



**Introduction and Background:**

O cp{ 'r tqo kpgpv'dwukpguu'igcf gtu."egrgdtkkgu."cpf cy ngvu'ctg'cnuq'tgpqy pgf 'r j krcpj tqr kuu0  
 Rtqxf kpi 'hwpf kpi 'hqt'r tqlgewu'tgxqmkpi 'ctqwpf 'yj g ko r tqxgo gpv'qh'f{ qwj "gf wecvkqp'ku'c'r qr wret  
 hqto "qh'o ci pcpko k{0"Gpvtvckpgt"Ugcp"\$F kff { "\$Eqo du j cu'cuukvfg "yj g'Ecr kenRtgr 'pgy qtm'qh  
 ej ctvt'uej qqu'lp'yj g'qr gpkpi "qh'yj tgg'hqecvkuu. kpenwf kpi 'j ku'i kh'qh'&3"o knkqp"v'qr gp"c'uej qqn  
 kp'yj g'Dtqpz'lp'423: \*O ke j gm'4242+0Vj g'Dkm'cpf O gndpf c'I cvgu'Hqwpf cvkqp'j cu'cnuq'dggp  
 cevxg'lp'uw r qtvkpi "ej ctvt'uej qqu'lp"Y cuj kpi vqp0 Vj g'hqwpf cvkqp'j cu'f qpcvfg "o qtg'yj cp"&47  
 o knkqp"v'yj g'Y cuj kpi vqp"Ucvg'Ej ctvt'Uej qqu'Cuuekcvkqp cpf "ur gpv'cf f kkpccn'hwpf u'qp  
 r qnkkecn'hqdd{ kpi 'hqt'yj g'r wtr qugu'qh'g zr cpf kpi "yj g ucvgu'uej ctvt'uej qqn'pgy qtn0"F gur kg  
 f genkpi 'r qnkkecn'kpgt gu'lp'yj gug'gpf gcxqtu."yj g I cvgu'j cxg'eqpvkpwgf "v'uw r qtv'ej ctvt  
 uej qqu'f guki pgf "v'ugt xg'uwf gpw'y j q'j cxg'utwi i rfg kp"tcf kkpccn'r wdne"uej qqu"\*J q'423: +0  
 Hkpcmf ."dcungvdcmluct'Ngdtqp'Lco gu'y cu'kputwo gpvcnkpi'yj g'qr gpkpi "qh'c's wcu'k'r wdne"uej qqn'k  
 j ku'j qo gqy p'qh'Cntqp."QJ 0"J ku'\$KRtqo kug'Uej qqn\$ y cu'f guki pgf "v'ugt xg'uwf gpw'f ggo gf '\$cv  
 tkun\$'qh'pqv'gxgpwcm{ 'i tcf wevki 'j ki j "uej qqn'dcugf qp'yj gk'cecf go ke'cpf "dgj cxkqten'tcen0 Djj ?j qo 50

vj g"o qtg"tcf kkpncnr wrke"uej qqn. "o cng"ej ctvgt"uej qqn"e"eqo o qpn{ "etkkek gf "kpuwkwkp0  
Uwr rqtvhqt"ej ctvgt"uej qqn"j cu'y cpgf "kp"tgegpv" { gctu=cu'tgegpv( "cu"4238. "r qmu'hqwpf "vj cv'o qtg  
vj cp"j cih'qh'Co tkecpu"uwr rqtvgf "ej ctvgt"uej qqn0 J qy gxgt. "vj ku'pwo dgt"j cu'hcmgp"vq"rguu"vj cp  
62' "kp"tgegpv" { gctu. "y j kg"vj g'r gtegpvc i g"qh'Co gtecpu y j q"qr r qug"vj g"gzr cpukqp"qh'ej ctvgt  
uej qqn"j cu'tkugp"vq"cm quv"vj g"uco g"rgxgn0" Ghqtu d { "vj g"PCER"cpf "vj g"PCvkapnci" Gf wecvkap  
Cuqekcvkap"vq"tgutlev"vj g"i tqy vj "qh'vj g'pcvkap) uej ctvgt"uej qqn"pgwy qtnlj cxg"uggo kp"

o qpg{ 'hgi klo k gf "o cp{ "qh'y g'cti wo g'pu'ci ckpu'y g'ej ctvgt'uej qqn'o qf gn'J qy gxgt. 'tgeg'pv  
 h'pf kpi u'j cxg'j ki j rki j v'f 'y g'o g'ku'qh'c'ej ctvgt uej qqn'gf wecvkqp. 'gur gekcm{ 'j gtg'kp  
 O cuucej wugwu'Uwf kgu'eqpf wev'f "qp'ej ctvgt'uej qn'uwf gpv'r gthqto cpeg'kp'y g'Dquvqp  
 o gtqr qrkcp'ctgc'h'pf 'y cv\$guv'ueqtg'i ckpu'r tqf wegf d{ 'Dquvqp'ej ctvgtu'ctg'uqo g'qh'y g  
 rti guv'y cv'j cxg'gxgt'dggp'f qewo gpv'f 'hqt'cp'cv'uecng gf wecvkqp'k'p'vgtxgp'k'p-\$'cf f k'k'p'cm{ .  
 \$uwf kgu'uj qy 'Dquvqp'ej ctvgtu'uwdu'cp'k'cm{ 'k'petgcug UCV'ueqtgu'\$'cpf 'ctg'p'qv'o g'gn{ 'h'qewukpi  
 yj gk'tguq'wtegu'qp'y g'O cuucej wugwu'uw'cp'f ctf k gf v'gukpi 'k'p'qtf gt'v'q'cej k'gxg'y g'ug'i ckpu  
 \*Eqj qf gu'cpf 'F { p'ctunk'4238-0"Uwf kgu'eqpf wev'f "qp l

MRR'ku'y g'\$rti guv'pqr tqh'v'ej ctvt 'pgwy qtn'lp'y g'eqwpt { '\$'cpf 'j' cu'tgegkxgf 'eqpukf gtcdrng  
 hgf gtcn'hwf lpi 'v'g'zr cpf 'ku'pgwy qtn'v'q'xgt'422 uej qqn'0'k'423; . 'MRR'y cu'ci clp'cy ctf gf  
 hgf gtcn'o ppg { =v'j ku'kgtcv'kp'y cu'o qtg'y cp'& 8'o k'k'qp qxgt'c'h'xg/ { gct'r'g'k'qf 'k'p'qtf gt'v'cf f  
 cf f k'k'qpcn'o k'f'ng'cpf 'j' k'j 'uej qqn'v'ku'c'rtgcf { xcu'v'pgwy qtn'0'MRR'uej qqn'j' cxg'f go q'p'ut'cv'gf  
 j k'j 'v'guv'cej k'xgo gp'v'cpf 'j' k'j 'uej qqn'i tcf w'v'kp'v'c'v'gu=cf f k'k'qpcn' . 'v' g'o cl'q'k'v' { 'qh'MRR  
 uwf gp'u'j' cxg'eqpuk'v'gp'v' { '\$qwr gth'qto gf 'uko k'rt'uwf gp'u k'p'f k'ut'lev'uej qqn'\$\*Dct'pwo '423; +0  
 J qy gxgt. 'v' g'q'xgty j gm' lpi n' 'r' qu'k'x'g'ko r'cev'qh'v'j g MRR'o qf gn'j' cu'dggp'ej cm'pi gf 'k'p't'gegpv  
 { gct'u'0'V'j g'v'guv'ueq't'g'gf i g'qh'MRR'uwf gp'u'q'xgt v'j gk't'cf k'k'qpcn'r w'dr'ke'uej qqn'r' ggt'u'j' cu'h'cm'gp  
 uqo gy j cv'cpf 'v'j g'MRR'o qf gn'u'ut'lev'f k'ue'r' n'p'ct { eqf g'cpf 'j' k'j 'uwur gp'uk'qp'v'c'v'gu'j' cxg'dggp  
 et'k'ek'k' gf \*Dct'pwo '423; +0'C'p'gi cv'x'g'd { r'q'f w'v'q'h v'j k'u'r' q'r'ke { 't'ki k'f'k'v' 'ku'c'uwf gp'v'c'v'k'k'qp'v'c'v'g  
 h'x'g'v'ko gu'cu'r'cti g'cu'v'j g'r' w'dr'ke'uej qqn'cxg'tci g'\*Ej cr r gm'4233-0'C't'gegpv'k'p'x'gu'ki cv'kp'v'q'q'pg  
 qh'MRR'u'h'q'wp'f gtu't'gi ctf lpi 'ugz'w'cn'j' ctc'uo gp'v'j' cu w'p'ht'w'p'cv'gn' { 'cnuq'v'cl'p'v'gf 'v'j g'p'gy qtn'u  
 tgr w'v'kp'v'\*Dct'pwo '423; +0

Vj g'j' k'j 'x'q'no g'qh'hwf lpi 't'gegkxgf 'd { 'MRR'cnuq'eqo r' n'ec'v'gu v'j g'g'x'cn'w'v'kp'v'qh'v'j g'p'gy qtn'u  
 gh'k'ek'p'e { 0'O k'q'p'g'v'cn'o'w'ugf 'WUOF gr'ct'wo gp'v'q'h Gf w'v'kp'v'f'c'v'v'q'f'g'v'g'to k'p'g'v'j cv'MRR'ej ctvt  
 uej qqn'y g't'g'i t'cp'v'gf 'p'g'ct'n { '&35.222'r'gt'uwf gp'v'\*4233. k'k'0'V'j k'u'co q'wp'v'f'y c't'h'gf 'v'j g'cxg'tci g  
 co q'wp'v'q'h'i t'cp'w'v'q'r' w'dr'ke'uej qqn'cpf 'q'v'j g't'ej ctvt uej qqn'd { 'o qt'g'y cp'&5.422'cpf '&3.222.  
 t'gr'g'v'x'gn' { 0'C'f'f'k'k'qpcn' . 'k'p'v'gt'p'cn'T'g'x'gp'w'g'U'g't'x'k'eg f'c'v'k'p'f'k'ec'v'gu'v'j cv'k'p'c'f'f'k'k'qp'v'q'v'j k'u'r' w'dr'ke  
 i t'cp'v'c'f'x'cp'v'ci g. 'MRR'cnuq't'gegkx'gu'p'g'ct'n { '&8.222 r'gt'uwf gp'v'ht'qo 'r' t'k'x'cv'g'f'q'p'qt'u'0'k'q'p'g'v'cn'o  
 4233. 'k'k'0

k'p'uwf { lpi 'v'j g'ko r'cev'qh'MRR'uej qqn'q'p'v'j g'gf w'v'kp'v' u'f' u'v'go 'c'v'rti g. 'w'p'f'g't'w'cp'f lpi 'v'j g  
 r'q'r'ke { 't'co k'h'ec'v'kp'u'qh'd'c'm'p'ek'p'i 'g's'w'k'v' { 'k'p'gf w'v'kp'v'p'cn'ur'gp'f lpi 'c'p'f'gf w'v'kp'v'p'cn'c'w'cl'p'o gp'v'ku

