; (2.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); <math>(1.-#"K) (2.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); <math>(1.-#"K) (2.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); <math>(2.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (2.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (3.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (3.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (3.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (3.*1#"Q-+*p0); "$0,,+*2."+*2"K)*); (3.*1#"Q-+*p0); (3.*1#
EL&3"/^#M&3=#832>-); \|#\|\3#83:90*&"\|)32^#E#83=0"&)432#3\|#M&*2; +#"2/#E=*&); "2#!"H#"2/#
S&"; %); *#.+1.-"/<J.); @ .2#"+(1.-"(<-1@.-".2)!)*3"+*2"</2+!)*3")*":&C%>"';/-)*3"MUMU4+D!<+.";../!$"
MUMU7""
F.L^JR\#SD.IRG#
                                               # # # #
                       #
                                                                                                                                              MU!d"4""
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!
07812;5E!?565!H"
                                       # 583R!AG!":!ASFM!T! ' R435>2:!&EE4; 241:!) + "!
? 567!5;=!@E537!29!N486R!H!!
(5642;5E46471H!
                                !!!!!!!!! ) + "!5;=!/87;3R!INU!;56P85E415642;VMGAAK!
# 58465E!5;=!/5<4EU!1656P1H!
                                       !# 58847=!62! # 5864; 7! # 4EE476V$4; N4; =78:!
                                       %76487=! . $ ' ?!+7;428!"=W4128:!'7;678!928!
                                       ,5X!02E43U!5;=!"=<4;41685642;!
!
                                !!!!!!!!!, Y2!=5P>R6781:!$ < 4EU!IJFK!5;=! # 58U!IJA:!
!
                                       ") 0! "EP<; P1\mathbb{K}!
Z5;>P5>71H!
                                       /87;3R!I9EP7;6K!5;=!$;>E41R!I;564W7K[!
                                       !
!
]2<7!"==871171H!!
                                       LB:!8P7!Z5P>478!
                                       D5841:!/%" ( '$!CFGAC!
/%"('$V!
                                       !, 7EH!IJJK!AV!BC!LJ!MB!FC!
                                       ' 7EEH!IJJK!LVG^VSGV^BVLL!
!
) + "!
                                       CBG!+2P6R!/7=785E!"@60!SGB!
                                       ' R435>2:!&EE4; 241!LGLGFVA^SG!
                                       ) + "!
                                       ' 7EEH!IAK!CCJVCAGVABFM!
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