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+ (% (#!.;!-2;G.!.37!V;O767??<7??!&X-47<7??!*7?;6>.1;<!N@!



X1.3!%) 5#+M"a\$!(37@!X166!?.166!D;!.34;>D3!X1.3!1.!7F7<!1P!1.!3-GG7<?!<7_.!?7O7?.74\$!(37@! X-<.!.;!O-Y7!?>47!.3-.!.37!?314.?!D7.!;427472!-<2!3-F7!.37O!47-2@\$!**K&B-"2#*.**!?.-.7?!.3-.! 1.7?!-!D;;2!127-\$!, F7<!1P!.37!?314.?!8;O7!1<!2>41<D!.37!<7_.!-8-27O18!@7-49!1.!X166!?.166!N7! ?; O7.3|<D!.3-.!@;>!2|2\$|**D**% **!\$#12"ZE**\ + **\$0***#"Z!?.-.7?!.3-.!.37@!?3;>62!.3|<Y!-N;>.!X3747! .37!?3!4.?!-47!8;O!<D!P4;O\$!:@N"<\$<<\$!?.-.7?!.3-.!1.Z?!-!D;;2!!27-!.3-.!X-@!.37@!8-<!DIF7! :>.!.37!?314.?!-.!.37!N7D1<<1<D!:P!.37!?83::6!@7-4\$!K>?.!N78->?7!<7X!?.>27<.?!X166!N7!8:O1<D! !<!-<2!.37!P47?3O7<!?.>27<.?!D7.!3@G72!;F74!7F74@.3!<D\$!(37@!X166!47G!.37!?314.!.3-.!3-?! .37|4!%;667D7\$!**K**@**B -''2**#***.**!?.-.7?!.3-.!.37@!8-<!;4274!.37O!<;X!;4!-GG4;F7!.37!P><2!<D!X1.3! .37!8;<..1<D7<8@!.3-.!.37@!D7.!21?.41N>.72!<7 .!@7-4\$!**!@**[\$>"**12\$**!?.-.7?!.3-.!G-??!<D!.37!?314.?! .; P147.!@7-4?!1?!-!D;; 2!127-!N>.!.3747!X166!-6?; !N7!?.>27<.?!.3-.!-47!><2786-472\$! (37@!?3; >62! N7!8-47P>6!;P!X3747!.37@!-47!;4274|<D!-<2!G4|<..!<D\$!(3747!X166!N7!47?.4|8.1;<?!.;!7F74@.3|<D! 1<!.74O?!; P!?31GG|<D!-<2!2761F74@\$! (37!P><21<D!8-<!N7!-GG4; F72!N>.!.37!<>ON74!-<2!-8.>-6! 8;?.!<772!.;!N7!?7.\$!**B%;\$0\$?\$**!?.-.7?!?31GGI<D!-<2!47871FI<D!1?!;G7<!;<!8-OG>?\$!#.!8;>62! E>?.!?1.!.3747!><.16!P>4.374!<;.187\$! (37!F14>?!X;<Z.!3-F7!-!X-4O!3;?.!.;!61F7!;<!?:!1.!X;>62! N7!27-2!N@!.37!.1O7!?;O7N;2@!;G7<?!.37!N;_\$!**K&B-''2***#**.**!?.-.7?!.3-.!1.!O1D3.!-6?;!27G7<2! ;<!X3747!.37@!-47!D7..1<D!.37O!P4;O\$!%74.-1<!47?.418.1;<?!-47!83-<D1<D!H>18Y6@\$!**N**@;**\$?***>\$! ?.-.7?!.3-.!.37@!X-<.!.37!;.374!07<-.;4!.;!3-F7!-!D;;2!?.-4.!X1.3!.37!4!@7-4\$!L;.3!<D!OID3.! D7.!;<!.37!?314.?!1P!.37!N; !1?!D;1<D!.;!?1.!.3747!><.16!<7 .!@7-4\$! + (\(\)*(\(\pi\).; \(\)G; \(\)?.G; \(\)7.\(\)U><\(\)2\(\)D!P; \(\)4\(\); \(\)667D7!O314.?!><.16!<\(\)7_.!\(\)O77.1<\(\)D!\(\)@!; \(\)A'', \(\)\$? (\)!?78; \(\)2!

