



bgbyqb Sampling

*cwi msL`vbMZ c×wZ c0qvM Kti Avgiv GKwU mgM0Ki wewfbaeAwfÁZij ä m½wZmgþni
 Awe®vi, eY0v I e`vL`v Kti _vuk| ¶z² mgM0Ki t¶¶tÎ cþiv mgM0Ki Dci MtelYv
 cwi Pjv br Kiv mnR ntj I epr mgM0Ki mKj Dcv`vbþK ubtq Zv Kiv KwWb e`vcvi | Kvi Y,
 mKj Dcv`vbþK Ašif¶ Kitz ntj th cwi gvY mgq, A_°`¶ Rbkw³ I e`e`vcvri c0qvRb
 nq Zv memgq MtelþKi c¶¶ tRvMvb t`qv m²e nq bv| GgbwK, wewfbaeKviþY mKj
 Dcv`vbþK Ašif¶ Kivl hıq bv| tm t¶¶tÎ, MtelK `eÁvwbK c×wZ Abyri Y Kti mgM0Ki
 GKwU AskþK bgbyv unmrte ubeþb Ktib Ges tmB bgbyvı wfwÉtZ mgM0Ki `eıwó" c0jb I
 fiel`0vYx Ktib| GB c0jb KZUKzc0ZubwaZkxj nte Zv ubfP Kiþe mgM0Ki `eıwktó"i
 Dci Ges h_vh_ bgbyqb c×wZ c0qvþMi Dci|m²tebv bgbyqb c×wZmgþ bgbyvı
 c0ZubwaZkxj ZvþK ubw0Z Kti, wKš'Am²tebv bgbyqb Zv Kti bv| Am²tebv bgbyqb c×wZi
 m²eav ntj v mij Zv| Ab`w`þK, m²tebv bgbyqb RiUj ntj I Gi c0vb m²eav ntj v m²Zv|*

GB BDıbtU Avgiv th cvW_ tj v Aa`qb Kiþev tm_ tj v ntj v:

- ◆ cvW - 1 : bgbyqþbi hıy³
- ◆ cvW - 2 : m²tebv bgbyqb
- ◆ cvW - 3 : Am²tebv bgbyqb
- ◆ cvW - 4 : bgbyvı AvKvi uba¶ı Y

cW - 1

bglyqtbh hv **Logic of Sampling**

GB cW tktl hv Rvbr hrte —

- bglyqb wK
- bglyv ebgv mgMK
- bglyqtbh wKQyqšij K cL`q
- bglyqtbh mjev
- bglyv awšl
- bglyqtbh cKvitf`

bglyqb wK (What is Sampling)?

wk kZtki tMrovi wtkl mvgwRK weAvtb bglyqtbh e`envi wQj GK aitYi weij NUbv| wKŠ`KrtKškj MZ Dbqab l c×wZMZ AvawbK weKviki dtj mvrččZKKvtj bglyqb c×wZi e`envi GKwU mvariY weItq cwiYZ ntqtQ| AvawbK bglyqb ZĖj l m`tebv ZĖj GZ wLwYfite weKwKZ ntqtQ th, bglyv gvb l mgMK gvtbi gta` cv`K`i dtj mō awšl cwi gvy cwi gvc Kti fweI`OvYqK m² t`tk m²Zi Kiv AvRKij Avi tkvb mgm`vB bq|

AvawbK bglyqb c×wZi e`envi mvrččZK ntj l bglyqtbh aviYv Avgv`i cčZ`wK RxeTb bZb bq Ges AcwiwPZI bq| fvZ wmx ntqtQ wKbv Zv terSvi Rb` nmo t`tk GKwU ev`wU fvZ wJtc cixwv Kivi tKškjwU Avgiv`wNf b aŕi t`tL AvmQ| Prtqi`v` terSvi Rb`, e`l t`tk Pij ev AvUvi`YMZ gvb terSvi Rb`, ev i³ cixwv Rb` Prtqi cŕiv KivU ev Pij -AvUvi cŕiv e`l ev kiti i cŕiv i³i cčqvRb nq bv| Aŕi cwi gvy t`tLB wmxvšl MhY Kiv hvq| G mKj KgRvŕŭ bglyqtbh gj-bmwZwU AbvriY Kiv ntq`vK|`w e`w³iv GB me KvR Ktib cPŪ AvZwekjm ntq| Zv`i GB AvZwekjtmi wQtb gj- KviYwU ntjv th, Zvuv th mKj e`wbtq KivR Ktib tm,tjv GZ mgj:c th GKwU ev`wU bglyv mgMK m`utK` m`uYfite wbfŕ aviYv w`tq`vK| G,tjv bglyqtbh m`vgv`v D`vniY ntj l G,tjvi cčmwšKZv Ab`wKvŕ

G hwer cwi msL`vbi weifbæc×wZ AvtjvPbvq chŕeŕYKZ. weifbæcčt`Ai eYŕv l e`vL`v t`evi tKškj,tjv e`envi Kti Avgiv GKwU mgMŕKi weifbæ`ewkó` m`utK`eYŕv Ges`ewkó`,tjvi weifbæm`utK` e`vL`v KtiwQ| wKŠ`AŕbK tŕt`T B epr AvKviti mgMK wbtq MŕelYv Kiv m`e nq bv| thgb, GKwU mekpe`ij tq 30 nvRvi Qvŕ-Qvŕx i tqQ| Zv`i Mo tgav gvb wYŕqi Rb` Zv`i cčZ`tki tgav gvb Rvbr cčqvRb| wKŠ`GiKg epr AvKviti mgMŕKi tŕt`T cčZwU chŕeŕY GKK m`utK`QZ` Rvbr memgq m`e bq| mZivs, G tŕt`T epr mgMŕKi cčZwUwZi Kti Ggb wKQymsL`K chŕeŕY t`tk mgMK m`utK`QZ` msMh Kiv mgm`wUŕK AŕbK mnR Kti tZvtj | mgMŕKi GB cčZwUwZi Ask, hv t`tk mgMK m`utK`Abgvb Kiv nq, ZvŕK bglyv etj Ges mgMK t`tk cčZwUwZi Ask wYŕ Kivi cčqvŕK bglyqb ej v nq|

mgMŕKi cčZwUwZi Ask, hv t`tk mgMK m`utK` Abgvb Kiv nq, ZvŕK bglyv etj Ges mgMK t`tk cčZwUwZi Ask wYŕ Kivi cčqvŕK bglyqb ej v nq|

bglyvqþbi hviþu tZgb Rulj bql thgb, miKvi KZR. MpxZ hgy Dbaqb Kgmpx t`tki hgy mgytRi KutQ KZUKzRbucq Avgiv hvi Zv RvbZ AvMhx nB, Zte Avgiv cltg 15 t_tK 24 eQi eq` RbtMvixK Avgvt`i mgMK mnmte Pwyz Kitevl Zvici bglv ubeppþbi eAnubK cxwZ e`envi Kti hgy mgytRi mgMK t_tK ce`mbaþi Z AvKvii GKiu AskþK ubeppþ Kitevl GB ubeppZ AskwþK mgMKi clZubwaZkxj ntZ nte G Kvity th, GB Ask t_tK Avnwi Z DcvEi `enkó` ubfþfite mgMKi `enkó`þK clZclwv Z Kitevl

cwi mSL`vþbi th kvLvq bglv ev bglvqb cluqv ubtq Avtj vPbv Kiv nq ZvtK m×všþj-K cwi mSL`vb etj |

eYðvgj-K cwi mSL`vb ubYþqi t`qþT bglv e`envi Kiv ntj l Avgiv tkl chSlcþjv mgMKiu m=utK`AvMhx ntq _vk | cwi mSL`vþbi th kvLvq bglv ev bglvqb cluqv ubtq Avtj vPbv Kiv nq ZvtK m×všþj-K cwi mSL`vb ev inferential statistics etj | mvari Yfite, m×všþj-K cwi mSL`vþbi gj- DþIk`u ntjv bglvi gva`tg mgMKi mQyenkó`þK cl`j b Kiv | thgb, Xivkv mekte`vj`þqi QvT-QvT`x`i eqtmi Mo, ev GKiu RbmsL`vq KLþbv meq Kþiub Ggb bixi mSL`v, ev tgvvBj tdiv e`envi Kvix RbtMvixi Mo Avq, BZ`w | GB `enkó`_þjv cl`j b Kivi Rb` GKiu bglv ubeppþ Kiv nq, þmB bglvi wfiE`Z GKiu clmizK cwi mSL`vb ubYþ Kiv nq (hv bglv `enkó` mnmte MY` Kiv nq) Ges mgMKi `enkó` cl`j þbi Rb` þm cwi mSL`vbuþK e`envi Kiv nq |

bglyv ebyg mgMK (Sample Verus Population)

Av`kMZfite, Avgvt`i MtelYvj ä djvdjþK Awakzi _iazi t`evi Rb` Avgiv cþjv mgMKþK ubtqB MtelYv Kitz Pibtevl KtqK nrvvi gvbþi mrvjvkviii wfiE`Z clB DcvEi cwi etZ`hv` ersjvt`tki mKj gvbþi mrvjvkvii ubtq mqv l i`qYkxj Zvi gta` GKiu D`P avvZK m=utK`chþe`qY Kwi, Zvntj MtelYvq clB djvdjþi clZ Avgvt`i mektm `wncZ nte AþbK tekx | mKs` Avgiv memgq mgMK ubtq MtelYv Kitz cwi bv Ges bglvi wfiE`Z MtelYv Avgvt`i tkl Aej`þb ntq `vavq |

bglyv thþnZzngMKi Ask, þmþnZzbglyvþK mgMKi ueu bKj iþc bvtfþe eis Avmbaiþc fiev DvPr | þþnZzbglyv wfiE`Z Avgiv mgMKi `enkó`þK cl`j b Kwi, þmþnZz`fveZtB clkaþZjv thþZ cþi th, bglv gvbþi Avntj mgMKi KZUKzDEg cl`j b? GB clkuþi ga` w`þq Avevi l clZwóZ ntjv th, Avgiv tkl Aewa mgMK m=utKB RvbZ AvMhx | GKRB AwfÁ l `q MtelK Zvü KvR`iaB Kþib mgMKi fievv w`þq Ges tkl Kþib bglv w`þq | Ab`w`þK, GKRB bZb Ges A`q MtelK`iaB Kþib bglv w`þq Ges tkl Kþib mgMK w`þq | hv` mgMKþK AvtM t_tKB msÁvqZ Kiv bv nq, Zte bglvi chþBZv gj`vqb Kiv Am`e bv ntj l Kivb ntq cto | mgMKþK mþv`þfite msÁvqZ Kþi bv ubtj AcðqvRbxq Ges AcðZubwaZkxj bglv ubeppZ ntZ cþi |