uki pkkcep0"Ur gekkccm{ . 'y g'i qcn'qh'y ku'uwf { 'y cu'v'q'r gthqto "cp'gxpvp'uwf { "qp'y g'lo r cev'qp  
 ucpf ctf k gf 'vgukpi 'tguwmu'lp'uej qqn'f kntleu'chgt vj g'qr gplpi "qh'c'MRR'uej qqn0"Y kj 'y gug  
 MRR'uej qqn'f tcy kpi "qp'hgf gtcn'hwpf u.'k'ku'y qt vj wpf gtucpf kpi 'y g'qxgtcnlko r cev'y gug'ej ctvt  
 uej qqn'j cxg'qp'y g'gpvtg'gf wecvkqpcn'u{ ugo 0"O gcuwtkpi vj g'lo r cev'qp'ucpf ctf k gf 'vgukpi  
 tguwmu'lp'uej qqn'f kntleu'y j lej 'mqug'uwf gpv'u'q MRR'lp'qtf gt 'v'cpcn{| g'y j gj gt 'MRR'ku'y qt vj  
 vj g'hgf gtcn'hwpf kpi 'k'tgegxgu'ku'lo r qtcvp'lp'gxcnvcvpi vj g'ghgevxgpguu'qh'r cu'MRR'i tcpu.  
 cpf 'f gvgto kplpi 'y j gj gt 'y ku'pgy qtn'ku'y qt vj 'hwpf kpi kpi 'y g'hwwt g0"Vj gt g'ku'c'ergt 'tcf gqhh  
 dgw ggp'wukpi 'hwpf u'hqt'o qt g'gs wksdn { 'cetquu'uej qqn'f kntleu'xgtuu'hwpf kpi 'y g'r tkqtkk cvkqp  
 qh'c'uo cml'udugv'qh'uwf gpw'ej qugp'y tqwi j "c'iqwt { cv'c'MRR'ej ctvt 'uej qqn0"Wpf gtucpf kpi  
 j qy 'f kntlevy kf g'vuv'tguwmu'ctg'lo o gf kvgn { 'lo r cevgf d { 'y g'qr gplpi "qh'MRR'uej qqn'y km  
 r tqxf g'ertk { 'lpv'v'g'gxcnvcvqp'qh'y g'ghgevxgpguu cpf 'lwvpguu'qh'cmqecvpi 'hgf gtcn'hwpf kpi  
 v'v'gug'uej qqn'wcpvkh { kpi 'y g'cej kxgo gpv'r tgo kwo r tqxf gf 'd { 'c'MRR'uej qqn'y km kxg  
 r qre { o cngtu'cp'cf f kvqpcn'f cv'r qkv'lp'y g'r tqeguu qh'cr r tqr tkvpi 'pcvqpcn'gf wecvkq'ur gpf kpi  
 hqt'ej ctvtu0

Wpf gtucpf kpi 'y g'hwm'lo r cev'y cv'y g'MRR'o qf gnj cu'qp'y g'tcf kvqpcn'r wdre'uej qqn'u{ ugo 'ku  
 cnq'lo r qtcvp'ltqo "c'r qre { 'r gtur gev'xg'dgecwug'qh vj g'wplqto kv { 'qh'MRR'uej qqn0"Y j kg  
 ucvgu'cetquu'y g'WU0j cxg'xct { kpi 'ewtlewrc. 'y g MRR'o qf gn'ku'tgrcvkgn { 'j qo qi gpquu'cetquu  
 vj g'gpvtg'eqwvt { 0"Vj gthqtg. 'kf gpvkh { kpi 'y g'twg ko r cev'qh'y gug'uej qqn'ku'uki pkkcepv'lp  
 f gvgto kplpi 'y j gj gt "gzc'cpf kpi 'y g'MRR'o qf gn'ku'dgpghekr0 Vj ku'ku'gur gekm { 'lo r qtcvp'i kxgp  
 vj g'hpf kpi u'qh'Eaj qf gu'g'v'cn0\*423; +0"Vj g'uwf { kf gpvkhgf 'y g'uweeguu'qh'\$r tqxgp'r tqxf gtu\$'qh  
 ej ctvt'uej qqn'gf wecvkqp<

\$Y j gp'c'r tqi tco 'ku'uweeguu'wn'r qre { o cngtu'hceg'y g f gekukqp'qh'y j gj gt 'v'j cxg'y g  
 qtki kpcn'lo r ngo gpvt'eqv'p'wg'v'q'r tqxf g'y g'r tqi tco . qt'y j gj gt 'i qxgtpo gpw'qt'qy gt  
 ci gpegu'uj qwr' 'cng'qxgt'y g'r tqi tco "cv'c'rti gt uecng0Vj ku'r cr gt 'uj qy u'y cv'lp'y g

ej ctvgt'uej qqn'eqpvzv'tgr n'ecv'kpi "gz'k'kpi "ej ctvgtu'o c{"dg'c"dgwgt"qr v'k'p'yj cp'cmqy kpi  
pgy "r tqxkf gtu"v'q"gpvgt'yj g"ugevqt\$\*E'qj qf gu'gv'ci0423; +0\$

K'i'tgr n'ecv'kpi "gz'k'kpi "uweegu'hw'le'j ctvgt'o qf gnu ku'r tghgtcdrg."w'pf gtu'x'c'p'f kpi "y'j g'gh'ge'v'k'x'g'p'g'u'q'h  
y'j g'MRR'o qf g'ri'ku'et'w'ek'n'l'p'f'g'v'g'to k'p'k'p'i "y'j g'y'j g't'v'q' eq'p'v'k'p'w'g'h'w'p'f kpi "y'j ku'c'it'g'c'f {"r'cti g'p'g'y' q'tm  
q'h'uej q'q'n'0

K'ku'g'z'r g'e'v'g'f "y'j c'v'y'j g'MRR'uej q'q'n'y' k'n'l'j c'x'g'c'r'cti g'n' r'q'uk'k'x'g'k'o r'c'e'v'q'p'f'k'ut'k'e'v'y' k'f'g  
r'g'h'q'to c'p'eg'cu'c't'g'u'w'n'q'h'l'p'et'g'c'ug'f "l'p't'c'f'k'ut'k'e'v'e'q'o r'g'v'k'k'p'c'p'f "l'p'p'q'x'c'v'k'p'r' t'q'x'k'f'g'f "d{"y'j g'  
q'r'g'p'k'p'i "q'h'y'j g'g'ue'j ctvgt'uej q'q'n'0"J q'y' g'x'g't."g'z'c'o k'p'k'p'i MRR'uej q'q'n'cu'c'y'j q'q'g'o c{"dg  
k'o r't'w'f'g'p'v'i k'x'g'p'y'j c'v'y'j g'p'g'y' q't'n'l'j cu'uej q'q'n'ug't'x'k'p'i x'c't'k'q'w'u'i t'c'f'g'h'x'g'n'0"F'w't'k'p'i "y'j g'g'c't'n'  
{g'c'tu'q'h'y'j g'p'g'y' q't'm'MRR'g'g'o g'p'v'c't {"c'p'f'o k'f'f'g'uej q'q'n'y' g't'g'ue'c'w'g't'g'f "c'e't'q'u'u'y'j g'e'q'w'p'v' (=   
j q'y' g'x'g't."d'g'i k'p'p'k'p'i "l'p'4228."y'j g'MRR'p'g'y' q't'm'd'g'i c'p' y'j g'r't'q'eg'u'u'q'h'ue'c'n'k'p'i "w'r "c'p'f "u'c'p'f'c't'f'k' k'p'i  
y'j g'b'o q'f'g'n'p'c'v'k'p'c'm(0"V'j g'y' q'b'o c'k'p'r'q'k'p'u'q'h'g'o r'j c'u'k'u'y' g't'g'y'j g'g'z'r'c'p'uk'p'q'h'MRR'u'o k'f'f'g'c'p'f  
high uej q'q'n'p'g'y' q't'm'c'p'f "y'j g'S'e'n'w'v'g't'k'p'i \$'q'h'o k'f'f'g'uej q'q'n'c'p'f "j'k'j "uej q'q'n'l'p'y'j g'uc'o g."q't  
p'g'c't'd {"f'k'ut'k'e'w'\*R'q'y' g'tu'4228-0"V'j g't'g'h'q't'g.'s'w'c'p'v'h{k'p'i

Y j gp'tgxkgy kpi 'vj g'htgctwtg'qp'hcevtu'ko r cevkpi 'uwf gpv'cej kxgo gpv.'c'uwf gpv'u'ho kfi  
dceni tqwvf 'y cu'eqpukvgpvnf 'o gpv'kqpgf 'cu'c'eqpvtkdwkpi eqo r qp'gpv'0'Ur gekh'kcmf.'c'ho kfi )u  
geqpqo ke'ukwcvkqp'uggo u'vq'dg'cp'ko r qtvcpv'r tgf kvqt qh'vj g'cecf go ke'uweegu'qh'vj gk'tej kftgp0  
Y j gp'eqpukf gtpi 'vj g'ko r cev'qh'c'uwf gpv'u'chhwgpeg qp'v'guv'ueqtgu.'k'uggo u'iqi kecn'vj cv'uwf gpw  
htqo 'c'j ki j gt'uqekqgeqpqo ke'ngxgn'y qwvf . 'kp'vj g'ci i tgi cvg. r gthqto 'cv'c'j ki j gt'ngxgn'vj cp  
uwf gpw'htqo 'iqy gt'uqekqgeqpqo ke'dceni tqwvf u0'Cnj qwi j vj g'htgctwtg'uwf r qtv'vj ku'emko . 'vj g  
r cr gtu'eqpukf gtf 'pwcpegf 'vj ku'g'zr gev'gf 'h'kp'kpi 0 O wej 'qh'vj g'tgugctej 'qp'chhwgpe{ 'cpf  
gf wecvkqp'cnuq'eqpukf gtu'tceg'cu'c'hcevt0'J qy gxgt. Dcwrg'cpf 'Ngy ku'kpxguki cvgf 'vj g'ko r cev'qh  
dqj 'tceg'cpf 'uqekqgeqpqo ke'ucwu'qp'uwf gpv'cej kxgo gpv'kp'j ki j 'uej qqn0'K'y cu'f gvto kpgf  
vj cv'uqekqgeqpqo ke'ucwu'ku'o qtg'vj cp'vj tgg'vko gu o qtg'ko r qtvcpv'vj cp'tceg'kp'r tgf kvkpi  
qweqo gu\$\*422: . '43-0'Egdcmq'gv'cn0'g'zr cpf gf 'vj g f gh'kp'kqp'qh'j qo g'Schhwgpe{ '\$'d{ 'o gcuwkpi  
vj g'ko r cev'qh'pgki j dqtj qqf 'y gcnj 'qp'uwf gpv'cej kxgo gpv'0 K'y cu'hqwpf 'vj cv'\$cf qnguegpw  
tgu'k'kpi 'kp'eqo o wpk'ku'y kj 'o qtg'o kf f ng'eruu'pgki j dqtu v'gp'f 'v'xkgy 'gf wecvkqp'cu'o qtg  
ko r qtvcpv'\$'cpf . 'kp'wtp.'cej kxg'i tgcvt'uweegu'kp vj g'em'utqo \*4226.'954-0'Vj gug'h'kp'kpi u  
wvf g'ueqtg'vj g'ko r cev'qh'uwf gpw'uqekqgeqpqo ke'dceni tqwvf qp'cecf go ke'cej kxgo gpv'0'Cu'c  
tguwv.'k'y cu'ko r qtvcpv'ht'vj ku'uwf { 'v'q'tgxkgy vj g'uqekqgeqpqo ke'kp'f kecvtu'qh'vj g'f kwt'kew  
eqpv'k'kpi 'MRR'uej qqn'cpf 'vj g'uqekqgeqpqo ke'dceni tqwvf u qh'MRR'uwf gpw'0'Ceeqtf kpi 'vq  
tgr qtu'htqo 'MRR'vj g'f kwt'kew'ugtxgf 'd{ 'vj gk't'pgy qtmctg'i gpgtcm{ 'j gcxk'f 'r qr w'v'gf .  
tgr'v'xgn' 'iqy /kpeqo g.'cpf 'tcekcm{ 'f kxgtug0'Qxgtcm vj g'uwf gpv'dqf { 'qh'MRR'uej qqn'ctg'o cf g  
w'qh'iqy /kpeqo g.'o k'p'k'f'uwf gpv'y kj 'tgr'v'xgn' 'iqy 'r tq'h'ek'pe{ 'kp'vj g'Gpi rkuj 'ncpi wci g0  
Ur gekh'kcmf.'; 7' 'qh'MRR'uwf gpw'ctg'Ch'kecp'Co g'kecp qt'Ncv'pz.: : ' 's w'k'h{ 'h'q'f'ht'gg'qt