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U\$ +#0% S 00#) L!#(, I!M!!(1*\$>\dagger + "?*\$\dagger;0"."#1"!

N@!:@AN''<\$<<\$9!O:.1;<!':AACD!\$!

(37!07<-.7!X166!21?8>??!3; X!.;!O-1<.-1<!-!G47?7<87!;<!?;81-6!O721-!G6-.P;4O?!! **B** \(\psi; \sqrt{90}; \sqrt{91}; \cdot \cdo

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%7<?>?! F127; \$! L; X!.3-.!.37@!3-F7!-!6;.!O;47!!<P;4O-.1;<9!.37@!X166!G47?7<.!1.!.;!.37! ?.>27<.?\$!&?!P;4!;PP187!3;>4?!1.!1?!2IPP18>6.!.;!3;62!G7;G67!-88;><.-N67\$!(3-.!1?!X3@!-!.-?Y! 61?.!X-?!847-.72!N>.!G7;G67!3-F7!.37!;G.1;<!.;!3;?.!;PP187!3;>4?!-<2!-!.477!61<Y!P;4!B;;O! X166!N7!847-.728**|K@B-"2#*.**!?.-.7?!.3-.!.37!.-?Y?!61?.?!-47!O7-<.!.:!47G6-87!:PP187!3:>4?!-<2! Y77G|<D!7F74@;<7!-88;><.-N67\$!01<87!.3-.!!?!7?.-N61?3!!.!X166!N!3-42!.:!O-<2-.7!7F74@;<7!.;! 3-F7!:PP187!3:>4?!F14.>-66@\$!**!**&**[\$>"12\$**!?.-.7?!.3-.!IP!.37@!X-<.72!.:!3:?.!:PP187!3:>4?!!<! -221.1;<!.;!.37!.-?Y!61?.9!.37@!8-<!2;!.3-\$!#.!1?!;Y-@!IP!?;O7;<7!X-<.?!.;!3;?.!;PPI87!3;>4?! E>?.!=-N14!.37!61<Y!-<2!1.!X166!N7!-2272!.;!.37!61<Y!.477\$!(37!.-?Y!61?.!X-?!847-.72!.;!47G6-87! :PP187!3:>4?9!-<2!7F74@;<7!3-?!-!27-26!<7\$! (37!27-26!<7!!?!P;4! I-483!\R!\#!N>.!7F74@;<7! ?3;>62!8;OO><18-.7!IP!.37@!<772!376G!X1.3!-<@!.-?Y\$!O1<87!7F74@;<7!3-?!-!6;.!D;1<D!;<\$!**B**@ ;\$0\$?\$!-?Y?!!P!.37!6!<Y!P;4!.37!4!B;;O!O77.!<D!.37!?-O7!7F74@!.!O7[!K@B-"2#*.!?.-.7?!<;\$! **B%**; **\$0\$?\$**!?.-.7!.3-.!.37@!?3;>62!O-Y?!-66!.37!:;-42!-<2!-<@!;.374!O77.1<D?!61<Y?!?3;>62! N7!.37!?-O7\$!0; !=-N14!X; < Z.!3-F7!.; !D; !1<!-<2!83-<D7!1.!7F74@!.1O7\$!&!D4; <math>> G!.7.!?3; > 62!N7!847-.72!P:4!.37!?:8|-6!072|-!.7-0!.3-.!X-@!.37@!-47!-66!>G2-.72!-<2!Y<:X!X3-.!.37@!0>?.! 2;\$!0;81-6!O721-!1?!-!21?.4-8.1;<!-<2!X7!?3;>62!>?7!.3-.\$!(3-.!X-@!X7!8-<!21?.4-8.!.37! ?.>27<.?!-!61..67!P4: O!-66!.37!<7D-.1F7!.31<D?!.3-.!-47!3-GG7<1<D\$!**K**@**B - "2#*.**!?.-.7?!.3-.!.37@! O>?.!?.