þKvb RbtMvixi Dci MtelYvu cwi Pwv Z nte Zv ubavþY bv Kþi hv` t`QvPwvZ e`v`þ`i mrvjvkvii MhY`ia Kwi Zte nqtZv t`Lv hvte th, clqvRb tbB Ggb RbtMvixB bglvq Ašfþ nqtþQ tekx | A`ev, meþkl GK aiþYi gvbþKB Ašfþ Kiv nqtþQ hv MtelYvi DþIk` ARþb clZubwaZkxj bql thgb, aiv hvK, iv`lq`wotq hvþK migtb cvlqv þMj ZviB mrvjvkvii tbqv ntjv, tm t`qþT nqtZv t`Lv hvte th, nq AwakvskB bix, ev cjad, ev Aemi clB e`v` bglvq Ašfþ nqtþQ | G aiþYi bglv h_v`ntZ cþi hv` tm aiþYi mgMK ubtq Mtel Yvu cwi Pwv bvi DþIk``mbaþi Z ntq _vtK |

þKvb RbtMvixi Dci MtelYvu cwi Pwv Z nte Zv ubavþY bv Kþi hv` t`QvPwvZ e`v`þ`i mrvjvkvii MhY`ia Kwi Zte nqtZv t`Lv hvte th, clqvRb tbB Ggb RbtMvixB bglvq Ašfþ nqtþQ tekx | A`ev, meþkl GK aiþYi gvbþKB Ašfþ Kiv nqtþQ hv MtelYvi DþIk` ARþb clZubwaZkxj bql thgb, aiv hvK, iv`lq`wotq hvþK migtb cvlqv þMj ZviB mrvjvkvii tbqv ntjv, tm t`qþT nqtZv t`Lv hvte th, nq AwakvskB bix, ev cjad, ev Aemi clB e`v` bglvq Ašfþ nqtþQ | G aiþYi bglv h_v`ntZ cþi hv` tm aiþYi mgMK ubtq Mtel Yvu cwi Pwv bvi DþIk``mbaþi Z ntq _vtK |

bglyvqb m=utK`GKiu mvari Y avi Yv iþtþQ th, bglvqb ntjv áwšli GKiu clvb Drm | GB avi Yvi mQywfie th tbB Zv bql bglvi wfiE`Z cwi Pwv Z MtelYvq clþ cwi gvtY áwšlntZ

cvti hw` mgMki Zvj KwU, thLvb t`tk bglv ubePb Kiv nq, AmuY`nq ev h_vh_ bv nq| hw` mgMki Ašf mKj e`w`tk bglvq Ašf nevi mgvb mthvM t`qv nq, Zte amsli cwi gY AtbKvstk ntm cvte| m`tebv ZtEj mVVK cQvMi gva`tg GB amsl ntm Kiv tZv hvqB GgbvK cvjv mgMk t`tk DcvE msMni Zj`bvq bglvi gva`tg AtbK tekx mVVK DcvE msMh Kiv m`e|

bglvq`bi mKQygsij K cZ`q (Some Basic Concepts of Sampling)

bglvq`b cxwZtZ tek mKQycZ`q l c` e`euZ nq| bglvq`bi Avtj vPbvq hveri cte`tm mKj cZ`q l c` i msAv, t`jv tRtb tbqv cQvRb|

Dcv`vb (Element): Dcv`vb ntjv MtelYvi tmB GKK hvi m`utK`Z`_` msMh Kiv nq Ges hv DcvE wek`i`Yi wfiE cQvb Kti | mvari Yfite, mvgvRK MtelYiq GKRB e`w` ev ubw` e` cKv`i e`w` gvbv ntjv mgMki Dcv`vb| Zte Ab`vb` ai`Yi GKKI Dcv`vb ntZ cvti | thgb, cwi evi, mvgvRK msMvb, e`emv cQZ`vb, m`cQvq, BZ`w` | cKZc`q, Dcv`vb ntjv MtelYvi tgsij K GKK|

Dcv`vb ntjv MtelYvi tmB GKK hvi m`utK`Z`_` msMh Kiv nq Ges hv DcvE wek`- i`Yi wfiE cQvb Kti |

mgMk (Population): Rwi c MtelYiq e`euZ Dcv`v`bi mgwotK mgMk etj | G mgwotK mgMk wnmte wPwZ Kivi Rb` GKwU mjbw` e` msAv Ges mg`qi gvT`v ubaP`Y Kiv cQvRb| thgb, wekpe`ij`q`i QvT`-QvTx ej`Z cY`Kv`xb Ges LUKv`xb QvT`-QvTx, m`ZK Ges m`Z`KvEi QvT`-QvTx, cQ`b Ges eZ`vb QvT`-QvTxK tevSv`Z cvti | G ai`Yi Awb` e` Rb`MvotK mgMk ej`v h`te bv| 2002 mtj` cQ`g etl`w`Z`n qv wekpe`ij`q`i QvT`-QvTx` i GKwU mjbw` e` mgMk wnmte MY` Kiv h`te|

Rwi c MtelYiq e`euZ Dcv`v`bi mgwotK mgMk etj |

Rwi c mgMk (Survey Populaiton): Rwi c mgMk ntjv MtelYv`vb Dcv`vbm`gni Avt`i mjbw` e` GKwU mgwot` wekpe`ij`q`i QvT`-QvTx wnmte hw` XvKv wekpe`ij`q`i QvT`-QvTx` i ubePb Kiv nq tm t`q`i XvKv wekpe`ij`q`i QvT`-QvTxivB tKej gvT` Rwi c mgMk wnmte we`vPZ nte, Ab` wekpe`ij`q`i QvT`-QvTxiv bq| A`P, GKwU Rwi c mgMk ntjv mgMki Dcv`vbm`gni tmB mgwot` thLvb t`tk cKZc`q Rwi c bglvU msMh Kiv nq|

Rwi c mgMk ntjv MtelYv`vb Dcv`vbm`gni Avt`i mjbw` e` GKwU mgwot`

bglv GKK (Sampling Unit): bglvq`bi th tKvb ch`q ubeP`bi Rb` we`vPZ GKwU ev GK tmU Dcv`vb`K bglv GKK etj | GKwU mij GK-`lix bglvq`bi (simple single-stage sampling) t`q`i Dcv`vb l bglv GKK GKB ntq`_v`K| RvUj bglvq`bi we`vbe`fi we`vbe` gvT`vi bglv GKK e`envi Kiv nq| thgb, aiv hvK, GKRB MtelK GKwU Dc`Rj`v`K ZvU MtelYv G`vKv wnmte ubePZ Kti`Qb| Zvici tmB Dc`Rj`vi GKwU Mlg Ges me`k`l, tmB Mlt`gi cQ`b eq`-`Rb`Mvoti GKwU bglv ubePb Kti`Qb| GB wZb``fi bglv GKK, t`jv ntjv h`_v`tg Dc`Rj`v, Mlg Ges cQ`b eq`-`gvbly, hvi gta``tkl GKwU ntjv Dcv`vb| GB wZb``fi wZb ai`Yi bglv GKK`K h`_v`tg cQ`gK bglv GKK (primary sampling unit), gva`gK bglv GKK (secondary sampling unit) Ges P`v`sl bglv GKK (ultimate sampling unit) ej`v nq|

bglvq`bi th tKvb ch`q ubeP`bi Rb` we`vPZ GKwU ev GK tmU Dcv`vb`K bglv GKK etj |

bglv Kwv`gv (Sampling Frame): bglv Kwv`gv ntjv bglv GK`Ki cKZ`Zvj Kv, thLvb t`tk bglv ev tKvb bglv``li ubePb Kiv nq| mij GK-`lix bglvq`bi t`q`i hw` GKwU t`f`v`vi Zvj Kv t`tk bglv ubePb Kiv nq Zte tmB t`f`v`vi Zvj KwU ntjv H bglvq`bi bglv Kwv`gv| hw` tKvb RvUj bglvq`b cQ`vq` cQ`gK bglv GKK GKwU Dc`Rj`v nq Zte Dc`Rj`vi Zvj KwU bglv Kwv`gv wnmte we`vPZ nq| mij GK-`lix bglv bKkvq (simple

bglv Kwv`gv ntjv bglv GK`Ki cKZ`Zvj Kv, thLvb t`tk bglv ev tKvb bglv``li ubePb Kiv nq|

single-stage sample design) MtelYv mgM0Ki Dcv`vbmgnri Zuvj KuvU ntjv Gi bglv Kivvtgv|

GKuv chfeY GKK ev DcvE msM0ni GKK ntjv GKuv Dcv`vb ev Dcv`vbi mgw0 hv t`tK Z` msM0 Kiv nq| chfeY GKK Ges wefkd`Yi GKK (unit of analysis) AwKvsk t`tK GKB ntq `vK| Zte me t`tK GuU wVK bq| KviY, AfbK t`tK t`Lv hvq th, GKRB mrvjvKvi M0YKvix GKuv cwi evt`i c0vb`K (head of the household) cK0Kti cwi evt`i Ab`vb` m`m`i m`u`K`Z` tbb| G me t`tK cwi evt`i mKj m`m` wefkd`Yi GKK ntjv hvi Kiv t`tK Z` tbgv nt`Q GKgvU wZubB (cwi evt`i c0vb) ntjv chfeY GKK| chfeY GKK I wefkd`Yi GKK GKB ntj Mtel`Ki Rb` KivRuv mnR ntq hvq| hv chfeY GKK I wefkd`Yi GKK GKB bv nq, tm t`tK Mtel`Ki Rb` mgm`v `Zix nq| Zte MtelKI Zvi wR`^D`ebx YgZv e`envi Kti tm mgm`v KuvU`q DVvi tP0v Kti b|

chfeY GKK (Observation Unit): GKuv chfeY GKK ev DcvE msM0ni GKK ntjv GKuv Dcv`vb ev Dcv`vbi mgw0 hv t`tK Z` msM0 Kiv nq| chfeY GKK Ges wefkd`Yi GKK (unit of analysis) AwKvsk t`tK GKB ntq `vK| Zte me t`tK GuU wVK bq| KviY, AfbK t`tK t`Lv hvq th, GKRB mrvjvKvi M0YKvix GKuv cwi evt`i c0vb`K (head of the household) cK0Kti cwi evt`i Ab`vb` m`m`i m`u`K`Z` tbb| G me t`tK cwi evt`i mKj m`m` wefkd`Yi GKK ntjv hvi Kiv t`tK Z` tbgv nt`Q GKgvU wZubB (cwi evt`i c0vb) ntjv chfeY GKK| chfeY GKK I wefkd`Yi GKK GKB ntj Mtel`Ki Rb` KivRuv mnR ntq hvq| hv chfeY GKK I wefkd`Yi GKK GKB bv nq, tm t`tK Mtel`Ki Rb` mgm`v `Zix nq| Zte MtelKI Zvi wR`^D`ebx YgZv e`envi Kti tm mgm`v KuvU`q DVvi tP0v Kti b|

civgvb ntjv mgM0Ki Aaxtb c`E GKuv Pj`Ki eY0vi mvi-mst`c|

civgvb (Parameter): civgvb ntjv mgM0Ki Aaxtb c`E GKuv Pj`Ki eY0vi mvi-mst`c| thgb, XvKv kn`ii RbmsL`vi Avtqi Mo ev eqtmi web`vmtK mgM0K gvtbi D`vniY wnmvte D`jL` Kiv th`Z cvti | GB mgM0K gvuU`K Ribevi Rb`B Avgiv bglv t`tK DcvE msM0 Kvi |