tgf wegf 'r tleg'uej qqnlwpej . 'cpf 'pgctn{ " 'ctg'f guki pcvgf 'Gpi rkuj 'Nepi wci g'Ngctpgtu'dgecwug'yj gkt  
pcvkg'ncpi wci g'ku'pqv'Gpi rkuj '\*\$P cvkqpenTgr qtv'Ectf \$+0

Qvj gt'r crgtu'j cxg'wugf "cp"gzr cpf gf "cpf "o qtg'j qnkwe f ghpkkqp"qh'chhwpeg"vq'uwwf { 'yj g'lo r cev  
qh'uwwf gpw)'dcem tqwpf u'qp'yj gkt'cecf go ke'uweegu0 Cp'gctnkt'uwwf { 'Htqo 'Dcj ctwf kp"cpf 'Nwugt  
hqwpf "uko kct'tguwmu'kpf kcvpi 'yj cv'j ki j gt'uwwf gpvcej kxgo gpv'y cu'kpnkf 'y kj 'kpetgcugf  
kpego g=j qy gxgt. 'chhwpeg'y cu'lwuv'qpg'hcevt'qho cp{ 'wugf "vq'o qf gn'yj g'f gi tgg'qh'lwko wcvkqp  
y kj kp'c'uwwf gpvu'\$j qo g'gpxkqpo gpv'\$\*3; ; . '5: 6+0 C"pwo dgt'qh'xctkcdrgu.'kpenf kpi "o ctken  
ucwuu.'pwo dgt'qh'ej kf tgp. 'cpf 'cecf go ke'uw r qtv'utcvgi kgu. y gtg'wugf "vq'i cwi g'yj g  
ucdkkx\ ls wckx\ 'qh'c'uwwf gpvu'j qo g'gpxkqpo gpv0 kpetgcugf 's wckx\ 'y cu'utqpi n\ 'eqttgrcvf 'y kj  
j ki j gt'cej kxgo gpv'kp'yj g'emautqo '\*Dcj ctwf kp"cpf Nwugt"3; ; . '5; 9+0"Hqt'yj g'r wtr qug'qh'yj g  
uwwf { . 'yj ku'ksgtcwtg'ugtxgf "cp'lo r qtv'pvtqg'i kxgp yj g'r tgxkqu'qdugt'cvkqp'yj cv'MRRR'uwwf gpw  
v'pf "vq'eqo g'Htqo '\$uwr r qt'vkg\$'qt '\$p'cev\$'hco krgu0 C"o qtg'j qnkwe 'f ghpkkqp"qh'c'uw r qt'vkg  
j qo g'gpxkqpo gpv'ku'c'wughw'o qf gn'htq'hco krgu'ugpf kpi yj gkt'ej kf tgp"vq'MRRR'uej qqu0'C  
r ctg'p'lxqnkpi 'yj go ugrgu'o qtg'k'p'ko cvgn\ 'kp'yj gkt'ej kf )u'gf wcvkqp"d{ 'gpeqwtci kpi "cpf lqt  
cmqy kpi "cwgpf cpeg'cv'c'tghqto cvqt { 'MRRR'uej qqn y j lej 'tgs wktgu'c'i tgcvt'vko g'eqo o ko gpv

Kp'cf f kkp'v'j g'lo r cev'qh'j qo g'gpxktqpo gpv'qp'uwwf gpv'cej kxgo gpv'j g'lo r cev'qp'v'j g  
 cej kxgo gpv'ixgn'qh'c'uwwf gpv'u'r ggtu'ku'lo r qt'cpv'y j gp'eqpukf gtlpi 'j qy 'v'j g'iquu'qh'o qv'x'cv'gf  
 uwwf gpv'u'q'MRRR'uej qqu'y qwf 'ch'gev'uwwf gpv'u'htqo v'j g't'cf kkp'cn'r wdrke'uej qqu'dgkpi 'rghv  
 dgj kpf 0"J gkuugn'cpf 'Ncf f'pqv'gf 'v'j cv'cu'c'tguwn'qh'kpetgcugf 'hgf gtcn'i tcpw'kp'P qt'v'j 'Ectqkpc.  
 v'j g'g'y cu'cp'kphwz 'qh'iqy g'r gthqto kpi 'uwwf gpv'u'htqo *failed* uej qqu'u'v'j g'uej qqu't'gegkxkpi  
 i tcpw'\*423: .52: +0"C'v'j g'eqpenwukp'qh'v'j gk'r gtlqf qh'uwwf {. 'v'j g'cwj qtu'pqv'gf 'v'j cv'v'j g'j ki j guv  
 cej kxkpi 'uwwf gpv'u'cy 'uki p'k'kecp'v'f getgcugu'kp'v'g'uv'ueqt'gu.'y j k'g'uwwf gpv'u'lwu'dgm'y 'r tqh'kegpe{  
 r'xgn'g'zr gtl'kepgf 'c'urki j v'k'petgcug'kp'cej kxgo gpv'\*J gkuugn'cpf 'Ncf f'423: .536/537+0"P gcn  
 ugeqpf u'J gkuugn'cpf 'Ncf f'u'r t'guwo r v'kp'v'j cv'v'j ku'r'wgt t'guwn'o quv'h'ngn' 'u'ngo u'htqo 'gf wecv'qtu  
 k'p'gh'keg'p'v'f 'f'gx'q'v'pi 'k'p'q'f'k'p'c'v'g't'gu'q'w'eg'u'v'q'uwwf gpv'u'lwu'dgm'y 'c'o'cp'f'cv'gf 'r tqh'kegpe{ 'r'xgn'k'p  
 q'f'g't'v'q'k'petgcug'r cu'kpi 't'cv'gu'qp'u'cp'f'ct'f'k'g'f'v'g'v'k'pi \*4232.'346+0'\ ko o gto cp.'y j q'uwwf k'gf  
 eqmgi g'uwwf gpv'u'h'q'w'p'f'c'uko k'ct't'guwn'v'q'J gkuugn'cpf 'Ncf f'=j g'h'q'w'p'f'v'j cv'uwwf gpv'u'y kj  
*roommates* k'p'v'j g'd'q'w'qo '37' 'qh'v'j g'uwwf gpv'd'q'f' { 'k'p'v'g'to u'qh'k'p'eqo kpi 'UCV'ueqt'gu'cej kx'g'f  
 urki j v'f' 'y'qt'ug'v'j cp'g'zr g'ev'gf 'i' t'cf'gu'd'cu'gf 'qp'v'j gk' qy p'UCV'ueqt'g'\*4225.'43+0"Y j gp'eqpukf gtlpi  
 v'j g'q'v'j g't'g'p'f'qh'v'j g'ur g'ev'two . 'v'j g'h'k'g't'c'w't'g'ku'p'q'v'k'p'eqo r ng'v'g'ci t'ggo gpv'0"MKuu'q'dug't'x'g'f'c  
 p'c'w't'cn'g'zr g't'ko gpv'k'p'I gto cp{ 'c'p'f'h'q'w'p'f'\$'v'j cv'uwwf gpv'u'd'g'p'gh'k'htqo 'c'd'ng't'r ggtu.'d'w'r w'k'u'y kj  
 j ki j 'e'rc'u'r g't'eg'p'v'k'g't'c'p'm'u'f'q'u'q'v'c'uo'c'm'g't'g'z'v'p'v'\$ \*4235.'86+0"MKuu'd'c'ule'h'k'p'f'kpi u'ct'g'v'j cv'cp  
 g'p'x'k't'q'p'o gpv'h'k'ng'f'y kj 'j ki j g't'cej kxkpi 'r ggtu'j'cx'g'c'r'q'uk'x'g'lo r cev'qp'v'j g'ce'cf'go k'e'u'we'egu  
 qh'iqy g't'cej kxkpi 'uwwf gpv'u'0"J qy g'x'g't.'F'q'd'd'k'g'c'p'f' H' { g't'g'ce'j'g'f'v'j g'q'r'r'q'uk'g'eq'pen'w'uk'p'y j gp  
 uwwf { kpi 'o'c'ti'k'p'cn'uwwf gpv'u'cv'g'k'g'P'gy 'l'q't'n'i'Ek'k'f' r wdrke'uej qqu'y j k'ej 't'g's'w'k'g'c'p'g'p't'c'p'eg  
 g'z'c'o' <\$Q'w't'g'uw'nu'uw'i i guv'v'j cv'v'j g'v'f'r'k'ec'n'c'r'r'k'ec'p'v'f'q'gu'p'q'v'uki p'k'k'ec'p'v'f' 'd'g'p'gh'k'htqo 'c'w'g'p'f'kpi  
 c'uej qqu'y kj 'f't'co'c'v'k'ec'm'f'j ki j g't'cej kxkpi 'i' 'r ggtu'\$ \*4236.'96+0