-4.!.3|<Y|<D!; P!X-@?!.; !G4; O;.7!.37!7F7<.?!.3-.!-47!3-GG7<|<D!; <6|<7\$! (3-.!X-@!.37! F7<.?!8-<!3-F7!-!3ID374!.>4<;>.\$!**B**\(\); \(\\$0\\$?\\$!?.-.7?!?>DD7?.!?7<2!<D!-!\(\O-??!7\O-16!\)X1.3!-66! .37!7F7<.?!.3-.!-47!D; 1<D!.; 1<D!.-N;>.!;>4!?;81-6! O721-!-<2! X7N?1.7\$! : **\(N''<<\$<\$**!?.-.7?!.3-.!.37@!8-<!2;!-! X77Y6@! <7X?67..74\$! (3-.!X-@!?.>27<.?!Y<;X!X3-.!3-?!N77<!3-GG7<1<D!-<2!3-F7!-66!.37!61<Y?! 1<86>272\$! 0.>27<.?! -47!8378Y|<D!.37|4!7O-|6?!O:47!:P.7<! -<2!1.!X|66!N7!P-?.74!X-@!.:!D7.! 1<P;4O-.1;<!;>.\$! K\\ B - "2#*.!?.-.7?!.3-.!.37\\ X166! N7!?7<21<D!-!O-??!7O-16!.;!?.-PP!-<2! P-8>6.@9!N>.!.37@!X166!-6?;!?7<2!1.!.;!?.>27<.?\$!&!D7<74-6!<7X?67..74!P;4!&0#!8-<!N7!847-.72! -<2!8-<!1<86>27!B;; O!61<Y?!P;4!; PP187!3; >4?\$!#P!.37@!-22!B;; O!61<Y!P;4!.37!O77.1<D?!1.!8-<! N78: O7! .: :! :F74X376O1<D\$! **B** @ **: \$0\$?\$**! ?.-.7?! .3-.!#! N7..74! .3-<!<: .! ?-@1<D! -<@.31<D! :4! D1F1<D!61..67!1<P;4O-.1;<\$!: @N"<<\$<\$!?.-.7?!.3-.!.37@!8-<!-22!1<!47-?;<?!-?!.;!X3@!.37@!-47! E;1<1<0!1<.:!.37!077.1<0?\$!; W+\$*!-?Y?!IP!.37!S<2;8>&66@!.4-1<1<0!X166!N7!P;4!N;.3!?.>27<.?! -<2! -2O1<1?.4-.1; <\$! **K** \(\mathbb{B} - \"2\(\psi \).! ?.-.7?! \(\alpha \)? \(\sigma \) (3747! -47! \(\text{X} \); ! ?7G-4-.7! 7F7<. \(\sigma \)! (37! ; <7! P; 4! ?.>27<.?!!?!:<!&G4l6!0"^{\$!}!-<2!.37!;<7!P;4!-2O!<!?.4-.1;<!!?!!:<!&G4l6!0a!["]\$!!!

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              *) SL+!(\&:',!*,I\&*=0!
              B\(\); $0$?$!?.-.7?!.3-.!?37!!?!?.166!3;62|<D!374!;PP187!3;>4?!-<2!>???!1.!.;!X;4Y!;<!&0#!O-.741-68!:>.!
              1P! -<@;<7!8;<.-8.?!374!;>.?127!;P!.3-.!-<2!2;7?<Z.!47?G;<2!Y<;X!.3-.!?37!1?<Z.!1D<;4!<D!N>.!1?!
             X;4Y1<D!;<!;.374!1.7O?!<;.!476-.72!.;!&0#$!';;Y1<D!-.!.37!.-?Y!61?.!?37!1?!;F74X376O72!E>?.!N78->?7!
             -!X77Y!!?!<:..!7<;>D3!.1O7!.:!D7.!?.>PP!2:<7$!!
             1?!X;4Y1<D!;<!1.$!