MtelYv bglvq c0E GKuv Pj`Ki eY0vi mvi-mst`c| ntjv bglv gvb|

bglv gvb (Statistic): MtelYv bglvq c0E GKuv Pj`Ki eY0vi mvi-mst`c| ntjv bglv gvb| XvKv kn`ii mKj RbmsL`vi Avtqi Mo ev eqtmi web`vmti cwi etZ`GKuv Astki (hv`K Avgiv bglv etj AvfuvZ Kvi) Rb`M0xi Avtqi Mo ev eqtmi web`vmtK bglv gvtbi D`vniY wnmvte D`jL` Kiv th`Z cvti |

bglvq`bi mjev (Advantages of Sampling)

mgM0K m`tU Z` msM0ni `0U c`x`Z i`qtQ — `igvix I bglvq`b| `igvix`Z mgM0Ki c0Zuv GKK t`tK Z` msM0 Kiv nq Ges G t`tK tKvb bglv e`envt`i c`qvRb nq bv| ZvB GLv`b bglv `w`S (sampling error) NUvi AvksKv `vK bv| wK`S Avgiv Ruvb th, mgM0Ki c0Zuv GKK t`tK Z` msM0 Kiv ev `igvix MYbv Kiv mKj t`tK mjevRbK bq| tm t`tK bglvq`b AfbK tekx mjevRbK I mnRmva`|

bglvq`bi c0vb mjevuvU ntjv, GuU A`0miktq Kti | 2500 QvT-QvT`xi Kiv t`tK DcvE msM0 wbtm``tn 25,000 QvT-QvT`xi Kiv t`tK DcvE msM0ni tP`q Kg e`q euj GuU Kvitv eS`Z Amjev nevi K`v bq|

bglvq`b Z`bvqj-Kfite Kg ktg c0qvRb nq| Kg msL`K AwfA Ges `q ktgk`3 wbtqv`Mi gva`tg DcvE msM0, c0`uvKi Y I wefkd`Y Kiv hvq| bglv gva`tg GKuv MtelYvi e`e`vcbv c`jiv `igvixi Z`bvq wbtm``tn mnR Ges D`Pzi m`Zv c0vb Kti | bglvq`b mgq evD`q| cKZc`q, GB mg`qi w`lquU wetePbv KtiB Av`gigvixi g`a` bglv Rvi c`K tK`Kj wnmvte e`envi Kiv nq| c`jiv `igvixi Dci w`E Kti DcvE wefkd`Y Ges Gi djv`dj cKv`k GZ mgq t`M hvq th, hLb djv`dj cKv`kZ nq ZLb tmB DcvE`i c0m`KZv AfbK t`tK nvi`tg hvq| bglvq`bi gva`tg cwi Puvj Z MtelYq c0Zuv t`tK AwKZi hZevb nI qv hvq Ges mgm`vi AfbK Mf`xi w`Mtg DcvE`i w`v`Z wefkd`Y I e`vL`v Kiv hvq|

Zte GwU gtb ivLv ctqvRb th, hv` GKwU KvhrKi bglv bKkv (sample design) ubgP Kiv bv hvq, Zte bglvqtbi th mKj mpeavi K_v DtlL Kiv ntqtQ tm_tjvi KwLZ ev`lvqb Kiv mpe nq br| KvY, mvgwRK ev`eZvq gvbtl i AvPiY GZ tekx wfbwGes weipT th, tm_tjvi m² wekltYi Rb` AfbK tekx mveavbx ntZ nq| GKwU cYmgijcZvm=ubw (homogeneous) mgMK wnmvte FvZ wmx ntqtQ wKbv Zvi cixv, Pxtqi `t`i cixv Ges i³ cixv Rb` bglvqb hZ mnR, mvgwRK m=utKp gta` gvbtl i gZ Amgijc (heterogeneous) mgMK wbtq bglvqb ZZ mnR bq| hvB tnvK, mgMK memgq mgijc ntZ nte Ggb bq, Zte bglvi gra`tg cB DcvEi `enkó` mgMKi `enkó`i cZubwaZkxj ntZ nte|

bglv awšl(Sampling Error)

bglvqtbi metPtq eo AmpeavwU ntjv bglv awšl| A_w, mgMK t_tk ubePZ bglvtK mgMKi cZubwa wnmvte MY` Kiv ntj l, Zv mgMKtK m=uyvte cZubwaZi Kti br| eis `tqi gta` wQyv e`earb itqB hvq| e`earvbi GB gvTvtKB bglv awšlejev nq| mgMK Av bglvi gvtbi gta` e`earb hZ tekx nte, bglv awšl ZZ tekx nte etj Abgvb Kiv nq| thgb, av hvK, evsj v`tki gvbtl i gv_vwQyMo Avq 380 gwKb Wjvi | tKvb GKwU bglv Rwi`c t`Lv tMj th, Zv`i gv_vwQyMo Avtqi cwigvY ntqtQ 750 gwKb Wjvi | bglv Rwi`ci GB djvdj tKvb fiteB mgMKi cZubwaZi Kti br| A_w, GLvtb AwK gvTvtq bglv awšl cwigZ nt`Q| GB bglvq evsj v`tki mKj A_wZK tkYxi Rbmvari YtK mgvbwZK fite bglvi gta` Ašf b Kti Atc`vKZ. `Qj tkYxi gvbvtK AwK msL`vq Ašf Kiv ntqtQ etj nqtZv gv_vwQyAvtqi Moiw eo ntqtQ|

mgMK t_tk ubePZ bglvtK mgMKi cZubwa wnmvte MY` Kiv ntj l, Zv mgMKtK m=uyvte cZubwaZi Kti br| eis `tqi gta` wQyv e`earb itqB hvq| e`earvbi GB gvTvtKB bglv awšlejev nq|

G aitYi cwiv`wZtZ Avkvi K_vwU ntjv th, AvaybK cwimsL`vte bglv awšl wbi`fcY, wvYq l `hKltYi Dcvq D`weZ ntqtQ, hv bglvqtbi gra`tg cB DcvE w`tg mgMKtK Avtiv m²fite Rvbr mpe Kti Ztj tQ| bglv gvb_tjv mgMK gvtbi KZUKzKvQvKwQ MyQex `vtK Zv c`j`b Rb` mpebr ZEj Avgv`i m`w` m` c`vb Kti tQ| GB m`f`i wZbw Dcv`vb itqtQ – mgMK gvb, bglvi Avkvi Ges cwigZ awšl (bglv awšli GKwU cwigv)| m`wU ntjv,

$$SE = \sqrt{\frac{pq}{n}}$$

- thLvtb, SE = cwigZ awšl
- n = bglvi Avkvi
- pq = mgMK gvb

$$A_{ev}, S.E. = \frac{s}{\sqrt{n}}$$

- thLvtb S.E. = cwigZ awšl
- s = cwigZ e`earb
- n = bglvi Avkvi

hiv` mgMkU tQvU nq Zte omngZ mgMkKi mstkrabx0 unmrte $1 - \frac{n}{N}$ mstkrabx Dcv`vbuU
(correction factor) mfi i gta` Ašif9 KiZ nte|

$$S.E. = \frac{s}{n} \left(1 - \frac{n}{N} \right)$$

GB mfi n ntjv bgbvi AvKvi Ges N ntjv mgMkKi AvKvi |

bgbvtbi cKvif` (Types of Sampling)

AvanbK bgbvtb Zte; cãvZt` gaitYi bgbvtb cxuZi gta` cv`R` Kiv nq| GKU ntjv Amtebr bgbvtb (nonprobability sampling) Ges Ab`U mtebr bgbvtb (probability sampling)| Amtebr bgbvtb Ges mtebr bgbvtbi gta` th velqu cãvZt cv`R` mPZ Kti Zv ntjv, mtebr bgbvtb GKRb MtelK cãZu bgbvtb GKK ev Dcv`vbK bgbvtb Ašif9 nevi mgvb mtebr ubvZ KiZ cãvZt | iayZv bq, vebPZ nevi mtebrU KZUKZ Zvi cãvYU ubaY KiZ cãvZt | Ab`K`vq, cãZu bgbvtb GKti bgbvtb Ašif9 nevi mgvb mtebr vK | Amtebr bgbvtb cãZu bgbvtb GKti bgbvtb Ašif9 nevi mtebrK ubvZ Kivi tkvb mthM tbB|

GB cvtV G` gaitYi cãv bgbvtb cxuZi Aaxtb cãv tkYx vefvM, tjvi DttL Kiv nte Ges cieZP` gU cvtV tm, tjv vefvZ fite Avtj vPbv Kiv nte|

Amtebr bgbvtb cãvZt Pvi cKviti i ntq vK:

1. mjevRbK ev AvKiv`K bgbvtb (Convenience or Accidental Sampling)
2. Dti k`gj-K ev vetePvvgj-K bgbvtb (Purposive or Judgemental Sampling)
3. tKiv bgbvtb (Quota Sampling)
4. tmevj bgbvtb (Snow-Ball Sampling)

mtebr bgbvtb cãvZt Pvi cKviti i ntq vK:

1. mij`ve bgbvtb (Simple Random Sampling)
2. vbqZvšK bgbvtb (Systematic Sampling)
3. fivqZ bgbvtb (Stratified Sampling)
4. v`Q bgbvtb: GK-chvq I eú-chvq (Cluster Sampling: Single-Stage and Multi-Stage)

mvi usk

bgbvtb nj mgMkKi GKU cãZvãZkxj Ask, hiv` t`K mgMk m`utK`Abgvb Kiv nq| bgbvtbi cãv mjev ntjv, GuU mgqai Ges At`P mivkq Kti | mvariYzt` g`cKviti bgbvtb cxuZi gta` cv`R` Kiv nq — Amtebr bgbvtb I mtebr bgbvtb| Avevi Amtebr Ges mtebr bgbvtb cxuZi vefvbcKvif` itqtQ|

cvVĖi gj`iqb

beŃK cĕæ

mĭVK DĖti i cvtk ũK (√) ũPý ũ b –

1/ Rwi c MŃel Yiq e`eüZ Dcv`vbi mgũŃK etj |

- K. mgMĖ
- L. bgŃv GKK
- M. Dcv`vb
- N. bgŃv Kivrtgr

2/ AvaybK bgŃvqb ZĖĖ;cĕvbZt KZ aiŃYi bgŃvqb c×ũZ ũPŃýZ Kiv nq?