Vj g'rcem'qh'eqpugpuwu'cpf 'xctkpeg'kp'vgej pls wgu'kp'vj g'hkgtcwtg'tgi ctf kpi 'vj g'lo r cev'qh'r ggtu  
 qp'uwf gpv'cej kxgo gpv'cf f gf 'kpvtki wg'cpf 'lo r qtvcpeg vq'vj ku'uwf {0'Y kj 'MRR'uej qqu  
 r qcej kpi 'o qkxcvgf 'uwf gpv'htqo 'qvj gt'r wdike'uej qqu. cpcn| kpi 'vj g extent qh'vj g'lo r cev'qp'vj g  
 uwf gpv'y j q'tgo ckp'kp'vcf kkpncn'r wdike'uej qqu ku'r ctvewrctn| 'lo r qtvcpv0'J qy gxgt.'o qtg  
 tgugctej 'qp'MRR'uwf gpv'kp'r ctvewrct'y cu'pggf gf kp'qtf gt'vq'o cng'wug'qh'vj ku'hkgtcwtg'cpf  
 o cng'cp{ 'hkp'qh'wughnr tgf levqp'qp'vj g'lo r cev'qh'MRR'uwf gpv'hki j v'htqo 'vcf kkpncn'r wdike  
 uej qqu0

Tgxky 'qh'Nkgtcwtg'MRR'Cej kxgo gpv'cpf 'Uwf gpv Dqf { 'Eqo r qukkap

Y j kg'vj ku'uwf { 'y cu'pqv'iko kgf 'kp'hqewu'vq'vj g'r gthqto cpeg qh'uwf gpv'kp'MRR'uej qqu.'k'y cu  
 lo r qtvcpv'vq'wvf gtucpf 'y j cv'j cf 'dggp'y tkwep'qp'vj g ghgevkxgpguu'qh'vj g'MRR'o qf gr0  
 Ewttgpv|.'vj g'hkgtcwtg'ku'cmo quv'gzewukxgn| 'hqewugf qp'vj g'ej cpi g'kp'vguv'ueqtgu'htq'uwf gpv  
 chgt'vj g{ 'gptqm|p'c'MRR'uej qqu=vj g'hkgtcwtg hkp u'MRR'uej qqu'vq'dg'ghgevkxg'kp'grgxcvpi  
 vj g'vguv'ueqtgu'qh'vj gk'qy p'uwf gpv0'Cpi tkv'gv cr0'kp'r cr gtu'htqo '4232'cpf '4234.'hqwpf 'vj cv  
 uwf gpv'cej kxgo gpv'lo r tqxgf 'uki pkkcepv| 'chgt'gptqmo gpv'kp'vj g'MRR'uej qqu'kp'N| pp.'O C  
 \*4232.'465=4234.'. 59+0'Cf f kkpncn|. 'Vwug'gv'cr0'hqwpf 'c'ucv'kvecm| 'uki pkkcepv|'r qukkxg\$'cpf  
 \$uwducpv'kcn\$'ej cpi g'kp'cej kxgo gpv'd| 'uwf gpv'chgt vj g{ 'gptqmgf 'kp'c'MRR'uej qqu\*4232.'4: +0  
 Vj g'r qukkxg'lo r cev'qp'ucpf ctf k| gf 'vguv'cej kxgo gpv'hqwpf 'kp'vj gug'uwf lgu.'cnj qwi j 'k'f'kf 'pqv  
 hwn| 'cpuy gt'vj g's wgu'qp'qh'vj ku'r cr gt.'y cu'xgt| lo r qtvcpv0'Vj g'qxgty j gm kpi n| 'r qukkxg'tguwuu  
 qh'vj g'MRR'o qf gr'qp'ku'qy p'uwf gpv'r tqxgu'vj cvMRR'u'tghqto cvqt| 'o gyj qf u'lo r tqxg'vj g'vguv  
 ueqtgu'qh'c'uo cm'uwdugv'qh'c'f kvt'kv'u'uwf gpv0'Dctpw0 u'chqtgo gpv'kp'gf 'hkp kpi 'vj cv'MRR  
 uwf gpv'eqpukv'gpv| '\$qwr gthqto 'uko kct'uwf gpv'kp']vcf kkpncn\_'f kvt'kv'uej qqu\$'hwt vj gt  
 xcncf cvgu'vj g'cdkx| 'qh'MRR'uej qqu'vq'grgxcv'vj g'cej kxgo gpv'qh'vj g'uwf gpv'y j q'cwgpf

uej qqu'lp'y g'MRR'pgvy qtn\*423; +0Cu'c'tguwn.'cm'gnug'j grf 'eqpuwcv.'MRR'uej qqu'uj qwf 'cnuq  
 j cxg'c'r qukxg'lo r cev'qp'f kntlevy kf g'vuv'ueqtgu0 J qy gxgt.'y g'r vtr qug'qh'y ku'uwf { 'y cu'pqv  
 cuwo g'y gtg'ku'pq'lo r cev'qp'y g'uej qqu'MRR'uwf gvu rxcxg'dgj kpf.'cpf 'vq't { 'vq'wvf gtucpf  
 y j cv'y g'ghev'qh'y gug'uwf gvu'rgcxkpi 'tcf kkpncr wdne'uej qqu'j cu'qp'y g'gpvt g'f kntlev0  
 Vj g'o clqtv'qh'y g'ikgtcwtg'qp'MRR'uej qqu'j cu cpcn| gf 'y g'ghev'kxgpgu'qh'y g'lpukwkwqpu  
 qp'y gk'qy p'uwf gvu0'Vj ku'ku'lo r qtwpv'dgecwug o cp { 'MRR'uwf gvu'eqo g'htqo 'xgt { 'mgy  
 cej kxkpi 'uej qqn'f kntlevu0'J qy gxgt.'y g'rcen'qhtgugctej 'qp'j qy 'y g'hrki j v'qh'uwf gvu'lp  
 mgy /lpeqo g'uej qqn'f kntlevu'v'MRR'uej qqu'lo r cevu qxgtcm'cej kxgo gpv'rgxgn'lp'f kntlevu'y kj  
 c'MRR'lpukwkwq'grtgugpv'cp'gzr m'kcdng'i cr 'lp y g'gzkxkpi 'ikgtcwtg0'cmj qwi j 'Vwvrg'g'v'cr0  
 f q'r tqf weg'tguwu'eqpukv'v'y kj 'qy gt'ikgtcwtg. qpg'hkpf kpi 'lp'y gk'tgr qtv'y j lej 'cf f gf  
 eqo r rzkv' 'vq'y ku'tgugctej 'ku'y g'hkpf kpi 'y cv'MRR gptqmggu'\$v{ r kcm{ 'j cf 'r tkt'cej kxgo gpv  
 r'xgn'v'y cv'y gtg'mgy gt'y cp'cxgtci g'cej kxgo gpv'lp y gk'm'ecn'uej qqn'f kntlevu\$\*4232.'zk0'K'y cu  
 r t'xkqwu' 'tgcupgf 'y cv'MRR'gptqmggu'ctg'o qtg'o q'kxcv'gf uwf gvu='Vwvrg'u'eqpenwkwq  
 kpf kcv'v'y cv'r tqur gev'kxg'MRR'uwf gvu'o c { 'eqo g htqo 'o qtg'o q'kxcv'gf 'j qwugj qrf u.'dw'v'y ku  
 f qgu'pqv'o cng'y go 'j ki j 'cej kxgtu'r tkt'v'gptqmo gpv'lp'y g'MRR'pgvy qtn0'Vj ku'cf f gf 'hwtj gt  
 kvtki w'v'y ku'gxgpv'uwf { 0'O q'kxcv'gf 'uwf gvu rxcxkpi 'c'tcf kkpncr wdne'uej qqn'ht'c'MRR  
 uej qqn'y qwf 'r tguwo cdn' 'j cxg'c'pgi cv'kxg'lo r cev'qp'cej kxgo gpv'lp'y g'f kntlevu'tcf kkpncr  
 r wdne'uej qqu'j qy gxgt.'k'j cu'dggp'hqwpf 'y cv'lpgh'ekgpe { lp'o cp { 'uej qqu'ku'ecwugf 'd { 'cp  
 kqtf kpcv'co qwpv'qh'tguq'wtegu'dgkpi 'ur gpv'qp'uwf gvu lwu'dgmgy 'r cuukpi 'tcv'u'j gkuugr'cpf  
 Ncf f'423: .'52: +0'Eqpu'f g'kpi 'y cv'Vwvrg'g'v'cr0'hqwpf y cv'MRR'uwf gvu'qp'cxgtci g'ctg'dgmgy  
 cxgtci g'r gthqto gtu'cv'y gk'r t'xkqwu'uej qqu.'k'ku hgcukdng'y cv'o cp { 'MRR'uwf gvu'eqwf 'j cxg  
 dggp'lp'y ku'\$lwu'dgmgy 'r tqh'ekgpe { '\$'emuu'qh'uwf gvu0 Vj gtghqg.'uej qqu'gzr g'k'gkpi 'uwf gpv

hki j v"q"MRRR"uej qqm'o c { *benefit* kh"vj g { "ctg"cdng"vq"o qtg"ghhekgpwi { "f kwtkdwg"hgctpkpi  
tguqwtegu0

Tgugctej "y cu"cuq"eqpf wevgf "qp"vj g"tgrv"kpuij kr "dgy ggp uqekqgeqpqo ke"kp f lecvqtu"ur gekhe"vq  
vj g"MRRR"uwf gpv'r qr wv"vqp"cpf "cej kxgo gpv'0"Cpi tkuv gv'cr0kp"r ct vkwrt "wugf "vj g"rqwtg {

gptqmo gpv'u { ugo "cu"c"pcwntcncpf qo k gf "gzi gtlo gpvcpf "r tqxkf gf "lo r qtvcv'eqpvzvhqt"vj ku

uwf { "tgi ctf kpi "vj g"tqrg"qh"rcpi wci g'r tqhhekgpe { "qp vgu'cej kxgo gpv"\*4234+0"Vj ku'cpcn { uku

kp f lecvgf "vj cv"vj g"rci g"\$tgc f kpi "i ckpu"ctg"ftkxgp cm qu'eqo r rvgv { "d { "i "cpf "]Gpi rkuj

Ncpi wci g"Ngctpgt\_"uwf gpw."y j qug"tgc f kpi "ueqtgu"tkug d { "tqwi j n { "2057"uvcv'ctf "f gxcv"vqpu"ht

gcej " { gct"ur gpv'cv"MRRR"N { pp"\$\*Cpi tkuv'gv'cr04234. : 59+0"Vj ku'tguwv'uki pcrgf "vj cv"vj g"rqy gt

dcugrkp g'r tqhhekgpe { "qh"MRRR"uwf gpw'kp"Gpi rkuj "r tkqt vq"v'c'pvhgttkpi "vq"c"MRRR"uej qqn'tgr tgugpw

c"r tko g"qr r qtwpk { "ht"c"tgrv"v'gn { "gcu { "cpf "uy kv"kpctgcug'kp"Gpi rkuj "r tqhhekgpe { "wv qp"gpvcpeg

kp vq"c"MRRR"uej qqr0

Dqqngt "gv'cr0y cu'tgxkgy gf "kp"qtf gt "vq"gzco kpg"cp {

kp̄xq̄r̄gu'lp̄et̄gcugf 'tc̄v̄gu'lp̄'cf̄xc̄pegf 'eq̄wtug'cn̄k̄pi 'cp̄f'lo r̄tq̄xgf 'eq̄m̄gi g'r̄nc̄pp̄k̄pi k̄r̄r̄nc̄v̄k̄p̄  
tc̄v̄gu'\*D̄qq̄ngt'gv'cr̄04237.'z̄k̄x+0"V̄j ḡug'h̄k̄p̄f̄k̄pi u'h̄gf v̄q'ḡz̄r̄ḡev̄c̄k̄p̄u'h̄q̄t'v̄j k̄u'uw̄f { 't̄gi c̄t̄f̄k̄pi 'v̄j g  
f̄k̄h̄gt̄ḡpegu'd̄ḡvy ḡgp'v̄j g'lo r̄c̄ev̄q̄h̄j̄ k̄i j 'ūej q̄q̄n̄i'cp̄f o k̄f f̄ng'uej q̄q̄n̄i'q̄p'f̄k̄ut̄k̄ev̄y k̄f g'c̄=

