

A Private, Post-Secondary Vocational School Providing Educational Training

Florida #7795 4023 N. Armenia Ave. Suite 230 Tampa Fl 33607

917-349-4202

COURSE CATALOG

и	Dcemitqwpf"cpf"Nkegpuwtg"	Rcig"5"
п		Rcig"6"
	$Ftwi/htgglUoqmg/htgg"Rqnke\{"$	Rcig"6"
n		Rcig"7
"	$Cfokuukqpu"Rqnke{"}$	Rcig"8"
$\label{thm:conditional} \textit{Hkpcpekcn} \texttt{``Tgswktgogpvul''Fgpkcn''qh''Cfo}$	kuuk qp u"	Rcig"8"
	Vtcpuhgt"Rqnke { "	Rcig"9"
	Vwkvkqp"cpf"Hggu"	Rcig":"
	0"	Rcig":"
	$Ecpegnncvkqp" \ (\ "Tghwpf" Rqnke \{"$	Rcig";"
"	"	Rcig"32"
	11 11	Rcig"33"
	11	Rcig"34"
1111		Rcig"35"
""1"	11 11	Rcig"36"
	1111	Rcig"36"
	"	Rcig"36"
	"	Rcig"37"
		Rcig"38"
11	II .	Rcig"39"
	"" """"Rci	g"3:"ó"3;"
	"" """Rc	eig"42/43
	Hwnn/vk o glRctv/vk o g"Uvcvwu""	Rcig"43"
	п	Rcig"44"
11		Rcig"44"
	н	Rcig"44"
Uvwfgpv"Tgeqtfu"1"Vtcpuetkrvu"1"Nkdtct{"	п	Rcig"45"
	11111	Rcig"46"
	Ugzwcn" J ctcuu o gpv"Rqnke{"	Rcig"46"
И		Rcig"47"

 $\label{lem:vjg} Vjg"Cecfgo { "qhhgtu" vyq" rquv/ugeqpfct { "qeewrcvkqpcn" gfwecvkqp" rtqitcou<" HcekcnlUmkp"Ectg." cpf" Pckn"Urgekcnkuv0" I tcfwcvgu" ctg" cyctfgf" egtvkhkecvgu" cpf" jgnru" kp" rtgrctkpi "hqt" crrnkecdng" uvcvg" nkegpukpi "gzcou0" Vjg" uejqqn" cnuq" rtqxkfgu" eqpvkpwkpi "gfwecvkqp" encuugu" vjcv" gpcdng" rtqhguukqpcnu" vq" tghtguj "cpf" gzrcpf" vjgkt" umknnu" cpf" ockpvckp" vjgkt" nkegpugu0" }$

 $\label{linear_vision} Vjg"uejqqn"qrgtcvgu"qp"c"34/oqpvj"ecngpfct"u \{uvgo"ykvj"rtqitcou"dgikppkpi"gxgt \{"vjtgg"vq"hqwt"oqpvju0"C"hwnn/vkog"uvwfgpv"eqwtug"nqcf"ku"52"jqwtu"rgt"yggm0"}$

 $\label{lem:control_vjg} Vjg"Cecfgo \{ \text{"wugu"c"eqodkpcvkqp"qh"vtcfkvkqpcn"kpuvtwevkqpcn"vgejpkswgu. "kpenwfkpi"encuutqqo" ngevwtgu."jcpfu/qp"ncdlgswkrogpv"vtckpkpi. "cpf"yqtm/dcugf"cevkxkvkgu"vq"rtgrctg"uvwfgpvu"hqt" ngevwtgu. "jcpf"vqtm/dcugf"cevkxkvkgu"vq"rtgrctg"uvwfgpvu"hqt" ngevwtgu. "jcpf"vqtm/dcugf"ngevwtgu. "jcpf"vq$

ickphwn"gornq{ogpv"kp"vjgkt"ejqugp"rtqhguukqpu0"	
--	--

 $Gwtqrgcp"Dgcwv{"Cecfgo{"fqgu"pqv"fkuetkokpcvg"dcugf"qp"tceg."etggf."eqnqt."ugz."cig."fkucdknkv{."qt"pcvkqpcn"qtkikp0"}}\\$

Nkegpuwtg"

Gwtqrgcp"Dgcwv{"Cecfgo{"ku"nkegpugf"d{"vjg<"

 $\label{thmqtkfc} Hnqtkfc"Eqookuukqp"hqt"Kpfgrgpfgpv"Gfwecvkqp."Hnqtkfc"Fgrctvogpv"qh"Gfwecvkqp0""""Nkegpug"%99;7"Cffkvkqpcn"kphqtocvkqp"oc{"dg"qdvckpgf"d{"eqpvcevkpi"vjg"Eqookuukqp"cv<"}$

547" Y guv" I ckpgu"Uvtggv."Uwkvg"3636"Vcmc j cuugg."Hnqtkfc"545;;/2622"*:72+"467/5422"Ockp"Nkpg"

*:::+"446/88:6"Vqnn"Htgg

Fkcpc"Pqickdc{gxc" Fktgevqt"

Tgpcvc"Pqickdc{gxc" ""Qhhkeg"Cf o kpkuvtcvqt"

Cfokpkuvtcvkqp "

Fkcpc"Pqickdc{gxc" Fktgevqt"

Tgpcvc"Pqickdc{gxc" Qhhkeg"Cfokpkuvtcvqt"

 $Ec\ o\ rwu\ "Hceknkv\{\ "$

 $Gwtqrgcp"Dgcwv{"Cecfgo{"ku"kp."Hnqtkfcøu"hcuv/itqykpi."dwu{"kpfwuvtkcn"ctgc0""} Vjg"uejqqnøu"3.862/uswctg/hqqv"hceknkv{"hgcvwtgu" oqfgtp"kpuvtwevkqpcn"cpf"vtckpkpi"urceg." kpenwfkpi"4"encuutqqolncdlrtcevkeg"vtgcvogpv"tqqou."c"nkdtct{."uvwfgpv"nwpejldtgcm"tqqo."vyq"tguvtqqou"cpf"cfokpkuvtcvkxg"qhhkeg0"Kpuvtwevkqpcn"urceg"ku"hwtpkujgf"ykvj"wr/vq/fcvg"gswkrogpv"cpf"ocvgtkcnu"fgukipgf"vq"jgnr"uvwfgpvu"ngctp"cpf"rtcevkeg"vjg"xgt{"hcvguv'vgejpkswgu0"C"eqorngvg"nkuv"qh"vjg"uejqqnøu"kpuvtwevkqpcn"gswkrogpv"ku"cxckncdng"cv"vjg"qhhkeg0"$

Ftwi /htgglUoqmg /htgg "Rqnke{"

 $Gwtqrgcp"Dgcwv{"Cecfgo{"ku"c"ftwi/htgg."uoqmg/htgg"gpxktqpogpv0"Vjg"wug"qh"cneqjqn."ftwiu"qt"uoqmkpi"qp"ecorwu"yknn"pqv"dg"vqngtcvgf0"Hwtvjgtoqtg<"}$

- $Vjg"uejqqn"jcu"c"|gtq"vqngtcpeg"hqt"ftwiu"cpf"cneqjqn0"Pq"uvwfgpv"qt"gornq{gg"oc{"dg"qp"vjguejqqn"ukvg"wpfgt"vjg"kphnwgpeg"qh"cneqjqn"qt"ftwiu0}$
- Wug"qh"ftwiu"qt"qvjgt"knngicn"uwduvcpegu"qp"ukvg"ctg"itqwpfu"hqt"vgtokpcvkqp0

 $\label{lem:control_general} Gwtqrgcp"Dgcww{"Cecfgo {"dgnkgxgu"vjcv"cp{"rgtuqp"ykmkpi"vq"crrn{"vjgougnxgu."yqtm"jctf"cpf"ngctp"pgy"vgejpkswgu"ecp"cejkgxg"uweeguu"kp"cp{"hkgnf0"Qwt"ewttkewnwo"ku"rtqxkfgf"kp"c"hqtocv"vjcv"rtqoqvgu"uwwfgpv"uweeguu"kp"vjg"encuutqqo"cpf"vjg"yqtmhqteg0"Vq"uwrrqtv"vjku"xkukqp."Gwtqrgcp"Dgcwv{"Cecfgo{"uvtkxgu"vq<"}}$

