```
! "#$%&'() "*(+,-.(/01.(,.203044(3.546!"!#$%!&$%!'()*+,+-)(
   . %!''//+0-)!123(4,5!16+/%!''78+/$45!$)*!9$/+$!:$4;-%!
"#$%!
! "#$%&
'()*+,-&.&"/*012(34&516*/378&
9:(784.4!1:/14<*-37-44
=*:(-*1-\&.\&"661\&>8?/1,2\&
@7A1-31&.&@,/*1&B*//(:1&&
C(--(8?(: d. dd "6*/; d! 107d
%4(+4(:)&.&#/&D1-4&&
#+7//7&.&E;:1&E7F1G*H&&'(&
dd
95'I>%
51F(:2:74.4%*678(4571?/18)4&'(!
<(6*8*-36.6#/*A(657AJ-31)(:66'(6
<18?*:/å.å!*//*(å'//*F(:åå'(å
B776(:4.4E(88();4$(:/(344&'(4
K734&.&D7:1&L*//*16-78&&'(&
$:;1)d.d!, A*1d516618d&'(d
K77-(.34(814.4"FF*14=7M8/(;4B1J(M(//44))(4
K77-(.34(81N-&0/7AJ&.&&
• 518814kK7:)78kk)(k
• #22; &9416+/*8&&)(&
• #/\dD1-4\dPL4(8\d873\d%4(+4(:)\Q!\dd)(\d
• "6*/; &! 107&PL4(8&873&C(--(8?(:0!&))(&
C(6(/7:)\&.\&\#22;\&R1-3(:81J\&\&)(\&
C(314.4C1:*784516*/3784&)(4
R1A*0*-34. &E134:;8&%,34(:/18)&&)(&
```

```
'5.7.($!
$95 ' I > \%(83(:-\d-31?(\d0:76\dI\dT\d!\d18)\d/*(-\d)7M8\d78\d34(\d0/77:\d
   A7, ?4*8?&18)&);*8?UV&
&S'"$WR>%&(83(:-&-31?(&9&18)&/77J-&1:7,8)&4*6&*8&-47AJV&
*+,-./$0! 1 23456! 789:;<!=9>!;>=6?!
4S95'I > \%4-,)(8/;4-*3-4,+418)42(?*8-4-78?V4
"8.-9:;07<(04(=>?@/!
"@*'/$0!
+AB8=420: : !06!37D>E!
+AB8=420:;!06!F3G! 7 2B:!42B8Bl6!3!IE3;>B!0:!%2BFB6!
+AB8=420:;!C6!37D>E!
1 2B:!=9>\(\text{18B}\)!G=\(\text{C:};\(\text{!C:}\)\(\text{!%2BFB6}\)!
+AB8=420:;!C6!7986B!J3>6B!9>8!J89I6!38B!G=0:;!
1 B58B!;9::3!GCB<!=9>!3:G!-!38B!;9::3!C:DBJ4!B3J2!942B8!
) B4H6! I83=!49!42B!; 9G6!
%234!42B=5EE!649I!KCEEC:;!J976<!KCEEC:;!J89I6!
1 B!38B!FB;;C:;!;CAB!>6!69 LB! IB3 JBM!
+AB8=420::!06!37D>E!
+AB8=420:;!06!F3G! 7 2B:!42B8Bl6!3!IE3;>B!0:!%2BFB6!
+AB8=420: : !06!37D>E!
1 2B:!=9>\(\text{\text{8B}}\)!G=\(\text{C:};\(\text{\text{C:}}\)\\\2BFB6!
#.*))*0!
1 99M!%28BB<!479<!9:B<!;9M!
@3AB!=9>!2B38G!42B!:B76?!+AB8=9:BH6!43EKC:;!
```

) CDB!C6!F3G!HJ3>6B!BAB8=42C:; H6!37D>E! NC864!3!D3LC:B<!:97!42B8BH6!3!:B7!GC6B36B! OB;!42B!;9G6!J3>6B!-!G9:54!42C:K!42C65EE!JB36B!

```
.B9IEB!6J38BG<!JE>BEB66!KC:;6!
# 7 D>E!D3J46! L 3KB!C4! 7 986B!
 1 38<! IE3:>B6<!GB342<!42B=H8B!37D>E!
N3 LC: B<!GCAC: B! 78342<!42B=#8B!37D>E!