Vj gtg'ku'qpg'r tqo kpgpv'uwf { 'y j lej 'j cu'hqwpf 'vj cv'ej ctvgt 'uej qqu'j cxg'c'p'gi cv'xg'ko r cev'qp  
f kutlevy kf g'qweqo gu0'ko dgto cp'hqewugf "qp"qpg'Snti g'vtdcp'uej qqu'f kutlev'kp'vj g'Uqwj y gu\$  
cpf "eqpvqmgf "hqt"vj g'gpf qi gpqwa'hcevqt "qh'r j { ukecnr tqzko kw' "qh'ej ctvgt 'uej qqu'kp'tgrv'kp"vq  
r wdike'uej qqu'\*4233-0"Vj g'tguwmu'uj qy 'ucv'wkecm' uki p'kecp'v'f getgcugu'kp'r gthqto cpeg'hqt  
grgo gpvct { 'uej qqu'uwf gpw.'dw'hpf u'r quk'xg'tguwmu hqt"qnf gt'uwf gpw'\*ko dgto cp'4233.

: 72/: 73-0"Vj g'uo cm'uco r rg'uk' g.'r ctcf qz'kecn'tguwmu.





kpva'y g'tguwmu'qh'y ku'MRRR'uwf { 'i kxgp'y cv'MRRR'uej qqu'ctg'iqecvqf 'lp'wtdcp'f kwtkeu'y kj  
mcti g'r qr wrcvqpu0

Hkpcmf . 'y q 'uwwf kgu'j cxg'hqwpf 'y gtg'vq'dg'c'mcti g cpf 'eqpukvqpvw' r qukkxg'ko r cev'qh'ej ctvgt  
uej qqu'qp'vcf kkpccnr wdrke'uej qqu'0'Vj gug'vy q r cr gtu'cnuq'r tko ctkn' 'uwwf kgf 'wtdcp/dcugf  
r tkxcvg'uej qqu'0'Kp'P gy 'l qtm'Ekf. 'Eqtf gu'hqwpf 'y cv y g'gpvt { 'qh'c'ej ctvgt'uej qqu'kpva'c'uej qqu  
f kwtlev'j cf 'cp'ko o gf kcvg'r qukkxg'ko r cev'qp'y g'gzkwp' r wdrke'uej qqu'kw'y cu'cnuq' uwi i guvgf  
y cv \$r qvqpvkcn'gzr rcpvqpu'ht'ko r tqxgf 'r gthqto cpeg kpenw' g'kpetgcugf 'r gt'r wr kn'gzr gpf kwt gu.  
cecf go ke'gzr gevqpu. 'uwwf gpv'gpi ci go gpv. 'cpf 'c'o qtg tgur gevhw'icpf 'uchg'uej qqu'gpvktqpo gpv  
chvt'ej ctvgt'gpvt { \$'Eqtf gu'4238-0'Cf f kkpccmf. c' uwwf { 'qh'y g'qr gkpi 'qh'ej ctvgt'uej qqu'kp  
r tgf qo kpcpvw' 'wtdcp'uej qqu'f kwtkeu'kp'P qtvj 'Ectqkpc cnuq'hqwpf 'r qukkxg'ko r cev'qp'y g  
vcf kkpccnr wdrke'uej qqu'0'Kppck'4235-0'Kppcku r cr gt'cf f u'vq'y g'cpcn' uku'd { 'qdugt'kpi 'y g  
ko r cev'cetqu'i tcf gu'y j lej 'ctg'qh'gtg'cv'dqv 'y g vcf kkpccnr wdrke'uej qqu'cpf 'y g'pgy n  
qr gpgf 'ej ctvgt'uej qqu'0'Kppck'cf f u'y ku'f ko gpukq'p'cp'cwgo r v'vq'\$hmqy \$'y g' uwwf gpw'y j q  
j cxg'gh'y g'vcf kkpccnr wdrke'uej qqu'u'uggo 'cpf eqo r ctg'y g'tguwmu'qh'y g'uej qqu'f kwtlev'cu'c  
y j qrg'htqo 'dghqg'cpf 'chvt'y g'qr gkpi 'qh'c'ej ctvgt uej qqu'0'Kppck'4235. '49-0

Qxgtcm'y g'gzkwp' 'kxgtcwtg'qp'j qy 'ej ctvgt'uej qqu ko r cev'vcf kkpccnr wdrke'uej qqu' uwi i guw  
y cv'y gtg'ku'c'dgpghk'ht'uej qqu'f kwtkeu'cu'c y j qrg'tguw'kpi 'htqo 'y g'r tgugpeg'cpf lqt'qr gkpi  
qh'c'ej ctvgt'uej qqu'0'Ur gekkccmf. 'mcti g. 'wtdcp'uej qqu'f kwtkeu'uggo 'vq'dgpghk'y g'o quv'htqo  
ej ctvgt'uej qqu'0'Nqi kccmf. 'y ku'ku'wpf gtucpf cdrg i kxgp'y cv'k'y cu'dggp'guvdrkuj gf 'y cv'ej ctvgt  
uej qqu'gptqmo gpv'ku'ht'o qtg'eqpegpvcvqf 'lp'wtdcp ugw'kpi u=y' gug'f kwtkeu'j cxg'i tgcvt  
eqo r gkq'p'r tqxkf gf 'd { 'c'o wkwf g'qh'ej ctvgt'uej qqu'0 Eqpxgtugn' . 'uo cmgt' uwdwtdcp lwtcn  
f kwtkeu'y kj 'hgy gt'uej qqu'cpf lqt'o wej 'uo cmgt'ej ctvgt uej qqu'gptqmo gpv'pwo dgtu'f q'pqv'tger



gh

r t g x l q w u n { ' o g p v k p p g f . ' y k u ' h q u u ' q h ' u r k i j w l ' d g n y ' r c u k p i ' t c v g ' u w f g p u ' o c { ' h t g g ' w r ' u k i p k h e c p v  
t g u q w t e g u ' h q t ' v g c e j g t u ' v q ' u r g p f ' q p ' q y j g t ' u w f g p u 0 V j g ' j q o q i g p g k v { ' q h ' M R R R ' u e j q q n u ' c n u q  
g p u w t g u ' y j c v ' c m ' q h ' y j g ' u e j q q n u ' d g k p i ' u w f k g f ' c t g \$ j k i j ' g z r g e v c v k p u . ' j k i j ' u w r r q t v o ' o q f g n u = ' y j g u g  
u e j q q n u ' c t g ' g z r g e v g f ' v q ' j ' c x g ' y j g ' o q u v ' r q u k k x g ' k o r c e v 0

U g e q p f . ' k p e t g c u g u ' k p ' r t q h e k g p e { ' t c v g u ' y g t g ' g z r g e v g f v q ' q w r c e g ' c f x c p e g f ' c e j k g x g o g p v ' t c v g  
i c k p u 0 ' M R R R ' u w f g p u ' c t g ' q p ' c x g t c i g ' d g n y ' r t q h e k g p e { r g x g n ' u w f g p u ' r t k q t ' v q ' t c p u h g t t k p i . ' u q ' l v  
k u ' w p r k n g n { ' y c v ' q p g ' { g c t ' q h ' t g h q t o c v q t { ' u e j q q r k p i y q w f ' i g c f ' v q ' c ' r c t i g ' j k n g ' k p ' c f x c p e g f ' t c v g ' q h  
c e j k g x g o g p v 0 ' J q y g x g t . ' t c f k k q p c n r w d r k e ' u e j q q n u c t g ' p q v ' f g c r k p i ' y k j ' c p ' k p h w z ' q h ' h y g t  
r g t h q t o k p i ' u w f g p u ' d w ' t c v j g t ' c p ' q w h n y ' q h ' d g n y c x g t c i g ' u w f g p u = ' y j g t g h q t g . ' y j g ' h q u u ' q h ' y j g u g  
u w f g p u ' h t q o ' t c f k k q p c n r w d r k e ' u e j q q n u ' y c u ' g z r g e v g f v q ' i g c f ' v q ' c ' u o c m l r q u k k x g ' k o r c e v ' q p  
c f x c p e g f ' t c v g u 0

V j k f . ' c m j q w i j ' t c v g u ' q h ' c e j k g x g o g p v ' y g t g ' g z r g e v g f v q ' k o r t q x g ' k p ' d q y ' G p i r k u j ' c p f ' O c v j . ' y j g  
r c t i g ' r q t v k p ' q h ' M R R R ' u w f g p u ' d g k p i ' f g u k i p c v g f ' c u G p i r k u j ' N e p i w e i g ' N g c t p g t u ' i g f ' v q  
g z r g e v c v k p u ' q h ' G p i r k u j ' r t q h e k g p e { ' i c k p u ' q w r c e k p i O c v j ' r t q h e k g p e { ' i c k p u 0 ' V j g ' S n y / j c p i k p i  
h t w k \$ ' p c w t g ' q h ' r q v g p v c n ' G p i r k u j ' r t q h e k g p e { ' i c k p u c t g ' y j g ' t g u w n ' q h ' k p e q o k p i ' M R R R ' u w f g p u )  
r t q r g p u k v { ' v q ' j ' c x g ' n y g t ' G p i r k u j ' r t q h e k g p e { ' r t k q t v q ' g p t q m o g p v 0

H k p c m { . ' y j g ' k o r c e v ' q p ' f k u t l e v ' y k f g ' c e j k g x g o g p v ' t g u w n k p i h t q o ' y j g ' q r g p k p i ' q h ' c ' M R R R ' o k f f r g  
u e j q q n ' y c u ' g z r g e v g f ' v q ' d g ' r c t i g t ' y j c p ' y j g ' q r g p k p i q h ' c ' M R R R ' j k i j ' u e j q q n 0 ' V j g ' h k g t c w t g ' u w i i g u u  
y j c v ' y j g ' k o r c e v ' q h ' M R R R ' u ' o g y q f u ' c t g ' u k i p k h e c p v n { r c t i g t ' h q t ' u w f g p u ' p g y ' v q ' y j g ' p g y q t n 0  
N q i k e c m { . ' o k f f r g ' u e j q q n ' M R R R ' u w f g p u ' c t g ' c n u q ' { q w p i g t . o q t g ' k o r t g u u k q p c d r g . ' c p f ' c t g ' o c n k p i ' c  
o w e j ' o q t g ' f t c o c v k e ' e j c p i g ' l p ' y j g k t ' g f w e c v k p c n r r e p d { ' t g o q x k p i ' y j g o u g r k g u ' h t q o ' y j g  
t c f k k q p c n r w d r k e ' u e j q q n ' u { u v g o ' r t k q t ' v q ' j k i j ' u e j q q n 0 E q p x g t u g n { . ' j k i j ' u e j q q n ' u w f g p u ' c t g ' q r f g t .