- $30 \quad Gpuwtg"vjcv"cnn"uvwfgpvu"tgcej"itcfwcvg"uvcvwu"cpf"hkpf"gornq{ogpv"kp"vjgkt"hkgnf"qh"uvwf{0}}$
- 40 Rtqxkfg"cp"cvoqurjgtg" y jgtg"fkueqxgt{"cpf"ngctpkpi"ctg"vjg"hqewu0
- 50 Etgcvg"fguktg"kp"uvwfgpvu"cpf"itcfwcvgu"vq"dgeqog"nkhg/nqpi"ngctpgtu0

 $Gwtqrgcp"Dgcwv{"Cecfgo \{ \emptyset u"o kuukqp"ku"vq"rtqxkfg"best vtckpkpi"cv"c"ngxgn"vjcv"kipkvgu"gcej"uvwfgpv"vq"uqct"cpf"hnqwtkuj"kp"vjg"dgcwv{"hkgnf0"}$

 $\label{lem:condition} Gwtqrgcp"Dgcwv{"Cecfgo {$\phi u"rtqitcou" o ggv"cm"uvcpfctfu"ugv"hqtvj "kp"vjg"Twngu"cpf"Uvcvwvgu"qh"vjg" Hnqtkfc"Fgrctv o gpv"qh"Dwukpguu"cpf"Rtqhguukqpcn"Tgi wncvkqp."Fkxkukqp"qh"Rtqhguukqpu."Dqctf"qh" Equ o gvqnqi { ."cpf"vjg"Hnqtkfc"Fgrctv o gpv"qh" J gcnvj0" }$

- Cnn"uvwfgpvu"tgswguvkpi"cfokuukqp"vq"Pckn"Urgekcnkuv"owuv"dg"cv"ngcuv"3:"{gctu"qnf."jcxg"cJkij"Uejqqn"Fkrnqoc."IGF."qt"Eqnngig"Fkrnqoc0
- Uvwfgpvu"tgswguvkpi"cfokuukqp"vq"vjg"HcekcnlUmkp"Ectg"Urgekcnkuv"Rtqitco"owuv"dg "cv"ngcuv"38"{gctu"qnf."jcxg"c"Jkij"Uejqqn"Fkrnqoc."IGF."qt"Eqnngig"Fkrnqoc0"
 - fg o qpuvtcvg"iqqf" o cpwcn"fgzvgtkv{"*hwm"wug"qh"jcpfu"cpf"hkpigtu+

 $\label{lem:compression} Dghqtg"dgkpi"ceegrvgf"kpvq"c"rtqitco."rtqurgevkxg"uvwfgpvu"ctg"cfxkugf"qh"cm"rtqitco"cpf"cpekmct{"equvu."rgtuqpcm{"kpvgtxkgygf"d{"vjg"Fktgevqt."cpf"owuv"uwdokv"c"ukipgf"gptqmogpv"citggogpv"ykvj"dcug"rtqitco"hggu0"}$

 $Vq"fgvgt\ o\ kpg"uvwfgpv"eq\ o\ rgvgpe\{"kp"Gpinkuj"*qt"cfgswce\{"hqt"vjg"rtqitc\ o+."vjg"Fktgevqt"qt"jgt"fgukipgg"\ o\ c\{"tgswguv"vjcv"vjg"uvwfgpv"tgurqpf"kp"Gpinkuj."dqvj"xgtdcmn\{"cpf"kp"ytkvkpi."vq"rtqitc\ o/tgncvgf"\ swguvkqpu0"Uvwfgpvu"vjcv"crrgct"vq"jcxg"rtqdng\ o\ u"tgcfkpi."urgcmkpi."qt"ytkvkpi"Gpinkuj"yknn"dg"cumgf"vq"\ vcmg"vjg"Vguv"qh"Gpinkuj"cu"c"Hqtgkip"Ncpiwcig"*VQGHN+."Kpvgtpgv"xgtukqp"*mpqyp"cu"vjg"VQGHN"KDV"\ Vguv+0"Vjg"uvwfgpv"\ o\ wuv"rcuu"vjg"vguv"ykvj"c"\ o\ kpk\ o\ w\ o\ "vqvcn"ueqtg"qh"5320"$

- $\bullet \qquad \text{Uvwfgpvu" o wuv"uwdokv"c"eq o rngvgf"cpf"ukipgf"Gptqm o gpv"Citgg o gpv"cpf"rc{"cm"dcug"hggurtkqt"vq"dgkpi"ceegrvgf"kpvq"c"vtckpkpi"rtqitco0}$
- Wrqp"gptqnn o gpv."c"pg y "uvwfgpv" y knn"tgegkxg"c"eqr { "qh"vjg"Gptqnn o gpv"Citgg o gpv."cnqpi y kvj"c"Uvwfgpv" J cpfdqqm"cpf"Eqwtug"Ecvcnqi0

 $\label{lem:continuous} Vjg"uejqqn"tgugtxgu"vjg"tkijv"vq"fgp{"cfokuukqp"vq"c"rtqurgevkxg"uvwfgpv"kh"qpg"qt"oqtg"qh"vjg"Cfokuukqpu"Tgswktgogpvu"cdqxg"ctg"pqv"ogv0"$

 $\label{lem:convex} \begin{tabular}{ll} Kh"cp"crrnkecpv"ku"fgpkgf"cfokuukqp"vq"vjg"uejqqn."vjg"uejqqn"yknn"hwnn{"kphqto"vjg"crrnkecpv"qh"vjg"pcvwtg"qh"vjg"fgpkcn0"Crrnkecpvu"yjq"ctg"fgpkgf"cfokuukqp"vq"vjg"uejqqn"oc{"crrgcn"vjcv"fgekukqp"kp"ytkvkpi"vq"vjg"Fktgevqt0"Vjg"Fktgevqt"yknn"ocmg"vjg"hkpcn"lwfiogpv"cu"vq"vjg"fgpkcn"dcugf"qp"vjg"uejqqn)u"rwdnkujgf"rqnkekgu0"\\ \begin{tabular}{ll} Kh"cp"chekgudpp"chekgudp"chekgudp"chekgudpp"chekgudpp"chekgudpp"chekgudpp"chekgudpp"chekgudpp"chekg$

Vjg"uejqqn" y kmm" o ckpvckp"c"tgeqtf"qh"cp{"crrnkecpv"hqt"cv"ngcuv"34" o qpvju0

 $\label{thm:continuous} Gwtqrgcp"Dgcww{"Cecfgo{"eqpukfgtu"eqwtugu"hqt"vtcpuhgt"htqo"uejqqnu"ykvjkp"Hnqtkfc"cpf"vjg"W0U0"vjcv"jcxg"dggp"ceetgfkvgf"d{"vjgkt"tgikqpcn"qt"uvcvg"cuuqekcvkqpu0"Vtcpuhgt"etgfkvu"oc{"cnuq"dg"eqpukfgtgf"htqo"uejqqnu"qwvukfg"vjg"Wpkvgf"Uvcvgu"vjcv"jcxg"dggp"ejctvgtgf"qt"cwvjqtk|gf"d{"vjgkt"iqxgtpogpvu0"Gwtqrgcp"Dgcww{"Cecfgo{"ecppqv"ceegrv"oqtg"vjcp"97'qh"rtgxkqwu"etgfkvu"gctpgf"cv"cpqvjgt"kpuvkvwvg"vqyctfu"c"rtqitco="vjg"vtcpuhgt"uvwfgpv"owuv"cvvckp"cv"ngcuv"47'qh"etgfkvu"htqo"Gwtqrgcp"Dgcwv{"Cecfgo{0}"$

 $Igpgtcm{."Gwtqrgcp"Dgcwv{"Cecfgo{"ceegrvu"vtcpuhgt"etgfkvu"htqo"kpuvkvwvkqpu"nkegpugf"d{"vjg"Hnqtkfc"}} Fgrctvogpv"qh"Gfwecvkqp."Eqookuukqp"hqt"Kpfgrgpfgpv"Gfwecvkqp0"Vq"dg"gnkikdng"hqt"vtcpuhgt"etgfkv." eqwtugu"owuv"jcxg"dggp"eqorngvgf"ykvj"c"itcfg"qh"E"qt"dgvvgt0"Qeewrcvkqpcn"eqwtug"etgfkvu"gctpgf"oqtg"vjcp"hkxg"{gctu"rtkqt"vq"vjg"vkog"qh"tgswguv"ykm"pqv"dg"ceegrvgf"hqt"vtcpuhgt="egtvckp" qeewrcvkqpcnlvgejpkecn"rtqitcou"oc{"jcxg"oqtg"uvtkpigpv"tgswktgogpvu0"}$