- K. 2 aiŃYi
- L. 3 aiŃYi
- M. 4 aiŃYi
- K. 5 aiŃYi

3/ mgMĖ t_ŃK bgŃvi e`earvbi gvŃvŃK etj |

- K. bgŃvi nvi
- L. bgŃv e`earvb
- M. bgŃv msL`v
- N. bgŃv āŃšĭ

msŃŃB cĕæ

1/ bgŃvqb ũK?

2/ bgŃv GKK ũK?

iPbvġj-K cĕæ

1/ bgŃvqb ũK? bgŃvqŃbi mŃeavmgŃ-Avtj vPbv Ki ab?

2/ bgŃv āŃšĭ ũK? ũKfvte bgŃv āŃšĭ ũbifcY Kiv hġq?

mætebr bglvqrb
Probability Sampling

GB cW tkłI hv Rvbr hrte —

- mætebr bglvqrb tñš³KZv
- mij %e bglvqrb
- ubqgZmšK bglvqrb
- ði vqZ bglvqrb
- „Q bglvqrb: GK-chiŕx I eú-chiŕx

mætebr bglvqrb tñš³KZv (Logic of Probability Sampling)?

BwZnm chiŕj vPbv Kiŕj ð`Lv hvq th, mvgwRK Rwiŕci gva`tg cwi Pwv Z Mtel Yvi dj vdj eú tŕŕŕB ubfŕ nŕqŕQ| GB h_vh_ I ubfŕ dj vdj cvevi Rb` hŕ_ó mZKZvi mŕt_ bglv ubeŕPb KiŕZ nq| GKwU mgMŕKi mKj m`m` hŕ` GKB iKg nq Zte mZK`bglv ubeŕPbi tKvb cŕqvRb nq bv| G aiŕYi cwi w`wZŕZ GKwU mgMŕKi `ewkó` mæúŕK`Rvbi Rb` mgMŕKi GKwU Dcv`vŕbi ubeŕPb hŕ_ó| cŕKwZK ñeÁvŕbi tŕŕŕ G iKg avi Yvi wŕiÉŕZ Mtel Yv cwi Pj bv Kiv mæe| Kvi Y, cŕKwZK ñeÁvŕbi Ašfŕ mgMŕKi Dcv`vb_ŕjv mgiŕc| GB mgiŕcZvi KviŕY i³ cixŕv Kivi Rb` GKRb wPwKrmKŕK kixŕii me i³ ŕei Kŕi cixŕv KiŕZ nq bv, GK tŕwlv i³B hŕ_ó| GKBŕŕte, hŕ` GKRb ñeÁvŕb bvBŕUŕRb M`vŕmi „Yvej x cixŕv Kŕi ð`LŕZ Pib Zte ZvŕK cŕ_exi me bvBŕUŕRb M`vm cwi gvŕci ci tmLvb ð`ŕK bglv ubeŕPb Kŕi cixŕvU cwi Pj bv KiŕZ nŕe bv|

bglvqrb cŕqvŕi gj- wŕiÉuU nŕj v 0`ŕePqb0, hv mætebr bglvqrb mdj Zvi gvŕŕŕK ubwŕZ Kŕi|

mvgwRK ev`eZvq mgMŕKi Ašfŕ Dcv`vb_ŕjv GKwU ð`ŕK Ab`uU wŕbentq `vŕK eŕj Mtel Yvi tŕŕŕ ubqvšZ bglvqrb c`xwZ e`enŕŕi i cŕqvRb nŕq cŕo| tm KviŕY, Mtel Yvi cŕe` mvgwRK tMvŕx_ŕjvi AmgiŕcZv mæúŕK`ek`ŕŕte Rvbr cŕqvRb hŕŕZ Kŕi mŕwK bglv ubeŕPb Kiv mæe nq| Rwiŕc bglvqrb Pwvŕŕj ŕŕwU nŕjv, GKwU mgMŕK ð`ŕK GK tmU Dcv`vbŕK Ggbŕŕte ubeŕPb Kiv hŕŕZ Kŕi H Dcv`vb_ŕjvi ñeeiY (cwi msL`vbGj-K) tmB mgMŕKŕK mŕwKŕŕte cŕZubwaz; Kŕi| Avgiv BwZgŕa`B tŕŕbŕQ th, mætebr bglvqrb Avgvŕ`i GB j`ŕŕ` ARŕbi mæte`ZŕŕK ewotq ð`eri GKwU `eÁvŕbK c`xwZ cŕvb Kŕi| iayZvB bq, GB j`ŕŕ` ARŕbi mæte` mdj Zvi gvŕŕŕK cwi gvŕci c`xwZ I ubŕ`R Kŕi| bglvqrb cŕqvŕi gj- wŕiÉuU nŕjv 0`ŕePqb0 (random selection), hv mætebr bglvqrb mdj Zvi gvŕŕŕK ubwŕZ Kŕi|

ŕePqb cŕqvŕi `ŕU c`arb `ewkó` iŕŕŕQ| cŕ_gZt, GwU mgMŕKi mKj Dcv`vbŕK bglvq Ašfŕ nevi mgvb mŕhŕM cŕvb, wZxqZt, ŕePqŕbi gva`tg bglv ñePzZ ubYŕŕi gva`tg ubeŕPZ bglvU KZUŕZ mŕwKŕŕte cŕZubwaz; nŕqŕQ Zv ubiŕcY Kiv hvq|

GKRb MtelK tKvb ñekl cŕKŕY QvovB GKwU Rixŕci Rb` bglv ubeŕPb KiŕZ cŕŕb| wKŠ`mgm`wU nŕjv, tKvb `eÁvŕbK c`xwZi AbyriY Qvov bglv ubeŕPb Kiŕj MtelŕKi wR`^ cŕŕcŕZ tmB bglvŕK cŕŕneZ KiŕZ cŕŕb| dj`ŕŕc, bglvU mgMŕKi cŕZubwaz; nŕe bv| Rwiŕci bglvŕK Aek`B mgMŕKŕK cŕZubwaz; KiŕZ nŕe| mgMŕKi wŕbZvi ñeŕPbvq cŕZubwaz; bglvqrb tŕŕŕ ŕePqb Kvhŕi fŕgKv cvj b Kŕi| ŕePqb cŕqvŕi `ŕU c`arb `ewkó` iŕŕŕQ| cŕ_gZt, GwU mgMŕKi mKj Dcv`vbŕK bglvq Ašfŕ nevi mgvb mŕhŕM cŕvb Kŕi| hŕ`I GB gj-bwZi wŕiÉŕZ mætebr bglvqrb KLbB ubiŕk cŕZubwaz; Zv cŕvb Kŕi bv, wKŠ`mætebr bglvqrb c`xwZ Ab`vb` c`xwZi Zŕbvq AwKZi

Kiv hvq| th tKvb GKU msL'v t_K i iæKti hZŋY bv 30uU bglv ubePb tkl nt'Q ZZŋY chS' Avgiv %e msL'vi mviwY Abyri Y Kti msL'v Pqb KitZ _vKtev| 30uU msL'v wBYŋi mgq jŋ' i vLv` i Kvi th, mgMŋKi tkl msL'wUi (G tŋŋŋ 3000) PvBtZ eo msL'wewkó msL'v, wj ubePb t_K ev` w'tZ nte| hw' ubePb GKB msL'v `ŋevi cvl qv hvq Zte cŋgevi ubePb bi ci cieZŋcyi æ'gj-K msL'v, wj tK ev` w'tZ nte|

mij `ŋe bglvqb GKU tgšij K bglvqb c×wZ ntj l GwU gvtS gvtSB Avgvŋ' i Rb' Aev`é l e'qmva' ntq `vavq| bglvqtb i Rb' Aev`é l e'qmva' ntq vavq|

mij `ŋe bglvqb GKU tgšij K bglvqb c×wZ ntj l GwU gvtS gvtSB Avgvŋ' i Rb' Aev`é l e'qmva' ntq `vavq| bglvqtb i Rb' th bglv KvVtgv `Zixi cŋqvRb nq Zv Awakvsk tŋŋŋ K w/b l kŋmva' ntq cŋo| bglv KvVtgv `Zixi Rb' mgMŋKi GKKmgŋni Zwij Kv mslMŋ Kiv tMŋj l Zv me mgq MŋelYv DcŋwMx nqbv| thgb, tKvb GKU GjvKvq mKj Awævixi h_vh_ Zwij Kv bul cvl qv thŋZ cvŋi | hw' l ev cvl qv hvq, Zv Awakvsk tŋŋŋB AmævYev cŋj vŋbv ntZ cvŋi |

wbqZwšK bglvqb (Systematic Sampling)

wbqZwšK bglvqtb i mŋ_ mij `ŋe bglvqtb i gj-cv` R'wU ntj v th, mij `ŋe bglvqtb %e msL'vi mviwY e'envi Kiv nq, Avi wbqZwšK bglvqtb µgvbvŋti mŋvŋtŋv mgMŋKi Zwij Kv t_K cŋZ k-Zg Dcv` vŋtK bglv GKK wŋmŋte ubePb Kiv nq|

ev`é Abŋj tŋ mij `ŋe bglvqb K`wPr e'eüZ nq| Kvi Y, mŋvavi Yvŋte G c×wZwU meŋPtq KvRi bglvqb c×wZ bq Ges GwU Lŋ kŋmva'| mij `ŋe bglvqb c×wZ e'envi i Rb' Dcv` vŋbi GKU wLŋ Zwij Kv cŋqvRb| hw' G i Kg GKU wLŋ Zwij Kv cvl qv hvq Ges mgMŋKi AvKvi Lŋ tekx eo nq tm tŋŋŋ MŋelKMY mij %e bglvqtb i cwŋetZ`cŋŋkt Acŋ GKU bglvqb c×wZ cŋqvM Kti _vŋKb hvŋK wbqZwšK bglvqb ejv nq| GtK mij `ŋe bglvqtb i B LwMkUv cwŋewZ ms`i Y ejv hvq| Zte Gi mŋ_ mij `ŋe bglvqtb i gj-cv` R'wU ntj v th, mij `ŋe bglvqtb %e msL'vi mviwY e'envi Kiv nq, Avi wbqZwšK bglvqtb µgvbvŋti mŋvŋtŋv mgMŋKi Zwij Kv t_K cŋZ k-Zg Dcv` vŋtK bglv GKK wŋmŋte ubePb Kiv nq| D`vniŋYi gva`tg c×wZwU w`hw' Zvŋte tevSvi AvŋM wbqZwšK bglvqtb Lŋ tekx e'eüZ `ŋU c` mævŋK`Rivb cŋqvRb| GKU ntj v, bglv e'wŋB (sampling interval) Ges Ab'wU ntj v, bglv AbsvZ (sampling ratio)| bglv e'wŋB ntj v ubePZ bglvi GKU Dcv` vŋ t_K Avŋi K wU Dcv` vŋbi gŋa' cwŋwZ `i-Zj (standard distance) Ges bglv AbsvZ ntj v mgMŋKi gŋa' Dcv` vŋmgŋni AbsvZ|