o c { 'j cxg'f gxgr gf 'r qqt'cecf go le'j cdku'lp'yj gk'M: '{ gctu.'j cxg'o quv'kngr' 'ur gpv'o qtg'ko g  
kp'wvf gtr gthqto kpi 'M: 'uej qqu.'ctg'o cnkpi 'c'o qtg eqo o qp.'cpf 'rguu'eqpugs wgpvkn'o qxg  
cy c { 'htqo 'tcf kkpncnr wdike'uej qqu0

**Methods:**

Vj ku'tgugctej 'r tqigeve'wro kpcv'f'y kj 'cp'gxgpv'uwwf { y j lej 'gzco kpgf 'yj g'ko r cev'y cv'y g  
qr gpkpi 'qh'c'MRR'uej qqn'j cf 'qp'c'uej qqn'f kntlev'u ucvg/ur qpuqtgf 'ucpf ctf k gf 'vguv  
cej kxgo gpv'0'Vj g'uwwf { 'y cu'eqpf wevgf 'pcv'kpcmf 'wukpi cm'cxckrdng'vguv'ueqtgcej kxgo gpv  
kphqto cvkp'htqo 'MRR'uej qqu'cpf 'yj gk'tgur gev'xg r wdike'uej qqn'f kntlev'0'F kntlev'ngxgnr wdike  
uej qqn'f cv'kpenw'f kpi 'dqj 'tcf kkpncnr wdike'uej qqu cpf 'f kntlev'ej ctvgt'uej qqu'y cu'wkrk gf 'vq  
eqo r ctg'cecf go le'cej kxgo gpv'htqo 'yj g' { gct'dghqtg qr gpkpi 'y kj 'yj g' { gct'qh'yj g'uej qqn  
qr gpkpi 0'Vj g'uwwf { 'wugf 'f cv'htqo 'yj g'4228/4229'uej qqn { gct'vr 'wv'vri'yj g'423: /423; 'uej qqn  
{ gct'kp'qtf gt'vq'ecr wtg'tguwmu'htqo 'MRR'uej qqu qr gpgf 'dgy ggp'4228'cpf '42390'Cnj qwi j  
yj gtg'y gtg'c'pwo dgt'qh'MRR'uej qqu'qr gpgf 'r tkqt'vq 4228. 'yj ku' { gct'y cu'wugf 'cu'c'dgi kppkpi  
r qkp'v'lp'yj g'f cv'dgecwug'4228'y cu'yj g' { gct'y j gp'MRR uj kngf 'ku'gzr cpukap'r qnle { 'vq'kpenw'f g  
yj g'qr gpkpi 'qh'j ki j 'uej qqu'lp'cf f kkp'vq'yj g'kpetgcugf r tqn'htcv'kp'qh'o kf f ng'uej qqu'0'Vj ku  
f gnp'gcv'kp'ku'dqj 'eqpxgp'kpv'cpf 'pgeguuct { 'cu'dgi kppkpi yj g'f cv'ugv'chngt'c'ur gekke'ej cpi g'kp  
r qnle { 'gpwtgu'o qtg'ucpf ctf k cv'kp'co qpi 'yj g'uej qqu dglpi 'uwwf kcf 0

Fcv

Ukpeg'gcej 'ucvg'qh'gtu'f'htg'gpv'ucpf ctf k gf 'vguv'kpi y kj 'xctk'qwu'ueqt'kpi 'u' { ugo u.'f cv'qp'vguv  
ueqt'gu'y cu'i cvj gtgf 'cv'yj g'ucvg'ngxgn'ht'f kntlev'ngxgn'cej kxgo gpv'lp'yj g' { gct'r tkqt'vq'yj g  
qr gpkpi 'qh'c'MRR'uej qqn'0'Cf f kkp'pcmf . 'kp'kxf wen ucvg'ueqt'kpi 'u' { ugo u'y gtg'ki pqtgf =kpuwgf .  
r tqh'ekp'e { 'cpf 'cf xcpegf 'ngxgn'r gtegp'vci gu'lp'dqj Gpi rkuj 'cpf 'O cvj 'y gtg'eqm'gevgf 'kpuwgf 'qh

tey "ueqtgu0"l cwi kpi "gvu'cej kxgo gpv'd{ "j g'r gtegpvc i g'qh'uwf gpw"f ggo gf "Sr tqhlekpvlr cuulpi \$  
cpf "r gtegpvc i gu'qh'uwf gpw'cej kxkpi "Sqr "ueqtkpi kf xcpegf \$ pqto cik gf "j g'f cv"cetquu  
f khtgpv'ucvgu'y kj "f kxkpev'gvu0"







Ɔ'cf f kƙƙp'v'j ku'dcule'go r kƙecr'ò qf gn'cf f ƙƙi 'eqo r rƙzƙv' 'j tƙwi j 'j g'ƙƙenwƙƙp'qh'xctƙcdrgu  
 dcugf 'qp'uqekqgeqpqo ƙe'hcevtu'y cu'eqpukf gtgf 'cv'htuv'j qy gxgt. 'k'y cu'f gvto ƙƙgf 'ƙƙ'tgxƙgy ƙƙi  
 j g'f c'c'p'f 'eqo r quƙƙƙp'qh'j g'uwf gpv'dqf { 'qh'MRR uej qqn'j cv'j g'tgrvƙg'j qo qi gpgƙv' 'qh  
 j g'uej qqn'f ƙƙtƙeu'y ƙj 'MRR'uej qqn'c'p'f 'j g'uqekqgeqpqo ƙe dcemi tqwƙf 'qh'MRR'uwf gpw  
 o cf g'j ƙu'v' r g'qh'cpcn' uƙu'rguu'eqpugs wgpvƙc'ò'ƙƙvugcf . j g'eqo r rƙzƙv'ƙƙecvƙƙp'qh'j ƙu'uwf { 'y cu  
 f gtƙxgf 'htqo 'uƙc'v'ƙƙecvƙƙp'qh'j g'tguwuu'dcugf 'qp i tcf g'rgxgn'uwdlgev'ò cwt. 'c'p'f 'f ƙƙhtg'p'v  
 tcvg/dcugf 'ò gcuw'gu'qh'cej ƙxgo gpv

**Results:**

Rtƙƙt'v'v'wppƙi 'j g'y gƙxg'tgi tguƙƙpu. 'j g'f guetƙ vƙg uƙc'vƙƙeu'qh'j g'r t g/vtgcvo gpv'f c'c'ugv  
 y gtg'cpcn' | gf 0'Vcdrg'3'uwo o ctƙ gu'j g'f guetƙ vƙg uƙc'vƙƙeu'qh'j g'uej qqn'f ƙƙtƙeu'ƙ'j g'ò ƙf f r g  
 uej qqn'f c'c'ugv' r tƙƙt'v'v'j g'qr gƙƙi 'qh'c'MRR'uej qqn y j ƙg'Vcdrg'4'uj qy u'j g'uco g'uƙc'vƙƙeu'ht  
 j g'j ƙ j 'uej qqn'f c'c'ugv

Vcdrg'3

Xctƙcdrg	Qdugtƙc'vƙƙpu	O gcp	Uc'p'f c'f F gƙc'vƙƙp	O ƙƙo wo	O czƙo wo
Gpi Rtƙƙt'v'v'wppƙi { - C'f x'c'p'eg'f T'cv'g	87	6; 08;	3; 0 ; 9	350	: 80
Gpi 'Rtƙƙt'v'v'wppƙi { 'T'cv'g	87	580'97	350'78	34	860
Gpi 'C'f x'c'p'eg'f 'T'cv'g	87	350: 7	: 0 94	30	550
O c'j Rtƙƙt'v'v'wppƙi { - C'f x'c'p'eg'f T'cv'g	87	6; 07:	440 59	6	; 3
O c'j 'Rtƙƙt'v'v'wppƙi { 'T'cv'g	87	5508:	3604	50	7;
O c'j 'C'f x'c'p'eg'f 'T'cv'g	87	370; 3	330 95	20	640

Vcdrg"4

Xctkcdrg	Qdugtxcvkqpu	O gcp	Ucpcfctf F gxlcvkqp	O loko wo	O czko wo
Gpi Rtqhlekgpe{- Cf xcpegf Tcvg	4:	6; 067	3: 0893	3; 05	: 707
Gpi "Rtqhlekgpe{"Tcvg	4:	5908	360 4	3205	8: 07
Gpi 'Cf xcpegf "Tcvg	4:	34057	: 0878	304	55
O cvj Rtqhlekgpe{- Cf xcpegf Tcvg	4:	65093:	3; 0449	350	: 207
O cvj "Rtqhlekgpe{"Tcvg	4:	5304; 5	3508; 4	3408	7508
O cvj 'Cf xcpegf "Tcvg	4:	340647	: 0 3:	305	55

P qvcdn{.'y g'r tqhlekgpe{"tcvgu'kp"dqj 'Gpi rkuj "cpf O cvj 'y gtg'uki pkklecpw{ 'i tgcvt'y cp'yj g  
cf xcpegf 'cej kxgo gpv'tcvgu0'Cff kkkqpcmf.'y j gp'gzco klpki yj g'lpf kxf wcnf cve'gptkgu.'k'y cu  
qdugt xgf 'y cv'o cp{'qh'y g'f kwtleu'y kj 'y g'j ki j guvngxgn'qh'r tqhlekgpe{"cpf 'cf xcpegf  
cej kxgo gpv'r tkqt"v' yj g'qr gplki 'qh'y g'MRR'uej qqn'y gtg'f kwtleu'y kj 'gzkulpki 'MRR'uej qqn0  
Ur gekklemf.'O gvtqr qrkcp'Cvcpvc'cpf 'J qvwxp.'yj g Dc{'Ctgc'kp'Ecrkhtpkc.'cpf 'N{pp.'O C'y gtg  
f kwtleu'y kj 'gzkulpki 'MRR'uej qqn'r tkqt"v'4228. cpf 'gzj kdkgf 'uqo g'qh'y g'j ki j guv  
r tg/vgcwo gpv'ngxgn'qh'uwf gpv'cej kxgo gp0

Tgi tguakqp"t guwmu'qp'yj g'vtgcwo gpv'Ghgev'qp'O k f r g Uej qqn'cej kxgo gpv'kp'Gpi rkuj

Vj g'f cvc'ugv'ht"o k f r g'uej qqn'lpenwf gu't guwmu'htqo 87'MRR'o k f r g'uej qqn'qr gplki u'dgvy ggp  
4228/42390"Vcdrg"5'uj qy u'yj g't guwmu'htqo 'yj g'yj tgg tgi tguakqpu'twp"qp'yj g'ko r cev'qh  
f kwtlevy kf g'Gpi rkuj 'cej kxgo gpv't guwmu'htqo 'c MRR'o k f r g'uej qqn'qr gplki 0

