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^{!;)!4&}lt;('1!56!'01! . (J1-!&13(1=4E!'01!"55C!=1)'!5)!'5!"185 . 1!%! . ()5&!8>%44(8!56!'01!'&%31>! >('1&%'@&1!A1)&1!%)-!%8'@%>>#!1)-1-!@<!41&3()A!'5!<54('(31>#!<@">(8(01!'01!=%'!()!B@14'(5)E! %''&%8'()A! . %)#!)1=!<&%8'('(5)1&4!'5!?@--O(4 . +!H11!K %&-!UVWV!]^&16%81E_!J3DJJ+!!

^{!, .5)} A!'01!(-1%4!;!=(401-!'5!'&1%'!=1&1!'0541!56!85) - ('(5)1-!A1)14(4E!)(&3%) % E!1 . <'()144E!%) - ! C%& .%+!!

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 $; '!=\%4!\%<<\%k1) '!'0\%'!'01!=\&('()A!<\&58144!=\%4!-1.\%)-()A!\%)!531\&0\%@>E!\%!6@)-\%.1)'\%>! \\ \&185)81<'@\%>(0\%'(5)+!*01!<>\%#!>\%8C1-!4<(\&('+!*01!%<<\&5\%80!=\%4!=\&5)AE!45.105=+!L5)'()@()A!.#! \\ \&141\%\&80!()'5!'01!0(4'5\&\#!\%)-!)\%'@&1!56!'01!-\&\%.\%'(8!%\&'4E!;!''1A\%)!'5!&1\%>(01!=01&1!'01!<&5''>1.!>\%#+! \\ ;)!=\&('()A!\%!<(181!56!'01\%'&1!;!)11-1-!'5!>1%&)!05=!'5!&1<&141)'!(-1\%4!\%)-!41)4(''(>('(14!)5'!'0&5@A0!-(\%)>5A@1!\%)-!%&A@.1)'E!''@'!'0&5@A0!'01(&!<5&'&\%#%>!$)'(&#$/)+!,&'(5)E!C%&.&*!*01!)\%'@&1!56!C%&.&!! \\ 0\%-!\%>A@1!\%)-!%&A@.1)'E!''@'!'0&5@A0!'01(&!<5&'&\%#%>!$)'(&#$/)+!,&'(5)E!C%&.&*!*01!)\%'@&1!56!C%&.&!! \\ 0\%-!\%>A@1!\%)-#!''11)!(-1)'(6(1-!%4!5)1!56!81)'&\%>!'01.14!65&!'01!<>%#+!;!-@A!-11<1&+!,&4!('!'@&)4!5@'E!'') \\ 0\%-!\%>A@1.56!C%&.&M!''()DD'5!-5E!'5!%8'E!'5! \\ <1&65&.+!*0(4!41&1)-(<('5@4!85()8(-1)81!56!.1\%)()A4!<&53(-1-!I@4'!'01!8>@1!&1B@(&1-+!*5!=&('1!\%!') \\ <\%#!81)'1&1-!5)!?@--0(4.E!'01!A5\%>!85@>-!''1!)5'0()A!5'01&!'0\%)!'5!1)A%A1!()!M4N(-(D-&%.%+!'') \\ S0\%&.(8!-&\%.\%+!*5!1)\%8'!'0(4!A5\%>E!'01!=&('1&!0(.41>6!=5@>-!)11-!'5!''')!&1(..%A()1-!%4!=&('()A!()!) \\$

$$\begin{split} &4@80!\%! = \%\#!\%4!'5!\%>5 = !?@--0(4'!85)81<'4!\%) - !'01 . 14!\#/'?0'*0@/)\%\#''(\#0*!\&\%'01\&!'0\%)!4'\%'1-+!*01!\\ &\%@'05\&(\%>!4'\%) - <5()'!)11 - 1 - !'5!40(6'!6\&5 . !5)1!56!(. \%A()1-!85 . . 1)'%\&(\%>!5''I18'(3('\#!'5=\%\&-4!5)1!)56!) - @\%>!1 . ''5-(. 1)'!56!?@--0(4'!<\&()8(<>14+!;)!'0(4!=\%\#E!'01!<&5I18'W4!\&\%'(5)\%>1!85@>-!''1!&1-16()1-F!'01!A5\%>!=5@>-!''1!'5!=&('1!\%!34**, $\%\#!D-(=E!)5'!4(. <>#!\%!$$