$438AC: ;!3:G!G=C: ;<!=B32<!4234\(\text{B}6!37D>E!\)
 "@*'/$0!
+AB8=420:;!C6!37D>E!
+AB8=420:;!C6!F3G! 7 2B:!42B8Bl6!3!IE3;>B!0:!%2BFB6!
+AB8=420: : !06!37D>E!
 S * %@0!-!E9AB!GB342!F>4!L3:!4206!6>JK6T!
 , 'R#, 0!-!K:97!8C;24?!U34>8B!C6!2B3EC:;!F>4!42B!%2BF3:6!6>8B!
            38B:54T!!
$5#X"IBI '&34:7M-&-76(34*8?\dangle\dangle\J(\dangle\dangle\J(\dangle\dangle\dangle)\dangle\J(\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle\dangle
@#V+'O'*0!W9FBM!
X+%#0! 1 234!G9B6!4234!BAB:!LB3:?!!
X+X+) * ', 0! 'T-T.T!49!3!YZ[\!F3EEB8!LBLB!3:G!3!)97B8!
           XB809:!K0:;T!
O**X+'0!WCG6!42B6B!G3=6!63=!42B!6483::B64!420::61!
N#US-')0!-5L!0>64!;E3G!^9J3643!236:54!GCBG!=B4T!$2B56!
           6999999!J99ET!!
N+X-U-$\%0!-456!3L3 C::<!J9:6CGB8C::!9>8!E3 =!KC::!236:54!
           G9:B!3:=420:;!=B4!
N#US-')0!'(;24?!$2B56!73=!499!;99G!D98!2CLT!
 . # "-N-$%0! 1 BEEK! * BGCI>6!GCG!6B:G! "8B9:!49!J9:6>E4!42B!
            983.JEBT&
```

```
N+X-U-$%0!#:942B8!>:GB8834BG!$489:;!NBL3EB!"2383J4B8!
S**$+`%@+U#0!N+X#)+!N)+$@MMM!!
X+%#0! 1 CEE!=9>!;>=6!BAB8!62>4!>I!3:G!63=!69LB42C:;!4234!
3J4>3EE=!D>842B86!42B!IE94!D98!9:JB?!)99K<!"8B9:56!F3JKM!!
a9:(78&(83(:-&0:76&!V&))
*+,-./$0!"8B9:M! 1 BEJ9LB!F3JKM!(
"'+*U0!)C64B:!G>GB<!-!7B:4!>I!49!42B!*83JEB<!3:G!2B!49EG!LB!
42C:;6!-5L!:94!6>8B!38B!LB3:4!D98!3EE!49!2B38T!
*+,-./$0!-5L!6>8B!C456!DC:BT!%296B!729!IE3;>B!49;B42B8!643=!
49;B42B8T! 1 234!=9>!23AB!49!63=!49!42BL<!=9>!J3:!63=!49!LBT!!
```

```
"'+*U!
/;2<!DC:BT!
" '+* U!a*6*313*8?434(47:1A/(b!
#:G!-!D984>:34BE=!K:97!3!EC44EB!6BJ8B4!
-4H6!3!43EB!4234!-5L!6>8B!7CEE!CLI8B66!
#:G!GB38!608<!$2B!630G<!G9:H!E3>;2!
-5EE!4BEE!C4!9:!FB23ED!
*D!42B!LC6B83FEB<!42B!E9:BE=<!3:G!GBI8B66BG!!
*+,-./$!
"8B9: 1!
" '+*U!a*6*313*8?434(47:1A/(b!
.998!>:D984>:34B!69>E6!
-:!I3C:<!C:!:BBG!
%206!9:B!E9::0::!49!FB!6>JJB66D>E!
%234!9:B!73:46!49!;B4!42B!;C8E!
#:G!G9!-!2BEI!42BL?!
RB6<!C:GBBG!
%296B! I998!>: D984>: 34B!69>E6!
$9!63G<!69!48>B!
%2B=!J9LB!DE9JKC:;!49!L=!4BLIEB!
"8=C:;<!c.89I2BJ=<!*83JEB<!IEB36BMc!
#:G!-!2BEI!42BLM!
RB6!-!G9!
U97!EC64B:!JE96BE=!IEB36B!;99G!KC:;!
#!L>8GB8B8<!$2B!49EG!LB<!