 $Vq"vtcpuhgt"htqo"cpqvjgt"kpuvkvwvkqp."uvwfgpvu"owuv"uwdokv"qhhkekcn"vtcpuetkrvu"vq"Gwtqrgcp"Dgcwv{"Cecfgo{"hqt"tgxkgy"cpf"gxcnwcvkqp"d{"vjg"Fktgevqt"cpflqt"crrtqrtkcvg"hcewnv{"cfxkuqt0"Gwtqrgcp"Dgcwv{"Cecfgo{"fgekfgu"yjcv"etgfkvu"vtcpuhgt"cpf"yjgvjgt"vjqug"encuugu"oggv"Gwtqrgcp"Dgcwv{"Cecfgo{"rtqitco"tgswktgogpvu0"Cfxkuqtu"gxcnwcvkpi"vjg"eqwtugu"vq"dg"vtcpuhgttgf"nqqm"cv"eqwtug"eqpvgpv"cpf"fguetkrvkqp"vq"ugg"kh"vjg"encuu"oggvu"urgekhkgf"tgswktgogpvu0"$

 $\label{thm:condition} V tcpuhgttkpi''dgvyggp''Gwtqrgcp''Dgcwv\{"Cecfgo\{"rtqitcou''ku"cmqygf''qpn\{''kp"urgekcn"ecugu''yjgtg''vjg''rtqitco''eqpvgpv''cpf''enqem''jqwt''tgswktgogpvu''ctg''uwhhkekgpvn\{''ukoknct0'''Kpvgtpcn''rtqitco''vtcpuhgtu''ctg''uwdlgev''vq''vjg''fkuetgvkqp''cpf''crrtqxcn''qh''vjg''Fktgevqt0''}$

Vtcpuhgttkpi "Etgfkv"vq"Qvjgt"Kpuvkvwvkqpu

 $\label{thm:continuous} Vjg"vtcpuhgt"qh"etgfkvu"htqo"Gwtqrgcp"Dgcwv{"Cecfgo{"vq"qvjgt"uejqqnu"ku"cv"vjg"uqng"fkuetgvkqp"qh"vjg"tgegkxkpi"kpuvkvwvkqp0"Uvwfgpvu"ujqwnf"eqphkto"kp"cfxcpeg"yjgvjgt"etgfkvu"yknn"dg"ceegrvgf"d{"cpqvjgt"kpuvkvwvkqp"kp"vjg"gxgpv"vjg{"rncp"vq"eqpvkpwg"vjgkt"gfwecvkqp"chvgt"ngcxkpi"Gwtqrgcp"Dgcwv{"Cecfgo{0"}}$

 $C"uvwfgpv" o c \{"dg"uwurgpfgf"hqt"wr"vq"52"fc \{u"hqt < u"hqt < u"hqt$

- Pqp/rc{ o gpv"qh"hggu"
- $\bullet \quad \text{Hcknwtg"vq"eqorn} \{ \text{"ykvj"Uejqqn"Twngu"cpf"Rqnkekgu"cu"uvcvgf"kp"vjg"Ecvcnqi0"} \\$

 $\label{lem:wpnguu} Wpnguu"urgekcn"cttcpigogpvu"jcxg"dggp"ocfg"ykvj"vjg"Fktgevqt."uvwfgpv"cdugpegu"ctg"uwdlgev"vq"vjg"hqnnqykpi"eqpfkvkqpu<"$

• Uvwfgpvu"gptqnng f"kp"cp{"rtqitcou"wpfgt"822"Enqem" J qwtu"ctg"cnnqygf"Vyq"*4+" gzewugf"cdugpegu0"

- Uvwfgpvu" o wuv"cttcpig" y kvj "vjgkt"kpuvtwevqt"vq" o cmg"wr"cp{" o kuugf" y qtm"tguwnvkpi "htqo" cdugpegu."dgecwug"322 ' "qh"c"rtqitcoøu"enqem" j qwtu" o wuv"dg"eqo rngvgf"vq"dg"cdng"vq" itcfwcvg0"
- Kh"vjg"uejqqn"ku"enqugf"fwg"vq"cp"gxgpv"dg{qpf"vjg"qypgtuø"eqpvtqn."uwej"cu"c"jwttkecpg." vqtpcfq"qt"rqygt"qwvcig."qrrqtvwpkvkgu"hqt"ocmkpi"wr"hqt"nquv"vkog"ykmn"dg"rtqxkfgf0"

 $\label{thm:continuity:continuit$

- $\label{eq:continuous} \textbf{Gzeguukxg"vctfkpguu"*vyq"eqpugewvkxg"vctfkpguu"qt"c"vqvcn"qh": "vctfkpguu+" oc{"tguwnv"kp" vjg"uvwfgpv"dgkpi"rncegf"qp"Rtqdcvkqp0"}$
- Kh"c"uvwfgpv"tgegkxgu"vjtgg"*5+"vctf{"tgrqtvu"kp"qpg" y ggm."vjg"Fktgevqt" y knn"tgswktg"cp" gzrncpcvkqp"htqo"vjg"uvwfgpv."cpf"jglujg" y knn"dg" y ctpgf"vjcv"hwtvjgt"gzeguukxg"vctfkpguu" o c{"tguwnv"kp"fku o kuucn0"
- Vjg"Fktgevqt"jcu"uqng"fkuetgvkqp"tgictfkpi"uvwfgpv"rtqdcvkqp"qt"fkuokuucn0"
- Uvwfgpvu" y jq"ctg" fku o kuug f"hqt"Gzeguukxg"Vctfkpguu"qt"Gzeguukxg"Cdugpvggku o "*cu" fghkpg f" kp"vjku"Ecvcnqi+" y knn"pqv"tgegkxg"c"tghwp f"qh"vwkvkqp" o qpkgu"rckf0"

"""Uvwfgpvu" y jq"ctg"gzeguukxgn{"vctf{"qt" y jq" jcxg"gzeggfgf"vjg" o czk o w o "cdugpegu"hqt"vjgkt" rtqitco<"

- Yknn"dg"tgswktgf"vq" oggv" ykvj"vjg"Fktgevqt"vq"fkuewuu"eqttgevkxg"cevkqp0"
- $Oc\{"tguwnv"kp"vjg"uvwfgpv"dgkpi"rncegf"qp"Rtqdcvkqp"hqt"qpg"yggm"*9"fc\{u+0"$
- Oc{"dg"ejctigf"cp"cffkvkqpcn"&32"rgt"enqem"jqwt"hqt"vjg"cffkvkqpcn"hcewnv{"vkog"tgswktgf"vq"cmqy"vjg"uvwfgpv"vq"ocmg"wr"vjg"okuugf"jqwtu"qh"vtckpkpi"cpf"eqorngvg"vjg"enqem"jqwtu"tgswktgf"hqt"itcfwcvkqp0"

- $\bullet \quad \text{Kh" c"uvwfgpv"ku" rnceg f"qp" rtqdcvkqp" fwg"vq" gzeguukxg" vct fkpguu" qt" cdugpvggku o ."cp f"chvgt"vjg" rtqdcvkqp"rgtkqf"jcu"rcuug f"uvwfgpv"jcu" o gv"cm"vjg"uejqqnøu"tgswktg o gpvu"*cu"fgvgt o kpg f"d{"vjg" Fktgevqt+."vjg"uvwfgpv" y km"dg"cmq y g f"vq"eqpvkpwg"vtckpkpi0" }$
- Kh"chvgt"vjg"rtqdcvkqp"rgtkqf"jcu"rcuugf."vjg"uvwfgpv"jcu"pqv"hwnhkmgf"cm"vjg"uejqqn)u" tgswktgogpvu."vjg"uvwfgpv"ykm"dg"fkuokuugf0"

 $C"uvwfgpv"oc{"tgswguv"c"Ngcxg"qh"Cdugpeg"kp"ytkvkpi"vq"vjg"Fktgevqt0"Vjg"NQC"ykm"dg"hqt"c"urgekhkgf"vkog"rgtkqf"pqv"vq"gzeggf"3:2"Fc{u"*8"oqpvju+0"Uvwfgpvu"qp"c"Ngcxg"qh"Cdugpeg"oc{"tgvwtp"vq"c"rtqitco"cv"cp{"vkog"ykvjkp"c"ukz"*8+"oqpvj"rgtkqf"ykvjqwv"kpewttkpi"c"hkpcpekcn"ejctig"hqt"tg/gpvt{0"}}$

"