             N@'-"=$.\8;<D4-.>6-.7?!.37!07<-.7!P;4!G-??!<D!.37!4!P!4?.!.X;!47?;6>.1;<?!;P!.37!@7-4\!#.Z?!)<!S?!
             X166!N7!3-GG7<1<D!;<!?;81-6!O721-$!&<!7O-16!X166!N7!?7<.!;>.!X1.3!-66!.37!!<P;4O-.1;<$!(3747!X;<Z.!
             N7!-!N-<H>7.!.31?!@7-4!N>.!Y77G!-<!7@7!;>.!P;4!-!O-16!.;!F;.7!P;4!?G781-6!-X-42?$!!
              : NN''<$<<$\lank -.7!\D47-.!E;\N!.;!7F74\text{0}; <7!\X3;!3-?!2;<7!-!6;!2>41<\D!.31?!.1\O7\!#.!1?!21\text{1PP18>6.!.;!X;4Y!}
             P4; O!3; O79!N>.!-!6; .!; P!X; 4Y!3-?!N77<!2; <7$!#P!-<@; <7!3-?!H>7?.1; <?!47D-42!<D!3; >?!<D!P776!P477!
              ::!-?Y$!K>?.!8;<.1<>7!::!N7-4!X1.3!3;>?!<D$!!
              ; @A", $>$? (\(\lambda\)?.-.7?!.37!+7-<!; P!.37!\(\text{6}\)1N4-4@!3-?!\(\text{R}\)6-G.; G?9! \(\text{R}\)137-2?7.?9!c\(\text{L}\)7N8-O?!-<2!\(\text{1}\)1834; O7!
             N;;Y?!47-2@!.;!N7!47?74F72$! I -<@!?.>27<.?!3-F7!-647-2@!2;<7!?;9!-<2!.37@!<772!.;!Y<;X!N@!.;2-@!
              |P!-<@;<7!<772?!-<@!;P!.37?7!1.7O?$!#P!@;>!Y<;X!-<@;<7!67.!.37O!Y<;X!N78->?7!G|8Y!1?!.;O;44;X$!
              (37!&8-27O18!07<-.;4?9!012!-<2!d-E-I4-!-47!X;4YI<D!;<!24-P.1<D!-!67..74!.;!.37!&8-27O18!07<-.7!
             47D-421<D!O-Y1<D!86-??7!!G-??!!4!P-16!2>7!.:!%) 5#+M"a$!#P!-<@:<7!3-?!127-?!:<!.3-.!47-83!:>.!.:!
             >?$! ( 37@!X-<.!?.>27<.?!.;!3-F7!.37!;G.1;<!;<!X37.374!.37@!X-<.!-!D4-27!;4!<;.$! ( 37@!X-<.!.37!
              ;G.1;<!.;!N7!-F-16-N67!><.16!.37!7<2!;P!.37!?7O7?.74$!(37@!-6?;!X-<.!.;!O-Y7!1.!-F-16-N67!P;4!O-E;4!
              86-??7?9!N>.!.37@!X-<.!.37!8;<?7H>7<87?!.;!N7!867-4$!!
              : 0.1.2 - ... | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 
              (37!G-??!;4P-16!127-!!?!?; O7.31<D!.37@!?>GG;4.!?1<87!.3747!-47!?; O7!?.>27<.?!?.4>DD61<D!X1.3!86-????!
             N71<D!;<61<7$!!
              ; @A", $>$? (\lambda?.-.7?!.3-.!.37!6-G.; G!G18Y!1?!; G7<!.; |7F74@; <79!N>.!1.!1?!.;; |6-.7!.; |-2F74.1?7\!!
              : @N"<$<<$\X\166!?3-47!.31?!!<P:4O-.1:<!.:!.37!*&Z?!N>.!!P!.3747!-47!-<@!8:OG>.74?!67P.!:F74!-P.74!
              .;2-@!.;!67.!374!Y<;X!.3-.!X-@!?.>27<.?!!<!3;>?!<D!-47!8;F7472!.;;$!!
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             &+K) S * L I , L(!-.!"R/"\'!& I!
              I 1<>.7?!*7F17X72!: @/!
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