```

```
@36!43KB: !8BD>; B!C: !=9>8!F8942B8`C: `E3 7 56!%2BFB6!
RB6!42B!9:B!729!L>8GB8BG!)3C>6!
%2B!KC: ;!729!9: JB!6I9KB!>I9:!%2BFB65!GC36!
1 234!3!I998!>:D984>:34B!69>EM!
*+,-./$!
R9>!L>64!FB!09KC:;!
" '+*U!
1 2=!79>EG!-!09KB!3F9>4!69LB42C:;!69!ECDB!63AC:;!36!42C6?!
" '+* U!a*6*313*8?434(47:1A/(b!
*2!=9>!G9:54!>:GB8643:G<!2B2!2B2T!) (DBH6!D>EE!9D!49>;2!8CGGEB6<!
   C6: 14!C4?!@B2!2B2T!
O>4<!2B8B<!42B8B!(6!9:B!L98B!420::T!
1 B!23AB: H!GC6J>66BG!42B!8B369: !=9>!: BBG!49!K: 97!42C6T!
S9:(78&+1,-(-&07:&):1613*A&(00(A3V&
R9>!36KBG!LB!49!649I!IE3:>B<!6>IB8!G>IB8!B36=<!:9!8B3EE=M!
1 234!=9>!:BBG!49!G9!C6!`!G8CAB!2CL!9>4T!
*+,-./$!
@97!G9!-!DC:G!2CL?!@97!J3:!-`!
" '+* U!a*6*313*8?434(47:1A/(b!
R9>EE!23AB!=9>8!38L=<!=9>8!EC44EB!69EGCB86T!
#:G!G9:M!>:GB8B64CL34B!42B!CLI9843:JB!9D!=9>8!JC4CB:6<!23M!
%2B!;9G6!>I!42B8B!G9:H!ECKB!3!E94!9D!FE3FFB8!
%2B=!42C: K!3!KC: ;!72956!CGEB!C6!3!F98BM!
RB4!9: !B3842!C4H6!L>J2!I8BDB8BG!D98!KC: ;6!49!2B38!BAB8=!798G!
```

```
a C " C " ! ' I $ &4*?4&0*F(-&5#X" IBI 'b!
#:G!3D4B8!3EE!GB38<! 7 234!38B!983JEB6!BAB:!D98?!
 "9LB!9:<!=9>!:BBG!49!I3=!3!F(4!L98B!9D!344B:409:!
                                                                                                                                                                                 N+X-U-\$\%0!XB: 1!
%8>B!;B:4EBLB:!79>EG!EB38:!3EE!42B!D3J46!
                                                                                                                                                                                 X + \% #0! 1 89 : : !L9LT!
O>4!42B=!G94B!3:G!6799:!3:G!D37:!
                                                                                                                                                                                 *+,-./$0!*K<!69<!297!38B!7B!;9::3!DC:G!42B!L>8GB8B8?!%234!
 *:!3!E3G=!729H6!7(42G837:!
                                                                                                                                                                                           736!=B386!3:9!
-4\(\)6\(\)62B\(\)729\(\)29EG6\(\)2B\(\)49\(\);\(\)>B\(\)729\(\);\(\)B46\(\)3\(\)L3\(\).
                                                                                                                                                                                 " ' + * U0! 1 BEEd 7 B!J9>EG!36K!%(8B6C36!D98!2BEI?!
                                                                                                                                                                                 *+,-./$0!S8B34!CGB3M!a37&95'I>%b!"3:!=9>!;>=6!;9!;B4!2CL!
 "9LB!9:!=9>!I998!>:D984>:34B!69>E!
S 9!32B3GM!
                                                                                                                                                                                          D98!>6?!
X3KB!=9>8!6B38J2M!
                                                                                                                                                                                 @ #V+ 'O' *0!a+7,8)-44*-4A4(-3418)4.2*F(-44*6414+(1A(4-*28V!))
-HL!3!AB8=!F>6=!GBC4=!3:G!-!23AB:H!;94!3EE!G3=!
                                                                                                                                                                                          R9>!;94!04!F89T!
-5L!0>64!#I9EE9!
$>:!3:G!69::M!
                                                                                                                                                                                 a'"$WR>%18)&9I"'D&(Y*3&9U&95'I>%&(Y*3-&!&T&I&:(3,:8-&
R9>!I998!>:D984>:34B!69>E!
