!''#\$%&'(%)*+,+%

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1

-.1.34%) 5678104893/%

- "# \$!%&'()*'(!+,-'(\$!-'.!/,!0-'(!!232"4\$!5678!9&'(:,8';!-'.!9&<=-:-;*>8!?<=-@;A!&B! 0 8-;78:!&'!9&'A,<8:!C8>*8DAE!F>*.8'@8!B:&<!-'!G')*'8!H&:,<!-'.!FI=8:*<8';\$J! \$!K&)#!"L!?AA,8!"\$!==#LMNOP#!
- 2# \$!%&'()*'(!+,-'(\$!%<*;:*!Q#!R-:S&>*;@7\$!-'.!T:*-'!6#!C-;@7B&:.!123"04\$!5+*(7!&:!)&D! A8-A&'U!9&';:-A;*'(!)-,'@7!;*<*'(!@&'A*.8:-;*&'A!B&:!V*(NV,.(8;!-'.!)&DNV,.(8;!8';8:;-*'<8';! =:&.,@;A\$J! \$!K&)#!L2!?AA,8!WX"3\$!==#"WLYN"W03#!

- L# \$!%&'()*'(!+,-'(\$!R#K#^#!_,<-:\$!-'.!Z'.:8*!^;:*`'8>!123"L4\$!5678!?<=-@;!&B!^,==)*8:!

/.7.14., %193L.-.31.%)-./.3404893/%

- "# 5R-'-(*'(!^-)8A=8:A&'!FI=8@;-;*&'A!D*;7!-!R,);*N^;-(8!FI=8@;-;*&'N9&'B*:<-;*&'!H:-<8D&:S\$J! ZRZ!^,<<8:!9&'B8:8'@8\$!23"Y\$!Z;)-';-\$!QZ#!
- 2# 5R -: S8;*' (cA!C&)8!*'!9 -=;,:*'(!K-),8!B:&<!?''&>-;*&'E!_'&D)8.(8!C8A&,:@8A\$!^;:-;8(*@!F<=7-A*A\$!-'.!H*:<!K-),8\$J!a?9RF6!Z'',-)!9&'B8:8'@8\$!23''Y\$!+&'&),),\$!+?#!
- P# 5G: (-'*d-;*&'-)!e8-:'*'(!*'!%*BB8:8';*-;8.!^;:,@;,:8AE!678!97-:-@;8:*A;*@A!&B!C-.*@-)!?''&>-;*&'! +, VA\$J!a% R Z!C8A8-:@7!H&:, <\$!23"Y\$!Z;)-';-\$!QZ#!
- M# 5%*(*;-)!Z.>8:;*A*'(!-'.!H*:<!K-),8\$J!9^fFT!C8A8-:@7!^[<=&A*,<\$!23"Y\$!+-[D-:.\$!9Z#!
- L# 5+&D!<, @7!.*.!?!)*S8!*;U!FI-<*'*'(!R&&.NT-A8.!T*-A8A!*'!9&'A, <8:!C8>*8DA\$J!P\;7! ?gHGCR^!R-:S8;*'(!^@*8'@8!9&'B8:8'@8\$!23"L\$!T-);*<&:8\$!R%#!
- Y# 5%8;8:<*'-';A!&B!;78!a8:B&:<-'@8!&B!C-.*@-)!?''&>-;*&'!+,VA\$J!^;:-;8(*@!R-'-(8<8';! ^[<=&A*,<!Z'',-)!9&'B8:8'@8\$!23"L\$!%8'>8:\$!9G#!
- O# 5%&8A!^, 'A7*'8!a,;!a:&.,@;A!*'!-!T8;;8:!e*(7;U!678!?<=-@;!&B!08-;78:!&'!9&'A,<8:!C8>*8DA\$J! PY;7!?gHGCR^!R-:S8;*'(!^@*8'@8!9&'B8:8'@8!1^8AA*&'!97-*:4\$!23"M\$!Z;)-';-\$!QZ#!
- $\label{eq:solution} \begin{array}{l} "3\# 5R -: S8;*'(cA!C\&)8!*'!9-=;,:*'(!K-),8!B:\&<!?''\&>-;*\&'E!_'\&D)8.(8!C8A\&,:@8A\$!^;:-;8(*@!F<=7-A*A\$!-'.!H*:<!K-),8\$J!L"A;!Z'',-)!R 88;*'(!&B!;78!F-A;8:'!Z@-.8<[!&B!R-'-(8<8';\$!23"M\$!g8D=\&:;\$!C?#! \end{array}$
- ""# 5^8-A&'-)*;[!*'!;78!R &>*8!?'.,A;:[\$J!e-))[!C8A8-:@7!^[<=&A*,<\$!23"M\$!6:&[\$!g / #!
- $\begin{array}{l} "P\# 5^{7}\&,). |^{<}-))!H^{*}: <A!e-, "@7!g8D!a:\&., @;A!^{*}'!+^{(7!\&:!e&D!^8-A\&'AU!Z!H:-<8D\&:S!-'.!\\ F<=^{*:*@-})!Z'-)[A^{*}AJ!(;7!Z'',-)!H:-'S!R\#!T-AA!f6!\%-))-A!H:\&';^{*}8:A!^{*}'!R-:S8;^{*}'(!^{@*8'@8!}9\&'B8:8'@8!!23''PS!\%-))-AS!6h\#! \end{array}$
- ''M# 5Q8;;*'(!;&!?''&>-;*&'E!^8b,8';*-))[!FI=)&:*'(!-'.!FI=)&*;*'(!68@7'&)&(*@-)!9-=-V*)*;*8A\$J!
 Z@-.8<[!&B!?';8:'-;*&'-)!T,A*'8AA!^F!f^Z!97-=;8:!9&'B8:8'@8!1ZD-:.!H*'-)*A;4\$!23"P\$!Z;)-';-\$!
 QZ#!</pre>