 $Uvwfgpvu"ctg"tgswktgf"vq"ygct"ogfkecn"uetwdu."yjkej"oc\{"dg"kp"cp\{"eqnqt0"Pq"nqiq"qt"ytkvkpi."qvjgt"uetwdu."yjkej"oc\{"dg"kp"cp\{"eqnqt0"Pq"nqiq"qt"ytkvkpi."qvjgt"uetwdu."yjkej"oc\{"dg"kp"cp\{"eqnqt0"Pq"nqiq"qt"ytkvkpi."qvjgt"uetwdu."yjkej"uetwdu."$

HcekcnlUmkp"Ectg" 482"Enqem" J qwtu" Pckn"Urgekcnkuv"""""462"Enqem" J qwtu" Vq"dg"gnkikdng"hqt"itcfwcvkqp."c"uvwfgpv" o wuv"jcxg<" 30 Eqorngvgf"cm"vjg"enqem"jqwtu"tgswktgf"d{"vjg"Rtqitco0" 40 Ockpvckpgf"Ucvkuhcevqt{"Cecfgoke"Rtqitguu0" 50 Rckf"cnn"hggu0" Gcej"rtqitco"ku"kfgpvkhkgf"d{"cp"\$Cnrjc"Rtghkz\$"cpf"\$Eqwtugu\$"ykvjkp"vjcv"\$Rtqitco\$"ctg" $kfgpvkhkgf"d{"vjg"ucog"rtghkz0"$ HcekcnlUmkp"Ectg" Pckn"Urgekcnkuv"""""PU" Vjg"Uejqqn"fqgu"pqv"rctvkekrcvg"kp"vjg"Hnqtkfc"Eqooqp"Eqwtug"Pwodgtkpi"U{uvgoVjg"Cnrjc" Rtqitcoul Eqwtugu"yg"qhhgt"ctg"vtcpuhgtcdng"ykvjkp"vjg"Hnqtkfc"Eqooqp"Eqwtug"Pwodgtkpi" $U\{uvgo\emptyset$ " $Vjg"Uejqqn"fqgu"jcxg"cp"qrgp"gptqnn o gpv"rqnke \{"ykvj"urgekhke"uvctv"fcvgu"hqt"gcej"rtqitc o \emptyset "allowed by the properties of the proper$ Hcekcnl"Umkp"Ectg"" Gptqnn o gpv"Dgikpu"vjg"3uv"qh"Gcej "Oqpvj0" Pckn"Urgekcnkuv"" Gptqnn o gpv"Dgikpu"vjg"3"v"qh"Gcej "Oqpvj0"" vjg"rtgugpeg"qh"cp"kpuvtwevqt0" $\label{eq:continuous} Vjg"cxgtcig"encuu"uk|g"ku"ukz"*8+"uvwfgpvu"vq"qpg"*3+"kpuvtwevqt."ykvj"qpg"uvwfgpv"cuukipgf"vq"c"kpuvtwevqt."ykvj"qpg"uvwfgpv"cuukipgf"vq"c"kpuvtwevqt.$ y qtmuvcvkqp0"

- Vjg"Rtqitco"Qdlgevkxg"ku"vq"rtgrctg"c"uvwfgpv"hqt"vjg"yqtmhqteg."qp"cp"gpvt{"ngxgn."vq"yqtm"cu"c" Nkegpugf"HcekcnlUmkp"Ectg0"
- Kpuvtwevkqp"ku" fguk i pg f"vq" swcnkh { "uvwfgpvu"hqt"g o rnq { o gpv"wrqp"uweeguuhwnn { "qdvckpkp i "c"Hcekcnu" Urgekcnv { "Egtvkhkecvkqp"htq o "v j g"Hnqtkfc"Dqctf"qh"Equ o gvqnq i { 0"

 $\label{thm:comparison} Vjg"rtqitco"ku"fgukipgf"vq"oggv"vjg"gfwecvkqpcn"tgswktgogpvu"ugv"hqtvj"d{"vjg"Hnqtkfc"Fgrctvogpv"qh"Dwukpguu"cpf"Rtqhguukqpcn"Tgiwncvkqp."Fkxkukqp"qh"Rtqhguukqpu."Dqctf"qh"Equogvqnqi{0"}$

 $\label{thm:complex} Vjg"Rtqitco"hqewugu"qp"dtqcf."vtcpuhgtcdng"umknmu."cpf"uvtguugu"wpfgtuvcpfkpi"cpf"vjg"cdknkv{"vq"fgoqpuvtcvg"vjg"gngogpvu"qh"vjg"Equogvqnqi{"Kpfwuvt{"qh"rncppkpi."ocpcigogpv."hkpcpeg."vjg"vgejpkecn"cpf"rtqfwevkqp"umknmu"wpfgtn{kpi"uwej"vgejpqnqikecn"rtkpekrngu"cu<"ncdqt."eqoowpkv{."jgcnvj."uchgv{."cpf"gpxktqpogpvcn"kuuwgu0"}$

 $\label{thm:composition} Vjg"rtqitco"kpenwfgu"87"enqem"jqwtu"qh"encuutqqo"*Vjgqt{1Fkfcevke+."cpf"3;7"enqem"jqwtu"qh"kpuvtwevkqp"kp"c"enkpkecn"ugvvkpi"*Ncd"Crrnkecvkqpu+"yjkej"kpenwfgu"62"enqem"jqwtu"qh"Hcekcn"Ugtxkegu0" $Hcekcn"Ugtxkegu$"ku"fghkpgf"cu<"ugtxkegu"rgthqtogf"qp"c"enkgpv"vjcv"kpxqnxgu"ocpkrwncvkqp"*ocuucig+"qh"vjg"hceg"d{."jcpfu/qp"vgejpkswgu."qt"gngevtkecn"vgejpkswgu0"Vjg"$ugtxkegu$"rgthqtogf"d{"vjg"uvwfgpv"kpenwfg"vgejpkswgu"kpxqnxkpi"umkp"ectg."cpf"jckt"tgoqxcn0"}$

 $\label{thm:composition} Vjg"dcuke" rtqitco" hqnnqyu"vjg"ewttkewnwo" eqpegrvu"nkuvgf"kp"vjg"Hnqtkfc" Fgrctvogpv"qh"Gfwecvkqp." Ewttkewnwo" Htcogyqtmu"cpf"Rtqitco" Uvcpfctfu0" Vjg"Rtqitco" kpenwfgu"eqoowpkecvkqp. "ngcfgtujkr." jwocp"tgncvkqpu. "cpf"gornq{cdknkv{"umknnu="uchg"cpf"ghhkekgpv"yqtm"rtcevkegu="Hnqtkfc"Equogvqnqi{"Ncy"cpf"Twngu="ceswkukvkqp"qh"mpqyngfig"qh"vjg"HcekcnlUmkp"Ectg"Urgekcnkuv"cpf"tgncvgf"ejgokuvt{="dcevgtkqnqi{="cpcvqo{"cpf"rj{ukqnqi{="ctv"qh"ocmg/wr="cpf"fgxgnqrogpv"qh"umknnu"kp"rgthqtokpi"vjg"ocpkrwncvkxg"cpf"gngevtkecn"vgejpkswgu"tgswktgf"kp"vjg"rtcevkeg"qh"c"HcekcnlUmkp"Ectg"Urgekcnkuv" Qeewrcvkqp0"$

 $\label{thm:condition} Vjg"\\ \ Ugtxkegu\\ \ vjcv"ctg"tgswktgf"\\ \ d''Twng"ctg"\\ \ \ Heekenu\\ \ vjcv"kpenwfg"\\ \ Umkp"Eetg"\\ \ cpf"\\ \ J\ ckt"\\ \ Tg\ o\ qxcn\\ \ 0"$

 $\label{thm:condition} \begin{tabular}{ll} Kp"ceeqtfcpeg" y kvj "Hnqtk fc" Uvcvwvgu" 69902423."vjg" itc fwcvkpi "uvwfgpv"*y kvj "vjg" jgnr"cpf" fktgevkqp"qh"vjg" Kpuvkvwvg+. "y knn"eqpvcev"vjg" Hnqtk fc" Dqct f"qh" Equ o gvqnqi { ."eq o rngvg"vjg" pgeguuct { "hqt o u." rtgugpv"vjg" Fkrnq o c"cu" rtqqh"qh"eq o rngvkpi "vjg" 482/enqem" jqwt" Hcekcn" Urgekcnv { "Rtqitco." rc { "vjg" Hnqtk fc" Dqct f"qh" Equ o gvqnqi { }u"Kpkvkcn" Tgikuvtcvkqp" Hgg." cpf" yknn" dg" Tgikuvgtgf" d { "vjg" Dqct f"qh" Equ o gvqnqi { "vq" rtcevkeg" cu"c" Nkegpugf" Hcekcnl Umkp" Ectg" Urgekcnkuv0" }$