Vcdmg"5

Variable	Model on Middle School English Prof+Adv Rate	Model on Middle School English Prof Rate	Model on Middle School English Adv Rate
3	70 7: "3089+	50 6; "308; +	30 3: "306+
2	6; 08; "4209+	580797"4408; +	3508: 7 "3409+
T/us wctgf	20435	2043;	2033;

Vj g'tgi tguukqp"twp"qp"vj g'ko r cev'qp"t kntlevy kf g Gpi nkuj 'r tqhlekpe{ 'r nmu'cf xcpegf "tcvg tngxcmf "vj cv'vj g'qr gplpi "qh'c"MKRR'o kf f ng'uej qqny cu'eqttrcvf "y kj "c"70 "r qkp'vqxgtcm kpetgcug"lp"Gpi nkuj 'r tqhlekpe{ 'r nmu'cf xcpegf "r gtegpvi g0 Vj ku'tguwn'y cu'ucvukecm{ uki pklecpv'cv'vj g'32' "uki pklecpeg'ngxgr0"Vj g'ko r cev'qh'c"MKRR'o kf f ng'uej qqr'qr gplpi "y cu'c"50 r qkp'v'kpetgcug"lp'r tqhlekpe{ "tcvg"y j lej "y cu'ucvukecm{ uki pklecpv'cv'vj g'32' "uki pklecpeg'ngxgr0 Vj g'tgcvo gpv'ko r cev'qp"cf xcpegf "tcvg"qh'cej kxgo gpvy cu'r qukkxg."dwl'uo cmgt."vj cp'vj g'ko r cev qp'r tqhlekpe{ =vj ku'r qukkxg"tguwn'y cu'pqv'ucvukecm{ uki pklecpv0

Tgi tguukqp"tguwnu"qp"vj g"vtgcvo gpv'Ghgev'qp"O kf f ng Uej qqr'cej kxgo gpv'lp"O cvj

Vcdmg"6"uj qy u'vj g'tguwnu"htqo "vj g'vj tgg'tgi tguukpu twp"qp"vj g'ko r cev'qh'f kntlevy kf g'O cvj cej kxgo gpv'tguwnu"pi "htqo "c"MKRR'o kf f ng'uej qqr'qr gplpi 0

Vcdng'6

<b>Variable</b>	<b>Model on Middle School Math Prof+Adv Rate</b>	<b>Model on Middle School Math Prof Rate</b>	<b>Model on Middle School Math Adv Rate</b>
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Vcdng'7

<b>Variable</b>	<b>Model on High School English Prof+Adv Rate</b>	<b>Model on High English Prof Rate</b>	<b>Model on High School English Adv Rate</b>
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Vcdrg'8

Variable	Model on High School Math Prof+Adv Rate	Model on High School Math Prof Rate	Model on High School Math Adv Rate
3	5097;*202+	507; 5;*20 5+	20: 4 *206+
2	6503: *330 4+	5304; 5;*33069+	340647 *906+
T/us wctgf	202; 3	2037:	2022

Vj g'tgi tguukqp"tw"qp"vj g'lo r cev'qp" f kw lev y kf g O cvj "r tqhlekpe{ "r nu"cf xcpegf "tcvg'tgxgcrgf vj cv'vj g'qr gplpi "qh'c"MRJR'j ki j uej qqn'y cu'eqttrcvgf y kj "c"50"r qkv'qxgtcm'lpetgcug'lp"O cvj r tqhlekpe{ "r nu"cf xcpegf "r gtegpvc i g0"J qy gxgt. "vj ku tguwn'y cu'pqv'ucv'w'w'ecm{ "uki p'k'ecpv'cv'vj g 32' "uki p'k'ecpeg'ngxgn0"Vj g'lo r cev'qh'c"MRJR'j ki j uej qqn'qr gplpi "y cu'c"50"r qkv'lpetgcug'lp r tqhlekpe{ "tcvg'y j lej "y cu'cnuq'pqv'ucv'w'w'ecm{ uki p'k'ecpv'cv'vj g"32' "uki p'k'ecpeg'ngxgn0"Vj g v'gcv' gpv'lo r cev'qp"cf xcpegf "tcvg'qh'cej kxgo gpv'y cu dctgn{ "r quk'xg="y ku'r quk'xg'tguwn'y cu cnuq'pqv'ucv'w'w'ecm{ "uki p'k'ecpv'0

**Analysis:**

Vcdrg'9"uwo o ct'k' gu'vj g'ecrewcvgf "eqghlekpu'qh'kv'gt'guv'cetquu'vj g'y gr'xg'tgi tguukpu0

Vcdng'9

, Kf lecygu'urcwnlecn'uki pklecepeg<r ">"20,







vj ku'pcwtcn'gzr gtlo gpv'lp'ecr wtłpi 'vj g'eqo r rvg'ej cpi g'lp'o gcp'qweqo g'qh'vj g'uej qqn'f kntleu  
 wugf 'lp'vj ku'f cvc'ugv'ku'pgeguuct { 'v'f kuegtp'vj g vtwg'xcnwg'qh'vj ku'uwwf {0'Vj g'qdugt'xgf 'tgcvo gpv  
 ghge'v'qp'o gcp'qweqo gu'y cu'wpk'gtucm{ 'r qukk'xg'cetquu cm'vy grxg'tgi tguuk'qpu.'cpf 'vj gtg'gzkuu  
 gxkf gpeg'łwi i gułpi 'vj cv'vj gug'tguwu'y gtg'wpf gtuc'v'f =vj gtgh'qtg.'vj g'qdugt'xgf 'r qukk'xg'ko r cevu  
 qh'MRR'uej qqn'qr głpi u'qp'f kntlev'y kf g'cej kxgo gpv'uj qwf 'dg'uggp'cu'c'o gcpłpi hwt'guw'lp  
 vj g'gzr cpf łpi 'hgtcwtg'qp'vj g'ko r cev'qh'ej ctvgt uej qqn'hki j v0

Cv'vj g'o kf f'ng'uej qqn'hxgn'vj g'tgr'v'xgn{ 'rti g'ej cpi gu'lp'o gcp'qweqo gu'ecr'w'v'f 'd{ 'vj g  
 o qf gr'łpf kec'v'vj cv'vj g'gzr cpuk'qp'qh'vj g'o kf f'ng'uej qqn'pgwy qtn'dgi kłpi 'lp'4228'j cu'dggp  
 rti gn{ 'dgp'gh'ekn'łqt'vj g'f kntleu'ugt'xgf 'd{ 'MRR' Vj ku'uwwf { 'y cu'cdrg'v'f' i gpgtc'v'g'uc'v'k'ecn  
 gxkf gpeg'lp'Gpi r'uj 'cej kxgo gpv'łpf kec'v'pi 'vj cv'MRR'u v'cti gv'f 'o qf gr'łqt'gf wec'v'qp'tgh'qto 'lp  
 w'pf gtr'gth'qto łpi 'f kntleu'j cu'dggp'uweegu'hw'łp'gr'x'cv'pi vj g'cej kxgo gpv'qh'dq'vj 'ku'qy p  
 uwwf gpw'cpf 'vj g'qxgtcm'f kntlev'0'Eqpugs wgpw'ł. hwt'vj gt'ur tgc'f 'qh'vj g'MRR'o kf f'ng'uej qqn  
 pgwy qtn'ly qwf 'dg'cf xkuc'drg'dcug'f 'qp'vj g'tguwu'i gpgtc'v'f d{ 'vj g'go r k'lecn'o qf gr'łwug'f 'lp'vj ku  
 uwwf {0

Vj gtg'ctg'r qv'p'v'cn'ctgcu'qh'hwt'vj gt'tgug'ctej 'y j kej eqwf 'cuuk'v'lp'vj g'o cnłpi 'qh'c'o qtg'ur gek'le  
 tgeqo o gpf cv'qp'qp'cf f'k'łpcn'MRR'o kf f'ng'uej qqn'gzr cpuk'qp'0 Hktuv'tw'płpi 'c'uko k'ct  
 g'zr gtlo gpv'y j kej 'qpn{ 'łpen'f gu'vj g'hktuv'MRR'o kf f'ng'uej qqn'qr gpg'f 'lp'gcej 'f kntlev'eqwf 'j gr  
 ecr wtg'vj g'eqo r rvg'f kntlev'y kf g'ghge'v'qh'c'MRR'qr głpi 0'Vj ku'v' r g'qh'c'pcn{ uku'y qwf 'dg  
 g'z'v'go gn{ 'j gr hwt'lp'w'pf gtuc'p'f łpi 'c'MRR'o kf f'ng'uej qqn'u vtwg'xcnwg'v'q'vj g'qxgtcm'f kntlev'd{  
 tgo qxłpi 'cp{ 'r qv'p'v'cn'dku'dcug'f 'qp'vj g'f'ko kłuj łpi tgwt'pu'qh'o w'kr ng'tgcvo gpv'ghge'u0  
 J qy gxgt.'o cp{ 'qh'vj g'uej qqn'y j kej 'y qwf 'dg'r ctv'qh'vj g'f cvc'ugv'lp'vj ku'v' r g'qh'uwwf { 'y gtg  
 qr gpg'f 'y gr'dgh'qtg'42280'Vj ku'ku'r tqdrgo cv'e'łqt c'pwo dgt'qh'tgcu'qp'0'Hktuv.'vj g'MRR'o qf gn

y cu'nguu'tghkpgf "cpf" j qo qi gpk gf "cv'c'pc'kqpcn'rgxgnr tkqt "v" j g"4228"ghhqtu'v'uecrg'wr =  
 vj gthqtg. "v ku'v' r g'qh'uwwf { "y qwf "pqv'pgeguuctk' dg'cdng'v" i gpgtcrk' g'tguwmu'tgi ctf kpi "v g  
 utgpi vj "qh'v' g'MRRR'o qf gr'P gzv." vj g'f cv'ugv'y qwf dg'uki pkklecpv' "uo cmgt'hqt" vj ku'v' r g'qh  
 cpcn' uku'0"Hkpcn' . "ugw'kpi "cukf g'cp { "f cv'eqmgev'kqp vtqwdrgu'wgo o kpi "htqo "v g'ci g'qh'v' g'tguwmu  
 pggf gf "v'eqo r ngv'v' g'uwwf { . "v g'cuwo r v'kpu'eqf hkgf d { "v g" { hkgf "ghgev'vgo "y qwf "dg'nguu  
 rkngr' "v" j qrf "wr'0"Gzvgpf kpi "v g'uco r ng'v'k'pen'f g uej qqn'htqo "v g'3; ; 2u'y qwf "etgcvg'c'rti gt  
 y kpf qy "hqt'hw'pf co gpvcn'ej cpi gu'k'v'v' g'v'guv'dgkpi kuwgf "d { "xctkqwu'ucv'gu'0"Vj ku'eqwf "tguwv'k'p  
 ej cpi gu'v'v' g'eqgh'k'k'p'v'qh'k'p'v'g'v'p't'g'v'f "v vj g'qr gpkpi "qh'c'MRRR'o k f ng'uej qqn'y j k'ej  
 y qwf "dku'v' g'tguwmu'qh'v' ku'v' r g'qh'uwwf {0