                                                                                                                                                                                          -(1:A4*8?&07:&=WI "%W#%b!
-4\(\)6\(\)6\(\)G!F>4\(\)4\(\)8>B!
                                                                                                                                                                                  R = \frac{1}{2} R = 
-D!=9>! 73:4!49!J8966!42B!F8CG:B<!L=!67BB4!
R9>||AB|: 94!49!6BB!42B!893G6!
                                                                                                                                                                                 . # "-N-$%0! 1 2=!38B!=9>!=BEEC::?!
                                                                                                                                                                                 . 'R#.0!1 BEE!%BC8B6C36!C6!FEC:G<!8C:24?!$9!7B!23AB!49!=BEE!49!
S 9!32B3G!3 : G!43KB!3!F8B342!
#:G!DC:G!729!L>8GB8BG!4234!9EG!493G!
                                                                                                                                                                                          L3KB!6>8B!2B!DC:G6!>6T!
                                                                                                                                                                                 N \# US - ')0! \$ 7 BB4CB<!M(!38B!DC:GC:;!2CLT!)
*+,-./$!
                                                                                                                                                                                 O**X+'0!@B8B<!K(44=!K(44=T!)
                                                                                                                                                                                 , 'R#, 0! 1 BEE!34!EB364!-!K:97!2B56!:94!3!J34T!
 "8B9:<!423:K!=9><!:97!-HAB!;94!49!DC:G!9>4!L98B&
                                                                                                                                                                                 O**X+'0!"9LB!3:30:?!
 " '+*U!a*6*313*8?434(47:1A/(b!
                                                                                                                                                                                 S * * $+`\%@+U#0!-!+#\%!" #\%!N**, !N' * X!\%@+!" #UM!!
%2B!F966!C6!9:!3!89EE!
                                                                                                                                                                                 S * % @0!$2>62M! 1 23456!4234!C:!42B!GC643: JB?!
%2(6! 1998!>: D984>: 34B!69>EMMMM!
                                                                                                                                                                                  . # "-N-$%0! * 2<!-!420: K!423456!20LM!
S9 I" 'D&0/7,:*-4(-&18)&:(67F(-&':1A/(&A7-3,6(V&
                                                                                                                                                                                 a95 'I>%d(Y*3-d!Ud'"$WR>%d(83(:-d9Zd95 'I>%d(83(:-d!dM*34d
 " + * U0!\% 234!DBE4! 7 BC8GT!
                                                                                                                                                                                         R#9 V < V = \&18) \&C''C''! 'I \& \&/(1) *8? \& = V I'' \% V # \% b!
@ \#V + 'O' * 0!R9 > 8!L9L!DBF4!7BC8GT!
```

```
*+,-./$0!%2B8B!2B!C6M!^>64!42B!C:6C;24D>E!;>=!-!:BBGT!%BEE!LB<!
                                                                   -!J9>EG:54!FB!42B!L>8GB8B8!=9>!6297!LB<!RB32!!
   7 234!G9!=9>!K:97!3F9>4!) 3C>65!GB342?!
%-'+$-#$0!-!G9:54!42C:K!=9>!73:4!49!K:97!3F9>4!4234]!
                                                                   %-'+$-#$!#U,!"@*'/$!!
*+,-./$0!"5L9:!4BEE!LB<!-!I89L06B!-!79:54!FB!L3GT!
                                                                   R9>EE!:BAB8!K:97!
%-'+$-#$0!@B8B56!42B!42C:;0!=9>!38B!42B!L>8GB8B8T!
*+,-./\$0a*66()*13(/; \&(8:1?()b! 1 234?!U9!73=M!
                                                                   *+,-./$!!
                                                                   *2!-!K:97!
(2,7B:(#A75.(
"@*'/$!
                                                                   %-'+$-#$!#U,!"@*'/$!!
                                                                   %23456!297!)3C>6!GCBG!!
@B=<!I89I2B4!I89I2B4!
@B=!I89I2B4!I89I2B4!6C:;!!
                                                                   *+.-./$!
*+,-./$!
                                                                   %2B8BH6!Q>64!9:B!EC44EB!42C:;!
-5L!63=0:;!4234!-5L!0>64!42B!K0:;!!
                                                                   %234!649I6!LB!FBECBAC:;!=9>8!82=LB<!=B32!