 $\label{thm:composition} Vjg"Rtqitco"Dtgcmfqyp"d{"Eqwtugu"nkuvgf"dgnqy"ctg"fgukipgf"vq"oggv"vjg"Uvcpfctfu"ugv"hqtvj"kp"Twngu"83I7/440226*4+."83I7/440227*4+."cpf"83I7/440228*4+"H0C0E0."cpf"vjg"eqorngvkqp"qh"hqtv{"*62+"Hcekcn"Ugtxkegu0"Vjg"Rtqitco"hqnnqyu"vjg"Uvcpfctfu"ugv"hqtvj"kp"vjg"Ewttkewnwo"Htcogyqtmu"cpf"Rtqitco"Uvcpfctfu"hqt"HcekcnlUmkp"Ectg"Rtqitcou0"$

HCE"323"	Kpvtqfwevkqp"vq"HcekcnlUmkp"Ectg"	37"
HCE"324"	Uchg."Ucpkvct{" ("Ghhkekgpv" Y qtm"Rtcevkegu"ó" J KX1CKFU	37"
HCE"325"	Uekgpeg"qh" I tqq o kp i " ("Ucnqp"Ugtxkegu"	37"
HCE"326"	Hnqtkfc"Ncy" ("Uvcvg"Dqctf"Twngu" ("Uvcvwvgu"	32"
HCE"327"	Kpvtqfwevkqp"vq"Rgthqtokpi"Hcekcnu"	72"
HCE"328"	Hcekcn"Ocpkrwncvkqp" ("Tgncvgf"Ocuucig"	77"
HCE"329"	Vjg"Ctv"qh"Ocmg/Wr"	37"
HCE"32:"	Hcekcn" J ckt"Tg o qxcn"	37"
HCE"32;"	Vjg"Crrnkecvkqp"qh"Ctvkhkekcn"Ncujgu"	32"
HCE"332"	Rtqhguukqpcn"Fgxgnqrogpv" ("Gornq{cdknkv{"Umknnu"	32"
HCE"333"	Gpvtgrtgpgwtujkr" ("Ocpcigogpv"Umknnu"	32"
HCE"334"	Tgswktgf"UgtxkegulNcd"	62"

Vjgqt{"Jqwtu<"87"Jqwtu""
UgtxkeglNcdu"Jqwtu<"3;7"Jqwtu""

 $\label{thm:conv} Gwtqrgcp"Dgcwv{"Cecfgoo{"qhhgtu"c"HcekcnlUmkp"Ectg"Rtqitco"vjcv"rtgrctgu"vjg"uwwfgpv"vq"oggv"vjg"gfwecvkqpcn"tgswktgogpvu"qh"vjg"Hnqtkfc"Fgrctvogpv"qh"Dwukpguu"cpf"Rtqhguukqpcn"Tgiwncvkqp."Fkxkukqp"qh"Rtqhguukqpu."Dqctf"qh"Equogvqnqi{"Twngu."Ejcrvgt"83I7/440226*4+."83I7/440227*4+."83I7/440228*4+."HCE0"Vjg"Rtqitco"hqnnqyu"vjg"ewttkewnwo"eqpegrvu"nkuvgf"kp"vjg"Hnqtkfc"Fgrctvogpv"qh"Gfwecvkqp."Ewttkewnwo"Htcogyqtmu"cpf"Rtqitco"Uvcpfctfu0"$

 $\label{lem:condition} Vjg"Encuutqqo."Ncd"Vtckpkpi."cpf"Ugtxkegu"ctg"wpfgt"vjg"uwrgtxkukqp"qh"c"Equogvqnqikuv."nkegpugf"kp"vjg"Uvcvg"qh"Hnqtkfc0"$

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 $\label{thm:convergence} Vjg"Rtqitco"Qdlgevkxg"ku"vq"rtgrctg"c"uvwfgpv"hqt"vjg"yqtmhqteg."qp"gpvt{"ngxgn."vq"yqtm"cu"c"Nkegpugf"Pckn"Urgekcnkuv0"Kpuvtwevkqp"ku"fgukipgf"vq"swcnkh{"uvwfgpvu"hqt"gornq{ogpv"wrqp"uweeguuhwnn{"qdvckpkpi"c"Pckn"Vgejpkekcp"Egtvkhkecvkqp"htqo"vjg"Hnqtkfc"Dqctf"qh"Equogvqnqi{0"}}$

"

 $Vq"vgcej"c"hwnn"rtqitco"qh"pckn"dgcwvkhkecvkqp"cpf"ctvkuvt\{."rtgrctkpi"vjg"uvwfgpv"yjq"fguktgu"vq"dg"eqpukfgtgf"c"rtqhguukqpcn"kp"vjg"hkgnf"cu"c"Pckn"Urgekcnkuvvl"Rtqhguukqpcnkuo"ku"cejkgxgf"vjtqwij"rtkfg."eqorgvgpe{."cpf"ghhkekgpe{0"Vjg"uejqqn"kpuvtwevu"vjg"uvwfgpv"kp"cnn"rjcugu"qh<"pckn"ctv."cttcpigu"cktdtwujkpi"fgoqpuvtcvkqpu."ctvkhkekcn"pcknu"*pckn"vkru."uewnrvwtgf"pcknu."pckn"ytcrrkpi"cpf"fgoqpuvtcvgu"ign"pcknu+."ucpkvcvkqp."ocpkewtkpi."rgfkewtkpi="rnwu."rgtuqpcn"gvjkeu."ucnqp"ocpcigogpv"cpf"gornq{gglenkgpv"tgncvkqpu0"}$

PU/322"	HNQTKFC"NCYU"	7"
PU/323"	J KX1CKFU"	6"
PU/324"	DCEVGTKQNQI[."UVGTKNK\CVKQP"CPF"UCPKVCVKQP"	6"
PU/325"	RTQHGUUKQPCN"TGNCVKQPUJKRU"	4"
PU/326"	VJG"PCKN"	:7"
PU/327"	OCPKEWTKP I "	42"
PU/328"	RGFKEWTKP I "	32"
PU/329"	CFXCPEGF"PCKN"VGEJPKSWGU"VJGQT[!RTCEVKECN"	332"

 $Vjgqt\{"Jqwtu<"322"Jqwtu""\\ Ugtxkegl"Ncd"Jqwtu<""362"Jqwtu""$

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п

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*Vjgqt{" ô "37" J qwtu+"

 $Qxgtxkgy"qh"yjcv"vjg"uvwfgpv"ecp"gzrgev"d{"vcmkpi"vjg"rtqitco0"Vjg"rtqitco"u{nncdwu"ku"qwvnkpgf."cpf" xctkqwu"curgevu"qh"vjg"HcekcnlUmkp"Ectg"Urgekcnkuv)u"tqng"ykm"dg"fkuewuugf0"Vjg"eqwtug"kpenwfgu"vjg"dcuke" rtkpekrngu"cpf"rtqegfwtgu"kpxqnxgf"kp"Umkp"Ectg."vjg"gxqnwvkqp"qh"vjg"ogvjqf"qh"Umkp"Ectg."cpf"vjg" kfgpvkhkecvkqp"qh"ectggt"qrrqtvwpkvkgu"kp"vjg"ugtxkeg"hkgnf0"$

 $V_{jgqt} = 0$ "7" J qwtu. "Ncd" 0 "32" J qwtu+"

 $C"tgxkgy"qh"Wpkxgtucn"Rtgecwvkqpu."JKXlCKFU0"Ogvjqfu"qh"fgeqpvcokpcvkqp"rtqegfwtgu"vq"gpuwtg"uchgv{"hqt"vjg"enkgpv."cpf"uchgv{"kp"vjg"encuutqqo"cpf"vjg"ncd0"Wukpi"vjg"ocpwhcevwtgt)u"kpuvtwevkqpu."vjg"uvwfgpv"ku"vcwijv"vjg"eqttgev"ogvjqfu"qh"qrgtcvkpi"cpf"okzkpi"ejgokecnu"vq"GRC"cpf"jqurkvcn"uvtgpivj"ngxgnu0"Vjg"uvwfgpv"ku"cnuq"vcwijv"vjg"eqttgev"ogvjqfu"qh"engcpkpi"cpf"ockpvckpkpi"korngogpvu"d{"wukpi"crrtqrtkcvgn{"okzgf"ejgokecnu."cpf"fgeqpvcokpcvkqp"qh"vqqnu."rgt"Twng0"Vjg"uvwfgpv"ykm"rtcevkeg"vjg"ctv"qh"qdugtxkpi."kfgpvkh{kpi."cpf"cpcn{|kpi"vjg"hwpevkqpu."uvtwevwtgu"qh"egtvckp"fkugcugu"cpf"fkuqtfgtu"qh"vjg"jckt."umkp."cpf"pcknu0"}$