aiv hvK, GKU w`vj tŋi Qvŋ-Qvŋx` i exbv¼ (IQ score) hw'vBŋtŋi Rb' GKU bglvi cŋqvRb| tŋB w`vj tŋi Qvŋ-Qvŋx msL'v i tŋtQ 2000| bglv wŋmŋte 200 Rb Qvŋ-QvŋxK ubePb i w×vŋŋŋ tŋqv ntj v| G tŋŋŋ wbqZwšK ubePb i Rb' Avgvŋ' i tK cŋtg bglv AbsvZwU wBYŋ Kti wŋtZ nte| Avgvŋ' i D`vni Y Abŋvq, mgMŋKi AvKvi ntj v 2000 Ges KwLZ bglvi AvKvi ntj v 200| AZGe, bglv AbsvZwU nte $(200 \div 2000) = \frac{1}{10}$ ev 0.10| A_ŋ, cŋZ 10Zg Qvŋ-Qvŋx nte Avgvŋ' i bglv GKK Ges GwUB Avgvŋ' i bglv e'wŋB| cŋg 20 Rŋbi gŋa' KZZg Qvŋ-QvŋxK cŋg bglv wŋmŋte ubePb Kiv nte Zv %eŋvŋte wŋvŋY Kiv nq| thgb, cŋg 20 Rŋbi gŋa' hw' 11Zg Qvŋ ev QvŋxK `ŋevŋte ubePb Kiv nq, Zte cieZŋZ 21, 31, 41, 51Zg Gŋvŋte 200 Qvŋ-Qvŋxi ubePZ tkl bv nŋ qv chS' cŋµqvU Pj tZ _vŋK|

mij `ŋe bglvqb c×wZi Zŋbvq wbqZwšK bglvqb c×wZi meŋPtq , iæZcY'ævŋwU ntj v Gi mij Zv Ges mŋvav| GKRb cŋkŋYŋv ev` f cŋkŋYcŋB Dcv`E mslMŋKvixi cŋŋ tKvb GKU mŋvŋw`ŋ bglv GKK (aiv hvK 251Zg evox) LŋR cvl qv hZ mnR `ŋe msL'vi mviwY e'envi Kti bglv GKK LŋR tei Kiv ZZ mnR bq| Zte G c×wZi wKQYAmŋvavŋ i tŋtQ|

mij `ŋe bglvqb c×wZi Zŋbvq wbqZwšK bglvqb c×wZi meŋPtq , iæZcY'ævŋwU ntj v Gi mij Zv Ges mŋvav| GKRb cŋkŋYŋv ev` f cŋkŋYcŋB Dcv`E mslMŋKvixi cŋŋ tKvb GKU mŋvŋw`ŋ bglv GKK (aiv hvK 251Zg evox) LŋR cvl qv hZ mnR `ŋe msL'vi mviwY e'envi Kti bglv GKK LŋR tei Kiv ZZ mnR bq| Zte G c×wZi wKQYAmŋvavŋ i tŋtQ|

wfieZi Ziu mgMKtK mrvtZ cvtib| Gfite uzib ubioZ nZ cvtib th, Ziu bglvq h_vh_ cui gvTY D"P ukvqZ ucZi-gvZvi cUg tkYx cUB PZz@e!P QvT-QvTx ASf9 ntqtQ|

-i vqZ bglvqbi Pzvi
j qiu ntj v mgMKtK
KZ, tjv mgifc mve-tmU
mrvtbr Ges cZiu mve-tmU
t_K h_vh_ msL'vi
Dcr vbtK bglvq inmvte
ubepZ Kiv|

-i vqZ bglvqbi Pzvi j qiu ntjv mgMKtK KZ, tjv mgifc mve-tmU mrvtbr Ges cZiu mve-tmU t_K h_vh_ msL'vi Dcr vbtK bglvq inmvte ubepZ Kiv| Zte GLvtb gtb ivLv cUqvRb th, GKiu mgifc mve-tmU t_K AvtikuU mve-tmUi wfbzv _vKte| mve-tmU, tjv GKiu -livqb Pjtki (stratification variable) wfieZ mgifc ntj Ab" Pjtki wfieZi mgifc nZ cvtib| thgb, thtnZzQvT-QvTx`i tkYxi mv_ eqtmi GKiu mAUk@itqtQ, tmtnZztKYxi wfieZ -i vqZ bglvq eqtmi wfieZ -ivqtb| cZiubazKj nte|

-livqb PjK, tjvi ubepb wfp Kti wK aitYi PjK mnRj f' Zvi Dci| GKiu brtgi Zvj Kiv t_K mnRB wj %tK ubaY Kiv hvq| wKŠ' ukvq AvtK Pjtki mv_ mAUk9 ntj -livqbi Rb" AvtK mgq Zv mnRj f' bq| tKvb `ewko`i wfieZ Avgiv mgMKtK -i vqZ Kitev Zv ubepbi mgq gtb ivLZ nte th, `ewko`u ev `ewko`mga thb MtelYv mgm'vi mv_ cUwK nq| A_w, -i vqZ bglvqbi tqt Avgv`i gtb ivLZ nte th, -i vqZ bglvqb -i, tjv cui -uvi Kfite Abb" (mutually exclusive) nZ nte| A_w, mgMKi GKiu GKK tkej gvT GKiu -ti B ASf9 nte| GKiu GKK GKB mgq GKwaK -ti ASf9 nZ cvite bv| mgvMKfite, cZiu -ti i mgvB mAUYmgMKi mgvb nte|

-i vqZ bglvqb cUqv mgq, e`q l wfpZvi wK wq mij `oe bglvqbi tPtq mjevRbK| wtkl Kti, thLvtb mgMKi GKK, tjvi gta" Avak gvTvg AmgfcZv w`gvb, tmLvtb GB bglvqb cXwz wtkl fite DcthmX| KviY, -i wv'tmi gva`tg AmgfcZvi mgm'v `xfZ nq| thme tqt mgMKi wv'm ewqg nq, tm me tqt -i vqZ bglvqb LgB mjevRbK| D`vniY`tf, Avq wv'tmi tqt mij `oe bglvqb cUqv e`envi Kij D"P gvTvi Avtqi gvb, tjvi cZiubaz;bv| _vKtZ cvtib| -i wv'tmi gva`tg Avgiv cUŠK Avtqi gvb, tjvi cZiubaztK ubioZ Kitz cvii| -i vqZ bglvqbi AvtikuU eo mjev ntjv GLvtb GKwaK -ti i gta" Zjbr Kiv m@eci nq|

cZiu -ti bglvq ubepb mij %oe cXwz ev ubqgzwŠK cXwz nZ cvtib| Zte tKvb -ti wK nrti bglvq evQvB Kiv nte Zv GKiu „iazcy@eteP" wtlq| cZiu -ti t_K evQvBKZ. bglvq msL'v wv'pTYi `yU cXwz itqtQ| GKiu ntjv mgvzwZK eUv (proportionate distribution) Ges Ab`u ntjv AmgfcZv eUv (disproportionate distribution)|

mgvzwZK eUtb tgvU GKtKi msL'vi AbqvZ GKiu -li ev Dc- -li t_K bglvq GKK ubepb Kiv thZ cvtib| A_w, G tqt GKiu -li t_K evQvBKZ. bglvq Avkvi wfp Kti -ti i AvqZtbi Dci| aiv hvK, tKvb GKiu MtelYv tKvb Mtgi Avawmxt`i mgMK inmvte aiv ntqtQ| tmLvtb atgP wfieZ Mgevmxt`i tK Pvi fvtM fvm Kiv ntqtQ| thgb, gvmj g - 75 kZisk, w`y 20 kZisk, Liobv - 3 kZisk Ges teŠx - 2 kZisk| atgP wfieZ wef³ Mgevmxt`i cZiu tMwB nt"Q GtKkuU -li| GB cZiu -li t_K mgvzwZKfite bglvq Pqb Kiv thZ cvtib| tmLvtb hv KvwLZ bglvq Avkvi 100 nq, Zte bglvq gta" 75 Rb gvmj g, 20 Rb w`y3 Rb Liobv l 2 Rb teŠx _vKteb|

AmgfcZv eUtb -ti i AvqZb wtePbv bv Kti cZiu -li t_K mgvb msL'K bglvq ubepb Kiv nq| Gi cUv Dti`k`u nt"Q, bglvq msL'v ubepbi tqt AmgfcZv bglvq cXwz e`envi Kti bglvq bKkvi KvRvixZv ewx Kiv| wv'fbaeviw`wZtZ G aitYi bglvq cXwzi

m`m`i ga` t`K KivLZ bglv ubePb KitZ cvtib| GB c`uqv AvniZ bglvqb c`uZtK e`ch`x „Q bglvqb etj | G aiYi bglvqb c`tcty `yU c`uZ e`eniv Kiv ntq `vK — Zwj Kve`KiY Ges bglvqb|

e`ch`x bglvqbK KivRix (efficient) bglvqb c`uZ nmvte mgwii k Kiv thtZ cvti | uKŠ GB KivRixZvi neibgtq MtelKtK GKiu eo gj` i`Z nq Ges tmB gj`u ntjv mivKZv (accuracy)| mij `De bglvqb mgMOKi Zwj Kv t`K bglv ubePb Kiv nq etj tmLvtb gvI GKeri bglv `msiNtU| uKŠ`y`ch`x „Q bglvqb `yvi Ges uZb-ch`x bglvqb uZbevi bglv `msiNtU| Gfite bglvqtb ch`x hZ evotZ `vK bglv `msi cwi giv ZZ evotZ `vK| „t`Qi msL`v ubePb c`uqv gta` GB mgm`v mgvatbi tkD Dcvq ubwZ itqtQ| hiv GKRB MtelK 2000 e`i`i mivRvvi MhYi m`v`stbb Zte uZub GKiu „Q ubePb Kti tmB „Q t`K 2000 Rb e`i`i mivRvvi MhY KitZ cvtib| A`ev, uZub 2000 „Q ubePb Kti c`Zu „Q t`K GKRB Kti e`i`i mivRvvi MhY KitZ cvtib| tKSkj `yU tKivub h`v`bq| KivY, G `yUB ntjv Pig tKSkj | G aiYi cwi`uZtZ bglvi AvKiv I Dcv`vbi mgifcZvi melqu gtb ivLv metPtq „i`z`y` hiv „t`Qi Ašf`y Dcv`v`tjv mgifc nq Zte tekx „Q ubePb Kti c`Zu „Q t`K Kg Dcv`v ubePb Kiv hvq| Aviv hiv „Q`tjv mgifc nq Zte Kg „Q ubePb Kti c`Zu „Q t`K tekx Dcv`v ubePb Kiv hvq| „Q bglvqtb mivaviY bwiZgvj uU ntjv, „t`Qi msL`v tekx tiL ubePZ „t`Qi Af`šti Dcv`vbi msL`v Kgv`v| KivY, GtZ Kti mgMOKi Dcv`v`K AwaK cwi givY Zwj Kve` KiZ nq biv, hv „Q bglvqtb KivRixZv`K emotq tZvtj |