"@*'/$!
                                                                   %-'+$-#$!!
                                                                   "9LB!9:!
@B=!I89I2B4!I89I2B4!!
@B=!I89I2B4!I89I2B4!6C:;!!
RB32!
                                                                   *+,-./$!!
                                                                   R9>!J3:54!6BB!
%-'+$-#$!
-HEE!6297!=9>!4234!C416!9:B!3:G!42B!63LB!
                                                                   %-'+$-#$!!
'>EC:;<!L>8GB8!63LB!;3LB!
                                                                   -!K:97!-!J3:!
R9>!GCG!C4!!
1 3EKBG!>I!49!) 3C>6<!64384BG!67C:;C:;T!
                                                                   *+,-./$!!
                                                                   U94!3!J23:JB<!:9!
*+,-./$!!
-!8>EB!%2BFB6!:97<!3:G!4234I6!3EE!
                                                                   %-'+$-#$!!
%206!06!7234!-!G9!
                                                                   -!J3:!6BB!42C6<!4234!=9>!GCG!4234!
```

```
!
*+,-./$!!
O>4!=9>!J3:54!6BB!
!
"@*'/$!!
SB4!2CL!9>4!9D!42B!JC4=M!
!
*+,-./$!
R9>!J3:54!6BB!!
!
%-'+$-#$!!
-!63=!-!J3:!
!
*+,-./$!!
%2B8BH6!:94!3!J23:JB<!92!
!
%-'+$-#$!!
-!6IB3K<!=9>!6J8B3L<!-5L!3!6B8A3:4!9D!#I9EE9!!
!
```

```
*+,-./$0!R9>58B!E=C::!=9>!FEC:G!9EG!FEC:G!L3:M!
%-'+$-#$0!%206!06!499!L>J2<!-5L!9>4T!
*+,-./$0!R9>!J3:54!EB3AB<!-\!L!F3:\((620:::=9>:\)DC864\!!
%-'+$-#$0!a37\(\alpha\)R#9\(\noting\)\(\alpha\)C"C"!'I\$V!\S\(\B\)!\L\(\B\)!\D!
   2B8B<!42C6!KC:;!C6!;9C:;!49!6C:K!42B!JC4=T!
a = WI''W\#\%\&(Y^3-\&!\&M^34\&R\#9W<W\%=\&18)\&C''C''!'I\$V!
*+,-./$0!-4!0>64!G9B6:54!L3KB!6B:6BM! 1 2=!79>EG!4234!D3KB!
   I89I2B4!ECB!49!LB!ECKB!4234?!$9LBF9G=!L>64!23AB!I>4!2CL!
   >I!49!04 ] T"8B9:M!
N#US-')0!/;2<!72B8B56!^9J3643?!12=!236:54!62B!;944B:!C:49!
   42B!6498=!=B4?!
X + \% #0!, 9:54!7988=<!42B!F9LF62BEE!7CEE!6297!>I!7C42!3!
   F9LF62BET!
S * * + `\% @ + U # 0! - !) * V + ! O + # / \% - N / ) ! + g .) * , -US!
    1 * X + UM!!
a9 I " 'D&(83(:-&9b!
" ' + * U0!R9>!J3EEBG?!
*+.-./$0!@97!G38B!=9>M!-!J3:54!FBECBAB!=9>!79>EG!F8CFB!4234!
   37D>E!I89I2B4M!
" '+*U0!, 9!7234!:97?! 1 234!38B!=9>!BAB:!43EKC:;!3F9>4?!
*+,-./$0!R9>58B!3!483C498M!R9>!F8CFBG!%C8B6C36!49!63=!-!736!
   42B!L>8GB8B8M!
" '+*U0! 1 234?!U9M!-!79>EG!: BAB8!G9!4234M!R9>58B!42B!FB64!
   420: ;!4234!BAB8!23IIB:BG!49!LBM!
```

```
" '+*U!
-D!42B8B6!3!I8C_B!D98!IB8DBJ4!83:K6<!
-!;>B66!-HAB!3E8B3G=!79:!4234!
U9!KC:;62CI!C6!79842!48B3J2B8=!
1 2=!79>EG!-!FB483=!=9><!-5L!;99G<!:9!423:K6!
!
*+,-./$!