 $\begin{aligned} 0\%31!'5!''1!A@(-1-!''#!85)4(-1\&\%'(5)4!56!\&(AO'!4<1180!/\%(@=(1B>C&9+! $54'!(.<5\&\%))*HE!('!=5@>-!\\ 0\%31!'5!''1!05)14'!\%)-!\%(.!'5!-5!)5!0\%\&.+![5\&!'0(4!\&1\%45)E!('!=\%4!-18(-1-!1%\&*H!5)!'0\%'!'01!<\%H!\\ 405@>-!658@4!5)!'01!=14'1\&)!1J<1\&(1)81!56!?@--0(4.!\&\%'01\&!'0\%)!\%)H!>(3()A!,4(\%)!?@--0(4'!'\&\%-('(5)+!*0(4!85)4(-1\&\%'(5)!(4!8\&('(8\%))*H!(.<5\&'\%))'+!*01!.5'(3\%'(5)!65\&!'0(4!-18(4(5)!8\%))!''1!@))\\ 405@>-!658@4!5)!'01!=14'1\&)!1J<1\&(1)81!56!?@--0(4.!\&\%'01\&!'0\%)!\%)H!>(3()A!,4(\%)!?@--0(4'!'\&'(5)+!*0(4!85)4(-1&\%'(5)!*))!''1!@))\\ 405@>-!658@4!5)!'01!=14'1\&)'1J<1\&(1)8'+10(-5)*!'*0!+10(-1)*(5)*!'*0!+10(-1)*(5)*!'*0!+10(-1)*(5))!''1!@))\\ 405@>-!658@4!5)!'01!=14'1\&)'1J<1\&(5)!*0!+10(-1)*(5)*!*0!+11*:5)*(56!)*0!*(5))!''(5)+1**(5))*(55)*!*0!+11*:5)*(56!)*0!*(5))*(1)*(5)*!*0!+11*:5)*(56!)*0!*(5))*(56!)*0!*(5)*:56!*0!*0!*(5))*0!*(5)*:56!*0!*0!*(5))*0!*(5)*:56!*0!*0!*(5))*0!*(5)*:56!*0!*(5))*0!*(5)*:56!*0!*0!*(5))*0!*(5)*:56!*0!*(5)*:56!*0!*0!*(5)*:56!*0!*0!*(5)*:56!*0!*0!*(5)*:56!*0!*0!*(5)*:56!*0!*0!*(5)*:56!*0!*0!*:56!*0!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*0!*:56!*0!*:56!*0!*0!*:56!*0!*:56!*0!*0!*:56!*0!*:56!*0!*0!*:56!*0!*:50!*0!*:50!*0!*:50!*0!*:50!*0!*:50!*0!*:50!*0!*:50!*0!*:50!*0!*0!*0!*0!*0!*:50!*0!*0!*0!*0!*:50!*0!*0!*$

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(.1)'%&#!<1&45)%>('(14!&1%-(>#!>1)-()A!'01..41>314!'5!8&1%'(31!&1()'1&<&1''('5)!%>5)A! ?@--0(4'!>()14+!,&&(3()A!%'!'01!..5)%4'1&#!%'!'01!4%..1!'(..1E!'01!'=5!#5@)A!..1)!B@(8C>#!65&.!%)!

@)>(C1>#!6&(1)-40(<+!;)!'1&..4!56!80%&&8'1&E!*(..!(4!'01!<1&<1'@%>!5<'(..(4'E!%>=%#4!>55C()A!5)!'01! ''&(AO'!4(-1!56!>(61j!01!(4!4()81&1>#!()'1&14'1-!()!>1%&)()A!'01!?@--0%M4!=%#+!M(..!(4!%!4C1<'(8E!%! 8#)(8!6&5..!'01!4'%&'+!*01!?@--0%M4!'1%80()A4QDD=1>>E!'0%'!=%4!45!>5)A!%A5E!=05!8%)!&1%>>#!4%#! =0%'!01!%8'@%>#!'%@AO'Q!?14(-14E!=0%'!<544(''>1!&1>13%)81!85@>-!'01#!0%31!65&!'5-%#E!%)#=%#Q!!

*O&5@A05@'!'01!<>%#E!'01!'=5!80%&%8'1&4!%&1!-131>5<1-!()!4@80!%!=%#!%4!'5!(>Qq0.2(#!%)0.2(4)]TJETQq(%)ET-00

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*:\$! :N31!A5'!%!418&1'!:N-!&%'O1&!)5'!4%#!! ;!8%)\"!B@('1!"1>(131!('DD"@'!('\4!'&@1!'0%'!;+++! K 1>>E!#5@N31!<&5"%">#!A@1441-!('DD!N&5@)-!O1&1!('N4!'%"55!! ;'M4! . #!>(''>1!418&1'DD''@'!;N>!40%&1!('!=('0!#5@+++!! ;!"1>(131!()!c5-!/m!n9! 45.105=+++!! M: \$! K1>>E!:N31!A5'!%!418&1'DD'01!'&@'0!8%)!"1!0%&-!! ?@'!=1!0%31!'5!''1!61%&>144!%) - !4<1%C!05)14'!=5&-4!!;N-!&%'01&!)5'!C11<!('DD('N4!45!0%&-!'5!''1%&!! :\\>!I@4'!O%31!'5!4<1%C!('DD"@'!#5@\-!"1''1&!"1=%&1+++!! f (61N4!% "4@&-!/m! n 9!! ;'!%>>!I@4'!1)-4!5)1!-%#!! 1 *: \$!%) - !M: \$! !!"1>(131!()!c5-!0!f(61)4!%"4@&-+++/m!n9!kbG, 7;TY!*01&1!(4!%!418&1'E!)5!=5&-4!8%)!4%#!! f 55C! - 11 < !'0&5@A0!'0(4!45&&5 = !%) - !>(4'1)E!%) - !<&%#!*01!%)4=1&!=(>>!85.1!'5!#5@E!%4!%!40%<1D40(6'()A!8>5@-! %!6>5%'()A!45%<D"@"">1E!%)!(.%A()1-!4C#D6>5=1&+++! $k = \frac{1}{2} =$ *01!%<<1%&%)81!56!k1)%3(&5!5)!4'%A1!(4!%!&%&1!5)1+!*05@A0!0(4!&5>1!(4!.()(.%E!('!(4!1441)'(%)+!R(4! ()8>@4(5)!41&314!'5!<&53(-1!%!85)'&%4'!'5!'01!1J'&1.1!@)-1&4'%)-()A4!%)-!85)6@41-!''10%3(5&4!56! '01!=14'1&)!80%&%8'1&4!4'&@AA>()A!'5!6()-!%!655'05>-!5)!'01!<%'0+ !R(4!%8'(5)4!%&1!.1%)'!'5!4<1%C!

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