mvi usk

m`tebv bglvqb c`uqv gj- wfiE nj 0%DePqbD| `DePqb c`uqv `yU c`vb `eikó` itqtQ| c`gZt, Gu mgMOKi mKj Dcv`v`K bglvq Ašf`y nevi mgvb m`hivM c`vb Kti| uOZxqZt, `DePqtb gra`tg bglv wePz ubYq Kti ubePZ bglvu KZUKzmiWKfite c`ZubwaZkxj ntqtQ Zv ubifcY Kiv hvq| m`tebv bglvqtb weifb`c`uZ itqtQ| thgb, `De bglvqb, ubggZmšK bglvqb, `li`uqZ bglvqb, „Q bglvqb: GK-ch`x I e`ch`x| KLB tKiv c`uZu e`eüZ nte Zv ubf`P Kti Mtel`Ki `w`f`w, mgq, Ae`vb Ges MtelYvi DtiK` I aiYi Dci|

Df'ik` mxišgij-K bv ntq D`MvUbgj-K (exploratory) nq, tm tŋŋt cŋZwbazkij Zvi
velquU ZZ ,iazpŋ`vtK bv| hvi` tKvb mgMkK mWkfvte msAviqZ Kiv bv hvq, tm tŋŋt
mtebv bglyqb cxwZi e`envi Kwvb ntq cto| G aitYi cwiw`wZz Amtebv bglyqb
cxwZ cŋqvMi thšwKZvU Ab`Kvhŋ cŋZwbazkijZvtK wvŋZ KiZ bv cvitj| iagvŋ
mteav Ges A`mirkŋ G`ŋU velq mtebv bglyqbtbi me mteavtK wvŋZ Amtebv bglyqb
cxwZ cŋvb` we`li Kti|

mvgwRK weAvxiv cŋvbZ: th me Amtebv bglyqb cxwZ e`envi Ktib tm,tjv ntjv:
mteavRbK bglyqb (convenience sampling), Df'ik`gj-K bglyqb (purposive
sampling), tKvUv bglyqb (quota sampling), wtePbvij-K bglyqb (judgemental
sampling) Ges tmeej bglyqb (snow-ball sampling)| G cxwZ,tj vtK we`wi Zfvte
AvtjvPbv Kiv hvK|

mteavRbK bglyqb (Convenience Sampling)

GKRb MtelK hLb th tKvb mnRj f` bgly GKKtK ZvU mteav Ablyqx wtePb Ktib ZLb
ZvtK mteavRbK bglyqb etj| thgb, HIV/AIDS-Gi Dci hŋ mgvRi Avtbi gvŋv
wbfctYi Rb` GKRb MtelK ct` wŋtq th cŋg 200 Rb hŋq eqtmi e`wŋK tctjb
Zvt`iB Zvi bgly GKK wvŋte wtePb KiZ cvtib, ev GKRb wŋŋK ZvU KtjŋRi 200
Rb Qvŋ ev Qvŋx bgly wvŋte wtePb KiZ cvtib| G tŋŋt me KŋRb wtePZ bgly GKK
cjad ntZ cvti A`ev brix ntZ cvti| G aitYi bglyqbtbi gva`tg cŋZwbazkij Zv wvŋZ
Kiv hvq bv Ges mgMk gvbKl cŋ`j b Kiv hvq bv| G aitYi bgly wtePbtbi dtj th avŋŋ
nq Zvi wbfctY Kiv hvq bv| mteavRbK bglyqbtK accidental sampling| ejv ntq `vtK|

GKRb MtelK hLb th tKvb
mnRj f` bgly GKKtK ZvU
mteav Ablyqx wtePb Ktib
ZLb ZvtK mteavRbK
bglyqb etj|

Df'ik`gj-K bglyqb (Purposive Sampling)

Df'ik`gj-K bglyqbtbi gva`tg GKRb MtelK ZvU B`OvgZ bgly wtePb Kti `vtKb|
Df'ik`gj-K bglyqb MtelKtKi AwfAZv ev wtePbvi Dci cŋZwŋZ| KLtbr KLtbr MtelKtK
ZvU wŋRi AwfAZv mgMkKi Dci Avb, Ges MtelYvi Df'ik`i Dci wŋfŋ Kti bgly
wtePb KiZ nq| wtkl Kti cŋgvyv wbgŋYi cŋwK chŋq, MtelKtK ZvU cŋmgŋni
cŋqvmK DcŋwMzv cixŋv Kivi Rb` GB aitYi bglyqb cxwZ AbryiY KiZ nq| A`ev
AŋbK mgq GKw epEi RbtMvŋi GKw AskŋK wtePb Kivi cŋqvRb nq tmB RbtMvŋi
Dci GKw aviYv tbevi Rb`|

Df'ik`gj-K bglyqbtbi
gva`tg GKRb MtelK ZvU
B`OvgZ bgly wtePb Kti
`vtKb| Df'ik`gj-K bglyqb
MtelKtKi AwfAZv ev
wtePbvi Dci cŋZwŋZ|

hvi` MtelK gtb Ktib th, wtkl GKw RbtMvŋ ev wtkl wQye`wŋ ZvU MtelYvi j`ŋ
ARŋb mnvqK nte Zte wZvb tmB wtkl RbtMvŋ ev wtkl e`wŋeMŋK MtelYvi bgly GKK
wvŋte wtePZ KiZ cvtib| msikŋ bgly GKK wtePbtbi hŋŋ wvŋte MtelK aviYv KiZ
cvtib th, wtePZ bgly GKK,tjv ZvU MtelYv mgMkK cŋZwbazkij Kite| wKs`G aitYi
hŋŋ tZgb KvhRi bq| KviY, wvfbwMtelKtKi wtePbvi velquU wvfbwntq `vtK| thŋZz
wtePbvi m`uYfvte MtelKtKi wvR`^ wŋŋcŋZ Ges velqMZ (subjective), e`MZ
(objective) bq, tmŋZzGK MtelK t`ŋK Ab` MtelKtKi bgly GKK wtePbtbi wvŋwU wvfbw
ntZ cvti| Ggb cwiw`wZz MtelYvi djvdj wfbwnt Ges ZŋbvŋM`Zv nwiŋq tdjte|
mtevŋi, GKB mgMk t`ŋK bgly wtePb Kiti mgMkKi Aŋfŋ mKj Dcv`vtK bgly
wtePZ Kivi mgv mŋhM `vtK bv| Zte mteavRbK bglyqbtbi Zŋbvq Df'ik`gj-K bglyqb
wQyv DbzZi GB A`th, Df'ik`gj-K bglyqbt MtelYvi Df'ik`i wvŋŋZ GK aitYi

c0ZubwaZkxj Zvi welq weTePbrq _vtK, hir I tmB c0ZubwaZkxj Zvi welqiu Mteltki ubR^
wPsc0hZ|

tKivUv bglvqrb (Quota Sampling)

tKivUv bglvqrb gva tg
MtelK mKj tii
RbtMoxK c0ZubwaZkxi
Ggb GKiu bglv ubePb
KiZ Pvb|

mveavRbK bglvqrb I Dtikgj-K bglvqrb tqt tLv tMtQ th, th bmxZgvj vi wfiEtZ
bglv GKkK ubePb Kiv nq Zv mgMki mKj emkoK c0Zdij Z Kti br| tKivUv
bglvqrb bglv GKkK Ggbfite ubePb Kivi tPov Kiv nq hvZ Kti bglvU mgMki gZ
emko ariY Kti| tmB KviY, tKivUv bglvqrbK KLbl KLbl fvy Kti 0c0ZubwaZkxi
bglvqrb0 ejv ntq vtK| th mgMK mautK MtelK mvari YxKiY KiZ Pvb, uZub Zvu bglvK
tmB mgMki ueu GKB ifc w tZ Pvb Ges Gi gva tg c0ZubwaZkxi Zvi aviYmUtK c0Zu0Z
KiZ Pvb| thgb, hir GKiu mgMki gta 10 kZvsk gibly 60 eQtii Awak eqv nq, Zte
MtelK ubw0Z KiZ Pvb th, Zvu bglvi gta thb 60 eQtii tekx eqtmi 10 kZvsk gibly
Asf9 nq| A_er hir mgMki gta 48 kZvsk brix vtK, Zte MtelK Zvu bglvq 48
kZvsk brixK Asf9 Kivi welqiu ubw0Z KiZ Pvb| hir tKiv brixK bglvq Asf9 br
Kiv nq er Ly Ai mL K brixK Asf9 Kiv nq, mgMK mautK tmB bglv GKiu avslavi Yv
t te| KvRB, tKivUv bglvqrb gva tg MtelK mKj tii RbtMoxK c0ZubwaZkxi Ggb
GKiu bglv ubePb KiZ Pvb|

tKivUv ubePbi tqt awsl
nlqv wfiEK| KviY, th
bglv KivUv t tK bglv
ubePb Kiv ntqt0 tmUtZ
nvj -bivUv Z bvl vtKZ
cvti, A_er GKiu wtkl
Ask DtcuZ ntZ cvti|

AvciZt w0Z c0ZubwaZkxi gtb ntj| tKivUv bglvqrb gj-Zt mveavRbK er Dtikgj-K
bglvqrb gZB| cviv bglvi wifb0Dcivb,tjv mgMki msik0 Astki Dtikgj-K
bglvqrb Qrov Ab wKQyba| tKivUv ubePbi tqt awsl nlqv wfiEK| KviY, th bglv
KivUv t tK bglv ubePb Kiv ntqt0 tmUtZ nvj -bivUv (up-to-date) Z bvl vtKZ
cvti, A_er GKiu wtkl Ask DtcuZ ntZ cvti| thgb, umno tetq DVtZ K0 nte etj
GKiu 10 Zjv fetbi mteP Zjvq emeivmKvix eiv3i mivUvKvi MhY Kiv AtbK tqt
DtcuZ ntZ cvti|

tmeej bglvqrb (Snow-Ball Sampling)