1 29!GH=9>!42C:K!=9>H8B!KCG02 1 .2(:54)0.2(!FB)0.2(E)0.2(C)0.2(B)0.2(AB)0.2
```

(>,7B:('A9(\$B+(\$7(C,8.))))

```
*+,-./$!
X3:!=9>!J3:H!GB:=!C4!
1 29!=9>!38B!3:G!7234!=9>58B!G9C:;!
"8B9:!-5L!:94!F>=C:;!
@9:!C46!J3>6B!9D!=9>!4234!
-!J3EEBG!4234!D3KB!18912B4!>I!
1 2B:!=9>!;9::3!97:!>I!4234!=9>58B!3:!BACE!BACE!L3:!
!
```

```
R9>!ECAB!3:G!=9>!EB38:!C4!
                                                                                                                                                      F.(\#,7B:(GA/1)=E,@:(H-@7,(I\$75.4:J!)
#:G!CD!=9>!;B4!J9:D>6BG!69LB4CLB6!
                                                                                                                                                      "@*'/$!
U9F9G=\(\text{1B8DBJ4}\)!
                                                                                                                                                      1 B!G9: 14!43EK!3F9>4!-: JB64<!: 9<!: 9<!: 9!
S * %@0!%266!66!42B!KC:G!9D!3:;64=!J9:4B:4!-!ECAB!D98T!
                                                                                                                                                      1 B!G9: H!43EK!3F9>4!-: JB64!
N#US-')0!*K3=<!F>4!^9J3643?!$2B56!EC4B83EE=!IB8DBJ4T!-5L!
                                                                                                                                                      X+$$+US+'!i!"@*'/$!
        ;9::3!GCBT!
S * * $+`%@+U#0!, CG!=9>!63=!S996B`%2B:3?!$3J8CDCJB?!N98!
                                                                                                                                                       1 BEEM!-! 7 36!6B: 4!3 7 3=!&%2B=! 7 B8B!6B: 4!3 7 3=(!
        LB?!RB6?!
                                                                                                                                                      N89L!206!J20EG299G!29LB!
, 'R#, 0!U9<!:9T!O>4<!CD!=9>!73:4!-!23AB!69LB!;8366!3:G!
                                                                                                                                                      #:G!-!>:D984>:34BE=!23AB!F3G!:B76!&%2B=!23AB!F3G!:B76(!
                                                                                                                                                      *BGCI>65!D342B8<!.9E=F>6<!C6!GB3G!&,>:!,>:(!
       F > : 6?!
                                                                                                                                                      R9>!4BEEC:;!42C6!6498=!98!3L!-?!&-HL!6988=<!LB66B:;B8<!;9!9:(!
S * * S + `\%@ + U # 0! @ > L 3 : !DEB 62 ?!
 , 'R#, 0!a\:, 22*8?&4(:&21AJ\V&U9 | E34B8 | T!
                                                                                                                                                      "980:42!63=6<!c.EB36B!J9LB!F3JK!29LBc!&%2B=!73:4!20L!49!
X+%#0!RB32!7B!629>EG!23AB!6>8IE>6!9D!4234!F=!42B!B:G!9D!42B!
                                                                                                                                                             8>EB(!
       IE3=!
                                                                                                                                                      "98C: 42!63=6<!e. EB36B!FB!9>8!KC: ; f!&%2B=!73:4!2CL!49!8>EBM(!
*+,-./$0! 1 304:69! 7 2B8B!GCG!=9>!63=!) 30>6!GCBG?!
                                                                                                                                                       =\mathbb{C}: 169! : 34 > 83\mathbb{E} = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 12000 = 120000 = 12000 = 120000 = 120000 = 12000 = 12000 = 12000 = 12000 = 120000 = 12000 = 120000 = 120
^* " #$% #0! #4!42B! LBB4C: :!9D!428BB!893G6d72=?!
*+.-./$0! 1 B8B!42B8B!3:=!6>8ACA986?!
                                                                                                                                                      "@*'/$!
^* " #$% #0!*:B<!=B32<!F>4!72B:!=9>!388(ABG!2B!36KBG!49!FB!
                                                                                                                                                       1 B!G9:H!43EK!3F9>4!-: JB64<!:9<!:9<!:9!
       6B:4!373=T!
                                                                                                                                                       1 B!G9: H!43EK!3F9>4!-: JB64!&@B=(!
*+,-./$0!$9!72B8B!C6!2B!:97?!