*Vjgqt{" ô "7" J qwtu."Ncd" ô "32" J qwtu+"

 $\label{linear_vjg} Vjku"eqwtug"ku"cp"kpvtqfwevkqp"vq"dcuke"Cpcvqo {"cpf"Rj {ukqnqi {."cpf"vjg"Ejgokuvt{"cpf"Rj {ukeu."cu"vjg{"crn{"vq"vjg"gngevtkekv{"cpf"nki jv"vjgtcr{"rgthqtogf"qp"c"enkgpv."qt"wugf"kp"vjg"fgeqpvcokpcvkqp"qh"kpuvtwogpvu."cu"c"ogcpu"qh"kphgevkqp"eqpvtqn0"} \\$

*Vjgqt{" ô "32" J qwtu+"

C"tgxkgy"qh"Hnqtkfc"Ncy."Ejcrvgt"699."cpf"Ejcrvgt"664."\$Hnqtkfc"Tkijv/Vq/Mpqy"Ncy\$0"

*Vjgqt{" ô "32" J qwtu."Ncd" ô "62" J qwtu+"

""""Kpvtqfwevkqp"vq"vjg"Hcekcn0"Vjg"uvwfgpv" yknn"ngctp" o gvjqfu"qh"kfgpvkh{kpi"vjg"v{rgu"qh"dqpg"uvtwevwtg."cpf" hceg"ujcrg."uq"vjcv"vjg"tgswguv"qh"vjg"enkgpv"ecp"dg" o gv0"Vjg"eqwtug"kpenwfgu"vjg"dcuke"eqpegrvu"qh" ftcrkpi."ejqqukpi"vjg"rtqrgt"uwrrnkgu."rtqfwevu."cpf"gswkrogpv0"Vjg"uvwfgpv"yknn"dg"kpvtqfwegf"vq"vjg" xctkqwu" o gvjqfu"wugf"kp"umkp"cpcn{uku0"Vjg"uvwfgpv"ykm"cnuq"tgegkxg"kpuvtwevkqp"kp"vjg"eqttgev" o gvjqfu"vq"dg" wugf"kp"vjg"eqpuwnvcvkqp"ykvj"vjg"enkgpv0"Ncd"yqtm"yknn"knnwuvtcvg"vjg"dcuke"cevkqpu"cpf"tgcevkqpu"qh" egtvckp"rtqfwevu"wugf"hqt"engcpkpi"vjg"hceg"cpf"pgem0"

*Ncd" ô "77" J qwtu+"

 $\label{eq:continuity} Vjg"eqwtug"fgcnu"ykvj"vjg"ogvjqfu"wugf"kp"hcekcn"ocpkrwncvkqp."cpf"egtvckp"ogvjqfu"qh"ocuucig"wugf"hqt"vjg"hceg"cpf"pgem0"$

*Ncd" ô "37" J qwtu+"

 $Ogvjqfu"qh"rgthqtokpi"eqnqt"cpcn\{uku"cpf"hcekcn"dcncpeg"tgncvgf"vq"Ocmg/Wr"yknn"dg"fkuewuugf0"Ogvjqfu"qh"crrn\{kpi"dcuke"cpf"eqttgevkxg."gxgpkpi"cpflqt"incoqwt"Ocmg/Wr."dcugf"qp"vjg"enkgpv)u"pggfu"cpf"fguktgu"yknn"dg"rtcevkegf"d{"vjg"uvwfgpv0"Vjg"uvwfgpv"yknn"uvwf{"cpf"rtcevkeg"vjg"crrtqrtkcvg"ocmg/wr"crrnkecvkqp"rtqegfwtgu."wukpi"c"mpqyngfig"qh"eqnqt"vjgqt{."cpf"c"mpqyngfig"qh"umkp"v{rgu0"}}$

*Ncd" ô "37" J qwtu+"

 $\label{thm:continuous} Vjku"eqwtug"ku"c"tgxkgy"qh"qpn{"vjg"jckt"tgoqxcn"vgejpkswgu"vjcv"ecp"dg"wugf"d{"c"Hcekcn1Umkp"Ectg"} Urgekcnkuv0"Vjg"uvwfgpv"ykm"rtcevkeg"egtvckp"ogvjqfu"qh"ujcrkpi"g{gdtqyu"d{"vygg|kpi"cpf"yczkpi0"Vjg"tgncvkqpujkr"qh"$ujcrkpi$"cpf"$cpingu$"vq"vjg"enkgpv)u"dqpg"uvtwevwtg"yknn"dg"fkuewuugf"cpf"rtcevkegf"d{"vjg"uvwfgpv0"Vjg"uvwfgpv"yknn"tgxkgy"vjg"eqpegrvu"qh"hcekcn"dqpg"uvtwevwtg."hceg"ujcrgu"cpf"hcujkqp"vtgpfu"vq"dg"wugf"kp"hcekcn"jckt"tgoqxcn0"Vjg"uvwfgpv"yknn"rtcevkeg"ogvjqfu"qh"g{gdtqy"vkpvkpi"cpf"yknn"dg"ocfg"cyctg"qh"egtvckp"cfxgtug"tgcevkqpu"vjcv"ecp"qeewt0"}$

*Ncd" ô "32" J qwtu+"

 $Vjku"eqwtug"kpeqtrqtcvgu"vjg"rtqrgt"rtqegfwtgu"hqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn\{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g\{gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g[gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g[gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g[gncujgu0"nqt"crrn{kpi"ctvkhkekcn"g[gncujgu0"nqt"crrn{kpi"ctvkhkekcn"nqt"crrn{kpi"ctvkhekcn"nqt"crrn{kpi"crrn{kpi"ctvkhekcn"nqt"crrn{kpi"ctvkhekcn"nqt"crrn{kpi"ctvkhekcn"$

*Vjgqt{" ô "7" J qwtu."Ncd" ô "7" J qwtu+"

 $\label{eq:continuous} Dcuke"eqorwvgt"mpqyngfig"vq"rgtokv"vjg"uvwfgpv"vq"tgeqtf"cpf"tgrqtv"vjg"enkgpv)u"rtqitguu0"Ogvjqfu"qh"ytkvkpi"c"tguwog."nqqmkpi"hqt"c"lqd."iqqf"kpvgtxkgy"umknnu."cpf"hqnnqy/wr"vgejpkswgu0"$

* $Vjgqt\{$ " ô "7" J qwtu."Ncd" ô "7" J qwtu+"

 $Dcuke"dwukpguu"umknnu"pggfgf"vq"uvctv"c"u\ o\ cnn"dwukpguu0"$

*Ncd" ô "62" J qwtu+"

 $\label{thm:constraint} \begin{tabular}{ll} $Uvcvg"Dqctf"Twng"tgswktgu"Hqtv{"*62+"Hcekcn"Ugtxkegu"dg"rgthqtogf"d{"vjg"uvwfgpv0"C"$Hcekcn"Ugtxkeg$"ku"fghkpgf"cu<"Hcekcn"Ocpkrwncvkqp1"Hcekcn"Ocuucig."kpenwfkpi"Umkp"Ectg."cpf"Jckt"Tgoqxcn0" \end{tabular}$