Aabv tmeej bglvqrb cxuzi e'envi ew tctqtQ wtkl Kti tm mKj MtelKt i KvQ hri
ch0Yygt-K MtelYv Ges m0c0vq MtelYv Ktib| hir I tmeej bglvqrbK mvariYfite
Amtebr bglvqrb tKskj unmvte weTePbr Kiv nq, GiUtK mtebvgj-Kfite ubePb Kivi
tKskj Aw0Z.ntqtQ| GB tKskj e'envitii gva tg bglv awsl cwi gvc Kiv hvq Ges
mtebr er Amtebr hivb trvK br tKb, tmeej bglvqrb ch0muqKfite cwi Pwv Z nq|

c0g ch0q, c0qvRbxq emko mubamKQze iv3tK wPryZ Kti mivUvKvi MhY Kiv nq| bglvq
Asf9 Kiv hvq Ggb Ab eiv3ti wPryZ Kivi Rb G me eiv3tK mUvbvZv
(informants) unmvte e'envi Kiv nq| w0Zxq ch0q, G me eiv3i mivUvKvi MhY Kiv nq|
Ges ZZxq ch0q, Avtiv wKQze iv3tK bglvq Asf9 Kti mivUvKvi MhYi Rb G mKj
eiv3tK e'envi Kiv nq| Gfite hZ0Yy br c0qvRbxq mL K bglv mslMh Kiv tkl nq ZZ0Yy
ch0GB ch0muqK c0uqv Pj tZ vtK| 0tmeej 0 k0uLi e'envi Kiv ntqt0 eitdi tMj vi
mv_ Zjbr Kti, hv c0tg i i0nq GKiu tQvU tMj v unmvte Ges hZB GiU bxtPi w tK MoutZ
vtK axti axti ZZB eo ntZ vtK|

miv0ZKKvtj, wKQzMtelK tmeej bglvqrbK 'chain referral sampling' etj Avf0nZ
Kti0b| Gi Astb0nZ hvUv tmeej bglvqrb gZB| tmeej er chain referral

sampling c×wZwU ōōij Z Dc-ms`wZŌ (deviant sub-cultures) MtelYri tŋtŋ LqB Dc:thwMx thLutb DEi`vZv`i mvariYfite t`Lv hvq bv Ges cŋij Z bglvqb c×wZ,tjv KvhRi nq bv| thgb, gv`Kvk³t`i Dci MtelYri tŋtŋ GB bglvqb c×wZ tek dj cŋij nq| cŋij Z mvariY c×wZtZ gv`Kvk³ e`w³t`i mekymvthM`Zv ARB Kiv mae bq| Ggb wKQze`w³tK mŪvb`vZv mnmvte ubePb Kiv nq hviv gv`Kvk³ e`w³t`i tPt| wKŠ mŋvŋvKvi Mh:Yi Rb` Zv`i tek wKQzwb e`q KitZ nq| KviY, Av`v AR:bi melquw G tŋtŋ , iazcYp gv`Kk³ e`w³iv hZŋY chS`bv ubwōZ nteb th mŪvb`vZv e`w³t`i w`tq Zv`i tKiv ŋwZ nte bv ZZŋY chS`Zvii tKiv Z`B cŌvb Ki te bv|

mæbebv I Amæbebv bglvq:bi wgvY (Combining Probability and Non-Portability Sampling)

hiv` wewfbæchŋq bglvq:bi cŋqvRb nq, Zte GKwU bglv bKkvq mæbebv I Amæbebv bglvq:tK wgvY Kiv mæe| A`ŋ, GKwU ev`ŋw chŋq mæbebv bglvqb Ges Ab` chŋq,tjv tZ Amæbebv bglvqb c×wZ e`envi Kiv thtZ cŋij| thgb, „Q mæbebv bglvqb c×wZ e`envi Kti GKRb MtelK „Q,tjv tK e`envi KitZ cŋij| wKŠ PevšI chŋq Dcv`vb,tjv tK tKiv bglvqb c×wZ e`envi Kti ubePb Kiv thtZ cŋij| AZGe, cŋqvRbriq mSL`K MŋgtK mæbebv c×wZtZ ubePb Kti tmB ubePZ Mŋq,tjv t`tK LvbitKI (household) mæbebv bglvqb c×wZ e`envi Kti ubePb Kiv hvq, Ges ubePZ Lvbi,tjvi ga` t`tK wj ½ I eqtmi AbgvvZi wfwē:tZ tKiv bglvqb c×wZ e`envi Kiv hvq|

GiKg GKwU wgvY bglv bKkvi mæavwU ntjv th, bglvi Rb` wbaŋi Z bglv GKK,tjv ubeP:bi tŋtŋ e`vcK A`mvtq nq| wcvxZfite, cŋtg GjvKv,tjv tK mæavRbK ev D:t`k`gj-K bglvqb c×wZi gva`tg ubePb Kti tmB ubePZ GjvKv,tjv t`tK mæbebv bglvqb c×wZ e`envi Kti PevšI Dcv`v,tjv tK mæbebv ubePb Kiv thtZ cŋij|

mviusk

tKiv mgMK:tK hiv` mwwKfite msAvwZ Kiv bv hvq, tm tŋtŋ Amæbebv bglvqb c×wZ h_vh_ nte| mvariYzt cŋv ai:tYi Amæbebv bglvqb c×wZ Avgiv MtelYvq t`tL`wK| tm,tjv ntjv: mæavRbK bglvqb, D:t`k`gj-K bglvqb tKiv bglvqb, wetePbv:K bglvqb Ges tmæej bglvqb| Amæbebv bglvq:bi tKiv c×wZwU h_vh_ nte Zv wbfP Kti MtelYri D:t`k` I cKwZ, DchY cwi tek Ges m:hm-mæavi Dci|

bglyvi AvKvi ubaŷŷY
Determination of Sample Size

GB cW tkŷl hv Rvbr hvte —

- bglyvi AvKvi KZ eo nte
- bglyvi AvKvi ubaŷŷY i aZcYDcv`vbmgr
- mgvbgvŷZi Rb`bglyvi AvKvi ubYŷ
- Mtoi Rb`bglyvi AvKvi ubYŷ

bglyvi AvKvi KZ eo nte (How Big a Sample Size Should be)?

th tkvb MtelYvi Ab`Zg i aZcYŷelq ntjv bglyvi AvKvi | MtelYvi aiY, Dŷŷk, ZvŷEK Kivvŷgv, cZ`qmgŷni KivRi msAv Ges cwi gvc cŷuqv ubaŷŷYi ci GKRB MtelK cŷg th cŷuŷi mŷŷab nb tmiU ntjv, ōbglyvi AvKviU KZ eo nteŷ? tKD ej tZ cvŷib th, GuU ŷK GKU RŷUj mgm`v ntjv? MtelYvi Rb` hZ eo cŷqvRb bglyvi AvKvi ZZ eo nte | G aiŷYi eŷte`i gva`tg mgm`mŷi tkvb ev`emŷZ mgvaib ntjv br | Zte eŷe`UŷK Mfxi fvte chŷj vPbv Kitj ŷKQymŷ cvl qv hvte, hv bglyvi AvKvi ubaŷŷYi RŷUj RvŷU LjŷZ mrvh` Kite |

hLb ejv nŷ`Q th, ōMtelYvi Rb` hZ eo cŷqvRb bglyvi AvKvi ZZ eo nteŷ, ZLb gtbi gŷa` KZ, tjv i aZcYŷcŷh`ŷ tŷŷm DŷV | thgb, MtelYvi Dŷŷk`U ŷK? MtelYmU Kvŷ`i Rb` cwi Pwŷ Z nte? MtelYvi cŷKZ ŷK? BZ`w | tkl cŷuŷ w`ŷq`i i aKiv hvK | hv MtelYvi cŷKZU ev`L`vgj-K br nŷq eYŷvgj-K nq tm tŷŷŷŷ bglyvb cŷuŷ Ges bglyvi AvKvŷi i ŷelquU ŷKQyv ŷK`j fvte t`Lv thŷZ cvŷi | mnRfvte MtelYv Kiv`cwi Pj bvi Rb` Amŷŷebv bglyvb cŷuŷ e`enri Kŷi th tkvb AvKvŷi i bglyv ŷbeŷŷb Kiv thŷZ cvŷi | th mgMŷKi Dci MtelYv cwi Pwŷ Z nq tmB mgMŷU hv` mgŷfc nq, Zte `f msL`K bglyvi ŷŷŷŷŷ tmB mgMŷ mŷŷŷK`mavi YxKiY Kiv hvq | MtelYvi Dŷŷk` hv` Mfxi Zŷbvgj-K ŷŷkŷY nq Zte bglyvi AvKvi eo nte | Avi hv` Dŷŷk`U mgMŷKi maviY eYŷv nq Zte tQvU bglyv ŷŷŷ B Dŷŷk`U mvaZ nte |

G chŷŷAvŷj vPbv t`Lv hvŷ`Q th, bglyvi AvKvi ubaŷŷY cŷE eŷe`Uŷi chŷj vPbv t`ŷK tek ŷKQymŷ cvl qv hvq hvŷ ŷŷŷŷŷ bglyvi AvKvi ubaŷŷY ŷmŷŷŷŷŷ Kiv hvq | ŷKŷ mgm`v ntjv th, Dcti th cŷh`ŷ, tji vi Dŷŷŷ Kiv nŷqŷQ tm, tji hv` MtelŷKi Abŷŷŷ br ŷŷŷ Zte ōbglyvi AvKvi KZ eo nteŷ G cŷkŷe mŷŷŷŷ Reve cvl qv hvte br | hv` cŷh`ŷ, tji vi MtelŷKi Abŷŷŷ ŷŷŷ tm tŷŷŷŷŷ bglyvi cŷKZ. AvKvi ŷK nte Zv Rvbr hvq br | A`ŷ, GLbŷ Avgiv mŷŷŷŷŷŷŷŷŷ ej tZ cvŷiU br th, MtelYvi Rb` cŷKZŷŷŷ KZRb e`ŷŷŷŷŷ ŷbeŷŷb Kiv nte | KviY, Dci ŷŷŷŷŷ cŷh`ŷ, tji vi Qvovl Avŷiv ŷKQy, i aZcYŷDcv`v i tŷŷQ th, tji vi ŷŷŷŷŷ Avbr cŷqvRb |

bglyvi AvKvi ibaŋiY , iaZcyDcv`ibmgn (Important Factors in Determining Sample Size)

bglyvi AvKvi KZ eo nte Gi msL`v`ibYŋqi melquU`ibfP Kti c`avbZt`uZbuU`melŋqi Dci | tm,`tjv`ntjv:

1. mgMŋK gvb cŋ`j`ŋbi Rb` Kw`LZ m`Zvi gvT`v,
2. mnbthvM` T`auUi gvT`v, Ges
3. mgMŋKi cwi`ngZ e`eavtbi cŋ`ij Z gvb|

cŋ`g`ŋU`kZ`AwZ`mŋtRB`c`i`Y`Kiv`hvq|`Kvi`Y,`tm,`tjv`Mtel`ŋKi`ŋv`v`ibaŋi`Z`nq|`uKŠ`ZZxq`kZ`ŋU`c`i`Y`Kiv`Kw`b|`hv`Avgiv`mgMŋKi`cwi`ngZ`e`eavtbi`gvb`Rvb`ŋZ`cwi`Zvntj`Avgv`i`bglyv`ibeŋPb`Kti`Mtel`Yv`cwi`Pvj`bri`tKvb`cŋ`qvRb`nq`bv|`mgMŋKi`gvb`ARvbv`_v`ŋK`etj`B`Avgiv`bglyvi`gv`ŋbi`w`f`v`E`ŋZ`mgMŋK`m`u`ŋK`Rvb`ŋZ`PvB|`G`ai`ŋYi`cwi`w`uZ`ŋZ`Avgv`i`ARvbv`mgMŋKi`cwi`ngZ`e`eavb`m`u`ŋK`GKwU`ŋ`Avbiv`B`Abgvbŋ` (enlightened guess) `Ki`ŋZ`nq|`mgMŋKi`cwi`ngZ`gvb`m`u`ŋK`ŋ`Avbiv`B`Abgvbŋ`Ki`ŋZ`ntj`Avgv`i`nq`ce`cwi`Pvj`Z`Mtel`Yv`t`_`ŋK`cŋ`B`cwi`ngZ`e`eavtbi`K`A`_`ev`Mtel`K`KZR.`cwi`Pvj`Z`civ`Bj`U`Mtel`Yv`t`_`ŋK`cŋ`B`cwi`ngZ`e`eavtbi`gvb`ŋK`MŋY`Ki`ŋZ`nte|`GB`uZ`buU`Dcv`v`b`ŋK`GKwU`m`ŋi`cŋ`qvM`Kti`Kw`LZ`bglyvi`AvKvi`u`ibYŋ`Kiv`hvq|`Gevi`Avgiv`mgMŋKi`mgvb`ŋZ`ev`Mo`ŋK`cŋ`j`ŋbi`Rb``ibv`gZ`m`F,`tjv`e`envtii`gva`ŋg`Kw`LZ`bglyvi`AvKvi`ibYŋ`Kti`t`L`tev|

mgMŋKi Dcv`vb,`tjvi`gta`
 hv`Lg`tekx`w`f`b`Zv`_v`ŋK`
 Zte`m`ŋi`gva`ŋg`ibYŋZ`
 msL`vi`bglyv`AvKvi`h`ŋ`o`
 bvl`ntZ`cvti|`AwZ`gvT`vq`
 Amgijc`mgMŋKi`Rb`
 ep`Ei`AvKviti`bglyv`ibeŋPb`
 Ki`ŋZ`nte|

Zte`GiU`gtb`ivLv`cŋ`qvRb`th,`bglyvi`AvKvi`ibYŋqi`melquU`i`agvT`m`ŋi`gta`msL`v`cŋ`qvM`i`tLjv`bq|`ev`e`Ae`vi`cwi`t`cŋ`ŋZ`m`ŋi`gva`ŋg`bglyvi`AvKvi`ibYŋqi`cŋ`e`Av`ŋv`u`KQy,`iaZcy`melq`wetePbvq`ivLv`cŋ`qvRb|`Avgiv`cŋ`e`D`ŋj`L`Kti`u`Q`th,`mgMŋKi`Dcv`vb,`tjvi`gta`hv`Lg`tekx`w`f`b`Zv`_v`ŋK`Zte`m`ŋi`gva`ŋg`ibYŋZ`msL`vi`bglyv`AvKvi`h`ŋ`o`bvl`ntZ`cvti|`Avevi`hv`mgMŋKi`Dcv`vb,`tjv`mgijc`nq`Zte`ibYŋZ`bglyv`AvKviti`tP`ŋK`Kg`msL`K`bglyv`ibeŋPb`Kti`GKB`D`ŋi`k`m`vab`Kiv`hvq|`mgMŋKi`A`ŋf`ŋDcv`vb,`tjvi`gta`AwZ`gvT`vq`w`f`b`Zv`_v`Kvi`A`_`n`ŋ`Q`cwi`ngZ`e`eavtbi`gvb`ep`x`civ`qv|`Avi`cwi`ngZ`e`eavtbi`gvb`ep`x`civ`qv`i`A`_`n`ŋ`Q`bglyvi`AvKvi`ep`x`civ`qv|`A`_`ŋ,`AwZ`gvT`vq`Amgijc`mgMŋKi`Rb``ep`Ei`AvKviti`bglyv`ibeŋPb`Ki`ŋZ`nte|

uK`ai`ŋYi`Dcv`E`w`etkŋ`ŋYi`cwi`K`i`bv`Kiv`ntq`ŋQ`Zvi`Dci`l`ibf`P`Kti`bglyvi`AvKvi`uK`nte|`hv`R`u`Uj`cwi`msL`v`bK`w`etkŋ`ŋYi`cwi`K`i`bv`_v`ŋK`Zte`ep`Ei`bglyvi`AvKvi`A`_`en`dj`v`dj`f`te|`Kvi`Y,`A`ŋbK`tekx`Pj`K`GKBm`ŋ`w`etkŋ`ŋYi`gta`A`ŋf`ŋD`Kiv`hvq|`A`_`ŋ,`hv`m`vavi`Y`f`v`ŋe`GK`Pj`Kw`ew`k`o`cwi`msL`v`ŋbi`e`envi`nq` (thgb,`Mo,`mgvb`ŋZ,`kZ`Kiv,`BZ`w`),`Zte`A`ŋc`ŋj`v`KZ.`_`f`msL`K`bglyv`w`etkŋ`ŋYi`Rb``h`ŋ`o`ntZ`cvti|`Ab`w`ŋK,`hv`e`u`Pj`Kw`ew`k`o`cwi`msL`v`ŋbi`e`envi`nq` (thgb,`ibf`P`Y,`Dcv`vb`w`etkŋ`Y,`f`v`ŋ`ŋi`w`etkŋ`Y,`BZ`w`),`Zte`ep`Ei`AvKviti`bglyv`Acwi`nv`h`ŋ`ŋq`c`to|

m`ŋev`w`i,`mgq,`A`_`Ges``ŋ`Rbkw`i`3`ch`ŋB`Zv`bglyvi`AvKvi`ŋK`A`ŋbKv`ŋt`k`c`f`v`w`Z`Kti|`thgb,`m`F`cŋ`qvM`Kti`t`L`v`tMj`th,`GKwU`w`v`ŋ`ŋ`Mtel`Yv`Rb``1000`Rb`e`w`ŋ`ŋK`bglyv`A`ŋf`ŋD`Ki`ŋZ`nte|`uKŠ`A`_`mgq`ev`cŋ`qvRb`vq`msL`K`tjv`Ketj`i`Af`v`ŋe`Avgiv`gvT`500`R`ŋbi`m`v`ŋj`v`r`Kvi`MŋY`Ki`ŋZ`cwi|`G`ai`ŋYi`cwi`w`uZ`ŋZ`Avgiv`uK`m`Z`v`ŋK`wem`R`ŋ`w`ŋq`500`R`ŋbi`m`v`ŋj`v`r`Kvi`MŋY`Ki`ŋev,`b`w`K`h`Z`ŋj`Y`bv`1000`R`ŋbi`m`v`ŋj`v`r`Kvi`MŋY`Kivi`gZ`mgq,`A`_`ŋ`tjv`Kej`c`v`ŋev`ZZ`ŋj`Y`ch`ŋS`A`ŋc`ŋj`v`Ki`ŋev|`GB`w`m`x`v`ŋS`Mtel`K`ŋKB`w`ŋZ`nte|

Kiv DıPZ | mgMŃKi Dcr`vb, tıvi gta` hıı` Ly tekx ıfıbzv _vtK Zte mŃı i gva`tg ıbYŃZ
msL`vi bgııv AvKıı hı_ó bvl nŃZ cııı | ıKŠ` hıı` mgMŃKi Dcr`vb, tıv mgııc nq, Zte
ıbYŃZ bgııv AvKııı i tPtq Kg msL`K bgııv ıbeıPb Ktı MŃel Yı cııı Pııı Z nŃZ cııı |

ciṽVĒi gj'iqb

ḃeṽK cĕæ

mĭWK DĒti i ciṽk ĭJK (√) ĭPý ĭ b -

1/ bglvi AvKvi KZ eo nte Zv ĭbfP Kti ĭU ĭelṽqi Dci |

- K. GK
- L. ḃ
- M. ĭZb
- N. Pvi

2/ Mṽoi Rb' bglvi AvKvi ĭbarṽY Avgiv mĕU e'enri KiṽZ cwi |

K. $N = \frac{z^2(P_s)(Q_s)}{E^2}$

L. $\left[N = \frac{(z)(\alpha)}{E} \right]^2$

M. $N = \frac{z^2(P_s)^2(Q_s)^2}{E}$

N. $\left[\frac{(z^2)(\alpha)^2}{E^2} \right]$

3/ mgMĕKi Dcv`vb, ṽjvi gṽa' hĭ Lṽ tekx ĭfbZv `vṽK Zte:

- K. mṽĭ i gvaṽg ĭbaṽi Z bglvi AvKvi B hṽ_ó nte
- L. mṽĭ i gvaṽg ĭbYĕZ msL'vi bglvi AvKvi hṽ_ó bvl nṽZ cṽti
- M. ĭbYĕZ bglvi AvKṽti i tṽtq Kg msL`K bglvi ĭbeṽb KiṽZ nte
- N. cwi ĭgZ e'earṽbi gvb nĭm cṽte

msĭB cĕæ

1/ bglvi AvKvi ĭK?

2/ bglvi AvKvi ĭbaṽY, i aZcY`Dcv`vb, ṽjv ĭK ĭK?

iPbṽj-K cĕæ

1/ bglvi AvKvi KZ eo nI qv DĭPr etj Avcĭb gṽb Kti b? Avcbvi DĒti i `cṽĭ hyṽ ĭ b |

2/ bglvi AvKvi ĭbarṽY ṽh Dcv`vb, ṽjv, i aZcY`Zv Avṽj vPbv Ki ab |