^* "#$%#0!-!J3:!78C4B!C4!G97:!D98!=9>!a-A:*22/(-&1&873(&18)&
                                                                                                                                                       ' "$WR>%&18)&%5 "R5" I$&(83(:&I&
       418)-&*3&37&4*6b!
*+,-./$0!S8B34!423:K6M!!
                                                                                                                                                      ^*"#$%#!
                                                                                                                                                      R9>!K: 97!7234!4206!LB3:6<!FBJ3>6B!=9>8!D342B8!736:54!
a'"$\psi R > \langle (Y*3-\langle I <! C"\langle "DK" I \langle (83(:-\langle !b!)
                                                                                                                                                              L>8GB8BG!
                                                                                                                                                      1 B!J3:!:9!E9:;B8!DB38!42B!I89I2BJ=!7B!2B38G!
X+$$+US+'0!X=!j>BB:<!-!23AB!3!LB663;B!D98!=9>8!2>6F3:GT!
                                                                                                                                                      -5EE!64384!42B!JBEBF834C9:6!8C;24!373=!&"2<!J2<!J2(!
^* " #$% #0!-!J3:!43KB!C4!D98!2CLT!
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*+,-./$!?:12-&@7A1-31N-&1:6&
@9:B64E=!L=!67BB4!4206!06!3!; CD4!69!2>LFE0:;!
O>4!69LB42C:;!3F9>4!42C6!64CEE!EB3AB6!LB!D>LFEC:;!
1 B58B!;83 I IEC:;!7 C42! I 89 I 2B J CB6! 7 B!G9:54!>: GB8643:G!
, 9!=9>!>:GB8643:G?!
X + \$ + US + '!a - + *8 - \ell' () *+, -\ell 37 \ell 0 1 A (\ell 4 * 6 V \ell)
-!>6BG!49!FB!3!$2BI2B8G!=B386!3;9!
1 2B: !C!J3LB!>I9: !3!F3F=!9: !X9>: 4! "C423B89:!
RB32<!206!3:KEB6!7B8B!IC::BG!3:G!42B!429>;24!640EE!L3KB6!LB!
    6IC: !\&@B=(!
"@*'/$!a1++:71A4*8?&'()*+,-&18)&-,::7,8)*8?&4*6&*8&1&
    -81++*8?&A*:A/(V&
1 B!G9: H!43EK!3F9>4!-: JB64<!: 9<!: 9!
1 B!G9: H!43EK!3F9>4!-: JB64!
N#US-')!
%C8B6C36!49EG!LB!L=!62CI6!79>EG!GCB!
%2B!:BP4!G3=<!GB3G!&U9<!:9(!
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```
!
S9!9:!63AB!2B8!
!

X+X+)*',0!1 BEE!-EE!FB!29:B64h!-!G9:H4!8B3EE=!>:GB8643:GT!
O>4!-!DBEE!G97:!4266!2CEE<!3:G!-!;94!;E>B!9:!L=!23:G6T!U97!-!
;94!8BJ98G6!9:!L=!DC:;B86T!
@#V+'O'*0!1 233334?!
X+X+)*',0!'BJ98G6!9:!L=!DC:;B86T!-!;94!8BJ98G6!9:!L=!
DC:;B86<!3:G!-!Q>64!J3:H4!649IT!
O**X+'0!.EB36B!649IM!
X+X+)*',0!-!J3:H4!649IT!-!;94!3!S996B`42B:3!J9:489EEC:;!LBT!
S**$+`%@+U#0!@9:KT!
X+%#0!*2!7C42!3E!42B!;9G6`!7234!38B!=9>!3EE!G9C:;?!$B8C9>6!
42C:;6!38B!FBC:;!BPIE3C:BGT!
```

```
S 9G6!G9: H!BAB8!649I<!7 234BAB8!8B369:!!
+AB8=!LC:>4B<!BAB8=!G3=!
!
"@*'/$!i!#.*))*!aI-&+I:(834(-*-b!
X3:CI>E34B!3EE!42B!73=!=9>!;9443!F8B3K!\BL!\\"3>6B!-\L!;9C:;!
49!78BJK!=9>8!ECDB(!
@B56!;9::3!G9!C4\\-5L!;9::3!G9!C4(!
@B56!;9::3!I89AB!C4\\\@B56!;9::3!I89AB!C4(!
```