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30 Ejcrvgt"699."ujqtv"vkvng."Dqctf"qh"Equogvqnqi{"fwvkgu"
40 Ejcrvgt"83 I 7. "nkegpukpi"/"twngu"cpf"tgiwncvkqpu"
50 Tgekrtqecn"ncyu"
    Uejqqn"gzcokpcvkqp"hqt"egtvkhkecvkqp"
    Y j cv"ku" J KX1"Ckfu"cpf"v j g"ecwug"qh" J KX1"Ckfu"
40 Vtcpu o kvvkpi "vjg" Ckfu" xktwu"
50 Cfxcpegu"cickpuv"Ckfu"
30"Encuukhkeevkqp"qh"deevgtkc"
    c+rcvjqigpke"
    d+pqp/rcvjqigpke"
40"Dcevgtkcn" i tq y v j "cpf" tgrtq f wevkqp"
50"Dcevgtkcn"kphgevkqpu"
60"Qvjgt"kphgevkqwu"cigpvu"
70^{\circ} Ogvjqfu"qh"ucpkvcvkqp"
80"Uchgv{"rtg/ecwvkqpu"
90"Fghkpkvkqpu"rgtvckpkpi"vq"ucpkvcvkqp"
:0"Ucpkvcvkqp"/"twngu"kp" o cpkewtkpi"
       Gfwecvkqp."itqyvj."ejcpig."rtgxkgy"vq"{qwt"hwvwtg"
40 Gxcnwcvkqp"qh"ucnqp."kpxguvkicvkqp"qh"lqdu"
50 Gxcnwcvkqp"qh" y qtm" r gthqt o cpeg"
60 Pckn"vgejpqnqi{"/"uvchh"tgncvkqpujkru"cpf"gvjkeu"
70 Ucnctkgu."rc{tqnn."eq o okuukqpu."cpf"vczgu"
30 Pckn"uvtwevwtg"
40 Uvtwevwtgu"cflqkpkpi"vjg"pckn"
50 Rctvu"uwttqwpfkpi"vjg"pckn"
60 Pckn"itqyvj"
70 Pckn" o cnhqt o cvkqp."pckn" fkuqt fgtu"cpf" fkugcugu"
80 Xctkqwu"ujcrgu"qh"pcknu"
30 Gswkr o gpv. "k o rng o gpvu. "equ o gvkeu" cpf" o cvgtkcnu"
40 Rtgrctcvkqp"qh"vjg" o cpkewtkpi "vcdng"
   c+"Rtqegfwtg"
    d+vcdng"ugv/wr"
    e+ujcrg"qh"pcknu"
50 Rtqegfwtg"hqt"c"rnckp" o cpkewtg"
60 Cffkvkqpcn"vgejpkswgu"
70 Jcpf."cto."cpf"hqqv"ocuucig"
```

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30 Gswkrogpv."korngogpvu"cpf"ocvgtkcnu"
40 \quad Rtgrctcvkqp"
50 Rtqegfwtg"
30 Ctvkhkekcn"pckn."pckn"ytcrrkpilqt"ogpfkpi"
40 Pckn"vkru."hknn/kpu."uewnrvwtgf"pcknu."qxgtnc{u."ignu"
50 Tgoqxkpi"ctvkhkekcn"pcknu."pckn"ecrrkpi"
60 \quad Rqnkujkpi"cpf"pckn"ctv"cpf"ckt"dtwujkpi"*kh"cxckncdng+"
70
                                 Uewnrvwtkpi"wukpi"c"hqto"
yggm0"
\label{thm:linear} Hkxg"*7+"encuugu"gcej" y ggm"hqt"hqwt"*6+"enqem" j qwtu"rgt"encuu"?"V y gpv \{ "*42+""linear properties of the propert
```

"

 $\label{lem:condition} Vjg"Cecfgoke"Ecngpfct"hqmqyu"vjg"ecngpfct"\{gct"*Lcpwct\{"vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij"Fgegodgt+0""vjtqwij$

```
Pgy" [ gctøu"Fc{0"
Octvkp"Nwvjgt"Mkpi."Lt0"Fc{"
Rtgukfgpv)u"Fc{"
Ogoqtkcn"Fc{"
6vj"qh"Lwn{"
Ncdqt"Fc{"
Vjcpmuikxkpi"Fc{"cpf"vjg"fc{"chvgt"Vjcpmuikxkpi"
Ejtkuvocu"Fc{"
```

Qhhkeg" J qwtu"	Oqpfc{"ó"Htkfc{"	;"co"vq"8"ro"
Fc{"Encuugu"	Oqpfc{"ó"Htkfc{"	;"co"vq"7"ro"
Gxgpkp i "Encuugu"	Oqpfc{"ó"Htkfc{"	7"ro"vq";"ro"

Fkrnqoc"o"Dgcwv{"cpf" Jgcnvj "Kpuvkvwvg" Hcekcn"Urgekcnkuv"Nkegpug"%<"HD;992399" Gzrktgu<"3215314244"

"

 $\label{lem:condition} Cecfgoke"cfxkukpi"ku"cxckncdng"vjtqwijqwv"c"uvwfgpv\emptysetu"gptqnnogpv"cpf"tgswktgf"qh"cp{"uvwfgpv"yjq"jcu"c"itcfg"cxgtcig"qh" E"*92' "qt"nguu+0"}$

 $\label{lem:prop_state} Vjg"uejqqn"rtqxkfgu"lqd"rncegogpv"cuukuvcpeg"vq"uvwfgpvu"kp"vjg"hqto"qh"gornq{ogpv"ngcfu"cpf"tghgttcnu"igpgtcvgf"vjtqwij"qpiqkpi"eqpvcev"ykvj"ctgc"gornq{gtu"cpf"dgcwv{"cpf"jgcnvj"ugtxkeg"rtqxkfgtu0"Jqygxgt."vjg"uejqqn"fqgu"pqv"iwctcpvgg"gornq{ogpv0"}$

- Uvwfgpv"tgeqtfu"ctg" o ckpvckpgf"qp"ukvg"cv"vjg"uejqqn"kp"c"hktgrtqqh"ecdkpgv"cpf"fkikvcnn{" uvqtgf"qhh"ec o rwu"cu"rctv"qh"pkijvn{"dcem/wr"rtqegfwtgu0"
- Tgeqtfu"ctg"cxckncdng"vq"uvwfgpvu"wrqp"ytkvvgp"tgswguv0"
- Uvwfgpv"tgeqtfu" y knn"dg"rtqxkfgf"vq"rqvgpvkcn"g o rnq{gtu"qpn{"chvgt"c" y tkvvgp"tgngcug"jcu" dggp"uwd o kvvgf"d{"vjg"uvwfgpv0"
- Vyq"*4+"vtcpuetkrvu"ctg"rtqxkfgf"htgg"qh"ejctig"cv"itcfwcvkqp0"Cffkvkqpcn"eqrkgu"qh"c" vtcpuetkrv"ctg"cxckncdng"cv"c"equv"qh"&7"gcej0"

 $\label{lem:constraint} Cm"uvwfgpv"tgeqtfu"ctg"jgnf"uvtkevn{"eqphkfgpvkcn0"Vjg"uejqqn"eqornkgu"ykvj"vjg"Hcokn{"Gfwecvkqpcn" Tkijvu"cpf"Rtkxce{"Cev"qh"3;96."Dwemng{"Cogpfogpv."Rwdnke"Ncy";5/5:2."Ugevkqp"65:0"}$

 $\label{thm:continuity:continuit$

 $\label{lem:lem:hatter} Hqt"c"ewttgpv"kpxgpvqt{"qh"nkdtct{"rwdnkecvkqpu"cpf"tguqwtegu"qp"jcpf."qt"vq"uwiiguv"cffkvkqpcn"tguqwtegu."rngcug"eqpvcev"vjg"Qhhkeg"Cfokpkuvtcvqt"qt"Fktgevqt0"}$

Rwdnke"vtcpurqtvcvkqp"ku"cxckncdng"vq"cpf"htqo"vjg"uejqqn"ukvg0"

 $Y\ j\ kng"v\ j\ g"ue\ j\ qqn"\ f\ qgu"\ pqv"\ qhhgt"e\ j\ kn\ f\ ectg."kv"\ f\ qgu"\ o\ ckpvckp"c"nkuvkp\ i\ "qh"e\ j\ kn\ f\ ectg"hceknkvkgu"pgct"v\ j\ g"ue\ j\ qqn0"$

J qwukpi "ku"cxckncdng"pgct"vjg"uejqqn0"Kh"jqwukpi "ku"pggfgf."vjg"uejqqn" y knn"cuukuv"uvwfgpvu"kp"nqecvkpi "eqoowpkv{"cigpekgu"vjcv"ecp"cuukuv"kp"oggvkpi "uvwfgpv"jqwukpi"pggfu0"

- 11
- п
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 $\label{thm:continuous} Uvwfgpvu"gpicikpi"kp"wprtqhguukqpcn"eqpfwev"vjcv"oc{ "fkuetgfkv"vjg"uejqqn"ctg"uwdlgev"vq"vgtokpcvkqp0" Wprtqhguukqpcn"eqpfwev"kpenwfgu<"}$