C'o qtg'hgcukdng'cf f k'k'qpcn'uwwf { "y qwf "k'pxq'k'g'eqpvtq'k'k'pi hqt"v' g'r t'gugpeg'qh'q'v' gt "MRRR  
 uej qqn'k'p'v' g'f k'ut'lev'r tkqt "v" q'g'p'k'pi 0"Uko k'rt v'v'v' g'o qf gnu'wugf "k'p'r cr gtu'd { \ ko o gt. "Dwf f k'p  
 cpf \ ko o gt. "cpf "J cp"cpf "Mgg'g. "v ku'v' r g'qh'uwwf { y qwf "eqpvtq'v'qh'hqt"v' g'co qwp'v'qh'MRRR  
 uej qqn'k'p'c'f k'ut'lev'cv'v' g'v'ko g'qh'v' g'qr gpkpi "qh'cp'cf f k'k'qpcn'MRRR'o k f ng'uej qqn'cpf "k'v'eqwf  
 j gr "s'wcp'v'h' "v g't'cv'g'qh'f ko k'pkuj kpi "t'gwt'pu'qp"cf f k'k'qpcn'MRRR'k'px'guvo gpv'k'p'ur gek'k'f k'ut'lev'0  
 Cf f k'k'qpcn' . "o gcuwt'kpi "v g'gh'gev'v'v' q'MRRR'uej qqn' qr gpkpi "uko wnc'p'g'q'wun' "k'p'q'p'g'f k'ut'lev  
 y qwf "dg'k'px'c'w'cdng'0

Cv'v'v' g'j' ki j "uej qqn'rgxgn"v' g't'gr'v'k'x'gn' "uo cm'ej cpi g k'p'o gcp"q'w'eqo gu'ec'rw'v'v'f "d { "v g'o qf gn  
 k'p'f k'ec'v'gu'v'v'v' g'f g'x'gn'r o gpv'qh'c'j' ki j "uej qqn'r tqi tco dgi k'p'k'pi "k'p'4228"f guki pgf "v  
 uwr r ngo gpv'v' g'gz'k'k'pi "o k f ng'uej qqn'p'gy qtn'j cu dggp'nguu'dgp'gh'k'c'n'hqt"v' g'f k'ut'lev'u'gt'x'gf "d {  
 MRRR"0C'nj qwi j "eqo d'k'k'pi "v ku'eqpen'wuk'p'y k'v' "v g h'k'p'k'pi u'qh'D'q'q'ngt'g'v'c'f'0 c { "uwi i guv'v'v' cv  
 vj g'MRRR'j' ki j "uej qqn'p'gy qtn'0 c { "dg'nguu'x'c'w'cdng vj cp'ku'o k f ng'uej qqn' . "v ku'h'k'p'k'pi "pggf u  
 h'v'v'v' gt "eqpv'gz'0"Cu'f g'v'k'rgf "k'p'v'v' g't'g'x'k'v'v' "qh'v'v' g'gz'k'k'pi "h'v'g't'c'w'g' . "D'q'q'ngt'g'v'c'f'0 k f "h'k'p' "v cv



Hwtj gt'uwf { "qp'y g'rupi 'vgo "dgpghku'qh'MRR'lpkmtcvkp'lp'c'uej qqn'f kmtlev'eqwf "dg'f guki pgf  
vq'o gcuwtg'y g'Sghlekgpe{ })'qh'y g'rti g'co qwpv'qh'r gt'uwf gpv'hwf kpi 'tgegkxgf "d{ 'MRR'uej qqn0  
Ur gekhlec{.'wulpi "ecrewcvgf 'y ci g'r tgo kwo u'hqt'j ki j uej qqn'qt'eqmgi g'i tcf wcvgu'cpf  
f kmtlev/y kf g'j ki j 'uej qqn' tcf wcvkp'tcvguleqmg g eqo r ngvqp'tcvgu'htqo "dghqtg'cpf "chgt'y g  
qr gpkpi "qh'c'MRR'uej qqn'eqwf "o qpgk g'y g'y ci g'i ckpu qh'c'MRR'qr gpkpi 0

**Applications:**

Vj g'tguwnu'qh'y ku'uwf { 'eqwf 'j cxg'r qvvpkcm{ 'o clqt r rkle{ 'ko r rdecvkpu0Hktuv.'y ku'uwf { 'j cu  
rtqxf gf 'uqo g'gxf gpeg'v'umi i guv'y cv'y g'MRR'pgy qtmj cu'dgpghkxgf 'uej qqn'f kmtlev  
vj tqwi j qw'y g'eqwpt { 'vj tqwi j "gpj cpego gpw'lp'f kmtlev/y kf g cej kxgo gpv'tguwnkpi 'htqo 'y g  
qr gpkpi "qh'MRR'uej qqn0"Vj ku'lphto cvkp ecp'dg'cf f gf vq'y g'gzkukpi 'hpqy ngf i g'qp'ej ctvgt  
uej qqn'v'j gr 'hgf gtcn'cpf 'ucv'g'i qxgtpo gpw'f gygo kpg y j kej 'ej ctvgt'uej qqn'r tqi tco u'ctg  
y qtj 'hwf kpi 'cv'egtckp'r tleg'r qkp0 I kxgp'y g hkp' kpi u'qh'Eaj qf gu'gv'cn0kp"423; 'tgi ctf kpi 'y g  
dgpghku'qh'tgr rdecvkpi 'rtqxp'r tqxf gtu'qh'ej ctvgt gf wecvkp.'hwf kpi 'y g'gzcrukpi'qh'y g  
crtgcf { 'wtqpi "dcpf "qh'MRR'ej ctvgt'uej qqn'y qwf dg'cp'ghgevkxg'wug'qh'iko kgf 'i tcv'o qpg{0  
k'cf f kkp'v'y g'pgy qtm'uweegu.'y g'j qo qi gpgqu pcwtg'qh'MRR'u'kpukwkqpcn'qr gtcvkpu  
gpwtgu'y cv'y ku'qr vqp'ecp'dg'tgcf kn{ 'cxckndg vq'y g'gf wecvkp'u{ ugo "qh'cp{ 'ucv'g'h'k'ku'cdng  
vq'tgegkxg'y g'pgeguuct { 'hwf kpi 0'Hkpcn{.'y kj 'Lqg Dkf gp'cuwo kpi 'y g'qh'leg'qh'Rt guk'gpv'qh'y g  
Wpkxgf 'Ucvgu'pgzv'o qpvj .'s wcvkcvkxg'uwr r qt'v'y kmdg'pgeguuct { 'hqt'cp{ 'ej ctvgt'pgy qtm'j qr kpi  
vq'gzcrukpi 0'Dkf gp'j cu'r ngf i gf 'vq'Shewu'qp"pgki j dqtj qqf r wdike'uej qqn)'tcvj gt'y cp'ej ctvgt  
uej qqn)))\*Drcf "4242+0"Vj g'Rt guk'gpv'grgev'j cu'gxgp ej ctcevgtk gf 'ej ctvgt'uej qqn'cu oxgt {  
o kui wk gf 'uej qqn'tghqto u\$\*Y ki hcm'4242+0'Cu'c'tguwn. k'ku'iqi kcn'vq'gzcrukpi'ht'guu'hgf gtcn'hwf kpi . 'qt  
pgy qtm'ing'MRR'y km'j cxg'v'gpi ci g'lp'o qtg'lpvgpug eqo r gv'kqp'ht'guu'hgf gtcn'hwf kpi . 'qt

j cxg'v'iqm'v'r tkxcv'f qpqtu'hqt'cp'kpetgcugf 'uj ctg'qh'vj gk'hwpf kpi 0'Gkj gt'y c{. 'ej ctvgtu'y km  
pggf 'v'cto 'vj go ugrkgu'y kj 'gxkf gpeg'tgi ctf kpi 'vj g o gtku'qh'vj gk'o qf gr0'J qy gxgt.'ur gekkccm{  
k'vj g'eqo r gkkqp'hqt'hgf gtcn'hwpf u.'ej ctvgt'pgvy qtmu eqwrf 'eqwvgt'Dkf gp'u'kf gqmi kccn'ucpeg  
ci ckpu'pqp/pgki j dqtj qqf 'uej qqm'y kj 'gxkf gpeg'vj cvej ctvgtu'ecp'grxcv'vj g'r gthqto cpeg'qh  
gpvtg'uej qqn'f kutkew0

P qvgu

30 Ej ctw'y gtg'cngp'fktgew'ltqo "vj g"MR'R'y gdukg<  
MR'R'wdrk'Ej ctvgt'Uej qqn0\$P cvkqpcn'Tgr qt v'Ectf \$ KIPP.  
j wr u<ly y y Onkr Qti Itguwulpcvqpcn% wguvqp/3<y j q/ctg/qwt/uwf gpw





Ectpq{.'O ctvlp042270The Charter School Dust-up: Examining the Evidence on Enrollment and Achievement'Y cuj lpi vqp.'F E0'Geppqo le'Rqre{'Kpukwng0

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Radio.'O ctej '530  
j wr u<ly y y Ørt

J q. "Ucm{0423: 0\$CR'Gzenmukxg<Dknkqpcktgu'hwgn'WU'ej ctvgt'uej qqn'o qxgo gpv\$ *Associated Press*. "Lwn{ "380j wr u<lcr pgy u<eqo lctv<eng; 4fe; 36ff; 9e6: 9c; d; cc6d228; 2; c: e

Ko dgto cp. "UeqwC042330δVj g'Ghgev'qh'Ej ctvgt'Uej qqn qp'Cej kxgo gpv'cpf "Dgj cxlqt"qh Rwdre"Uej qqn'Uwf gpv\$ *Journal of Public Economics* ; 7<: 72/: 850

Lppck'[ wuwng042350δVj g'Ko r cev'qh'Ej ctvgt'Uej qqn Gpvt { "qp"Vtcf kqpcn'Rwdre"Uej qqn<P gy Gxkf gpeg'ltqo 'P qty 'Ectqkpcδ'Tqej guvt. 'P [ <Wpkxgtukv/ qh'Tqej guvt0

MRR'Rwdre'Ej ctvgt'Uej qqn0δMRR'u'Utwewtg<Ngctp J qy "MRR'Rwdre'Ej ctvgt'Uej qqn'Ctx Utwewtgf δ *KIPP.org*. j wr u<ly y y Onkr r Qiti luej qqnulutwewtg10

MRR'Rwdre'Ej ctvgt'Uej qqn0\$P cvkqpcn'Tgr qtv'Ectf δ *KIPP*. j wr u<ly y y Onkr r Qiti ltuwnulpcvqpcn%\$ wguvqp/3<y j q/ctg/qwt

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j wr u4ly y y 0y cuj kpi vqpr quw0qo lgf wecvkqp 423; 13412; Itgr qt v/hgf gtcn/i qxgtpo gpv y cugf /o knk  
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6xt, b rdb/b, E