- $\bullet \qquad Pqp/eq \ o \ rnkcpeg"qt"hcknwtg"vq"cdkfg"d\{"uejqqn"twngu"$
- Wug"qh"ftwiu."cneqjqn."qt"qvjgt"knngicn"uwduvcpegu"
- Gzeguukxg"cdugpegu"qt"vctfkpguu"
- Hcknwtg"vq"rc{"uejqqn"vwkvkqp"qt"hggu"
- Ejgcvkpi"qt"uvgcnkpi"
- $\bullet \qquad Dtkpikpi"c"hktgcto"vq"uejqqn"$
- Ugzwen" J eteuu o gpv"
- Fkuetk o kpcvkqp"qt"kpvk o kfcvkqp"qh"cp{"mkpf"
- Wug"qh"cdwukxg"ncpiwcig"qt"rtqhcpkv{"
- Yknnhwn"fguvtwevkqp"qh"uejqqn"rtqrgtv{"qt"cpqvjgt"uvwfgpv)u"rtqrgtv{"
- U o qmkp i "kpukfg"vjg"uejqqn"
- Rgtuqpcn"wug"qh"uejqqn"vgngrjqpg*u+."wpnguu"cwvjqtk|gf"d{"vjg"Fktgevqt"qt"Qhhkeg" Cfokpkuvtcvqt"

Uvwfgpvu"vgtokpcvgf"hqt"Wprtqhguukqpcn"Eqpfwev"ykm"pqv"tgegkxg"c"vwkvkqp"tghwpf0""

- Uvwfgpvu"ctg"tgurqpukdng"hqt"vjg"ectg"qh"uejqqn"gswkrogpv"cpf"rtqrgtv{0"
- $\bullet \qquad \text{Uvwfgpvu"ctg"tgurqpukdng"hqt"rtqhguukqpcnn{"tgrtgugpvkpi"Gwtqrgcp"Dgcwv{"Cecfgo{0"}} }$

Vjg"uejqqn"ykm"pqv"vqngtevg"jeteuu ogpv"qt"je|kpi"qh"ep{"uqtv0"

• Ugzwcn"jctcuu o gpv"kpenwfgu"wp y gneq o g"ugzwcn"cfxcpegu."qhhgpukxg"eq o o gpvu."i guvwtgu."qt" r j {ukecn"eqpvcev"qh"c"ugzwcn"pcvwtg"d{"uvwfgpvu"qt"uvchh0"

- Jeteuu o gpv"deug f"qp"eig."teeg."eqnqt."tgnkikqp."pcvkqpcn"qtkikp."qt" fkucdknkv {"cnuq" y knn"pqv" dg"vqngtevg f."pqt" y knn"je | kpi "*fghkpg f"eu" jeteuu o gpv"qh"cp { "qvjgt"uqtv."cdwug."qt" jw o knkcvkqp+0"
- J ctcuu o gpv"qt" j c | kp i " o c { "tguwnv"kp" fku o cn0"
- Cp{qpg"dgnkgxkpi"vjg{"jcxg"uwhhgtgf"jctcuuogpv"qt"jc|kpi"ujqwnf"tgrqtv"vjg"qhhgpug"koogfkcvgn{"vq"vjg"uejqqn"Fktgevqt"qt"Qhhkeg"Cfokpkuvtcvqt0"
- $\bullet \qquad \text{Uvwfgpvu"yjq"ctg"vgtokpcvgf"hqt"Jctcuuogpv"qt"Jc|kpi"yknn"pqv"tgegkxg"c"vwkvkqp"tghwpf0"}$

Gwtqrgcp"Dgcwv{"Cecfgo{"wvknk|gu"c"rtqitguukxg."vjtgg/uvgr"crrtqcej"vq"cfftguu"cpf"tguqnxg"eqornckpvu"cpf"itkgxcpegu."hqewukpi"hktuv"qp"gctn{"tguqnwvkqp0"

 $\label{twopolicy} Uvwfgpvu"ykvj"itkgxcpegu"qt"eqornckpvu"ujcnn"hktuv"cvvgorv"vq"tguqnxg"okpqt"kuuwgu"ykvj"vjg" kpuvtwevqt"qt"kpfkxkfwcn*u+"kpxqnxgf0"Kh"vjg"uvwfgpv"ku"pqv"ucvkuhkgf"ykvj"vjg"qwveqog."qt"kh"vjg"uvwfgpv"ku"wpeqohqtvcdng"vcnmkpi"ykvj"vjg"uvchh"ogodgt"qt"rctv{"kpxqnxgf."uljg"ku"gpeqwtcigf"vq"eqpvcev"vjg"Qhhkeg"Cfokpkuvtcvqt0"Vjg"uvwfgpv"ujcnn"kpkvkcvg"cevkqp"vq"cfftguu"vjg"kuuwg"ykvjkp"52"ecngpfct"fc{u"qh"vjg"ocvvgt"ikxkpi"tkug"vq"vjg"eqornckpv0"}$

 $\label{eq:Vjg} Vjg"Qhhkeg"Cfokpkuvtcvqt"ykm"kpxguvkicvg"vjg"eqornckpv."eqwpugn"vjg"uvwfgpv"cpf"rctvkgu"kpxqnxgf."cpf"cvvgorv"vq"tguqnxg"vjg"ocvvgt0"Vjg"Qhhkeg"Cfokpkuvtcvqt"ujcm"rtqxkfg"c"ytkvvgp"tgrqtv"qh"jku"qt"jgt"tgeqoogpfcvkqpu"vq"cm"rctvkgu"kpxqnxgf"ykvjkp"32"yqtmfc{u"qh"tgegkxkpi"vjg"uvwfgpv"eqornckpv0"Gxgt{"ghhqtv"ykm"dg"ocfg"vq"tguqnxg"vjg"kuuwg"ykvjqwv"oqxkpi"dg{qpf"Uvgr"30"}$

 $\label{lem:condition} \begin{tabular}{ll} Kh"c"eqornckpv"ecppqv"dg"tguqnxgf"vjtqwij"gctn{"tguqnwvkqp."kv"ujcm"dg"rtgugpvgf"vq"vjg"Fktgevqt." yjq"ykm"cvvgorv"vq"tguqnxg"vjg"ocvvgt"chvgt"vcnmkpi"ykvj"vjg"Qhhkeg"Cfokpkuvtcvqt"cpf"rctvkgu"kpxqnxgf"kp"vjg"eqornckpv0"Vjg"Fktgevqt"ujcnm"rtqxkfg"c"ytkvvgp"tgrqtv"qh"jgt"tgeqoogpfcvkqpu"vq"cm"rctvkgu"kpxqnxgf"ykvjkp"32"yqtmfc{u"qh"kpkvkcn"pqvkhkecvkqp0"} \end{tabular}$

 $\label{lem:continuous} \begin{tabular}{ll} Kp"tctg"ektew o uvcpegu" y jgtg"vjg" Fktgevqtøu" tgeq o ogpfcvkqp" fqgu"pqv"ucvkuh {"vjg"eq o rnckpcpv." vjg"uvwfgpv" oc{"tgswguv"c"jgctkpi"d{"vjg"Cecfgo{øu"Dqctf"qh"Fktgevqtu"chvgt"uwdokvvkpi"c" y tkvvgp"ngvvgt" y kvj"c"tgswguv"hqt"c"jgctkpi"vq"vjg" Fktgevqt0"Vjku"tgswguv" o wuv"kpenwfg"c"urgekhke" uvcvgogpv"qh"vjg"uvwfgpv"eq o rnckpv. "cp"gzrncpcvkqp"qh"vjg"tgogf{"uqwijv."cpf"c"eqr{"qh"vjg" Fktgevqtøu"tgeqoogpff" ykvjkp" Fktgevqtøu"tgeqoogpff" tguqnwvkqp0"C"urgekcn" oggvkpi"qh"vjg"Dqctf" y knn"dg"eqpxgpgf" ykvjkp" 52" y qtmkpi"fc{u"vq"cfftguu"vjg"i tkgxcpeg0" }\end{tabular}$

 $\label{lem:continuous} \begin{tabular}{l} $\tt Kh"c"fkurwvg"ecppqv"dg"tguqnxgf"wvknk|kpi"vjg"ogcpu"qwvnkpgf"cdqxg."vjg"uvwfgpv"oc{"eqpvcev"vjg"Eqookuukqp"hqt"Kpfgrgpfgpv"Gfwecvkqp"cv"vjg"cfftguu"dgnqy<" \end{tabular}$

Eq o o kuukqp"hqt"Kpfgrgpfgpv"Gfwecvkqp" 547" Y guv" I ckpgu"Uvtggv."Uvg"3636" Vcmcjcuugg."Hnqtkfc"545;;/2622"

*:::+"446/88:6"*Vqm"Htgg+"

*:72+"467/5422"