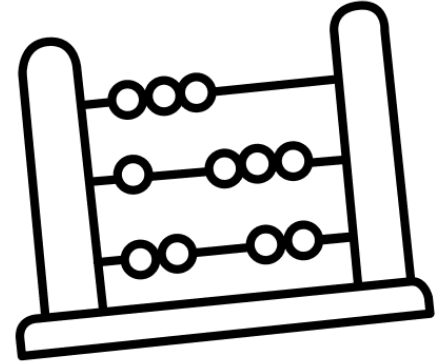


Miisaanka itimaalka (probability scale)



Maths

Cutub: Itimaal (probability): itimaalada aragtida (theoretical probabilities)

Natiijo

Waxaan u qoondeyn karaa qiime (value) natiiyo si aan u bixiyo itimaalka (probability) in natijadu dhacdo.

Erayada muhiimka ah

Natiijadu waa mid aan macquul ahayn (impossible) haddii aysan jirin suurto galnimo inay dhacdo.

Natiijadu waa mid hubaal ah (certain) haddii la dammaanad qaaday inay dhacdo.

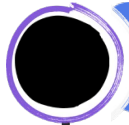
Natiijadu waxay leedahay fursad siman (even chance) haddii ay tahay inay dhacdo iyo inayna dhacayn isku mid tahay.

Tijaabo (experiment) waa ku celcelinta tijaabin (trial) marar badan si loo eego inta jeer oo natiijo kasta dhacdo.

Itimaalka (probability) in dhacdo dhacdo waa saamiga (proportion) jeer ee dhacdada la filayo inay dhacdo tijaabo (experiment) ku habboon oo weyn.

Qaabka casharka

Miisaanka itimaalka (probability scale)



Muujinta itimaalka (probability): boqolleyda iyo jajab tobanle (decimals)



Muujinta itimaalka (probability) jajab ahaan (fractions)

Muujinta itimaalka (probability): boqolleyda iyo jajab tobanle (decimals)



Itimaalku (probability) waa cabbirka suurtoalnimada in natiijo dhacdo.

Erayada sida 'laga yaabee' iyo 'sugnaan la'aan' waxay qeexayaan suurtoalnimada in dhacdo dhacdo, laakiin waa kuwo aan caddayn.

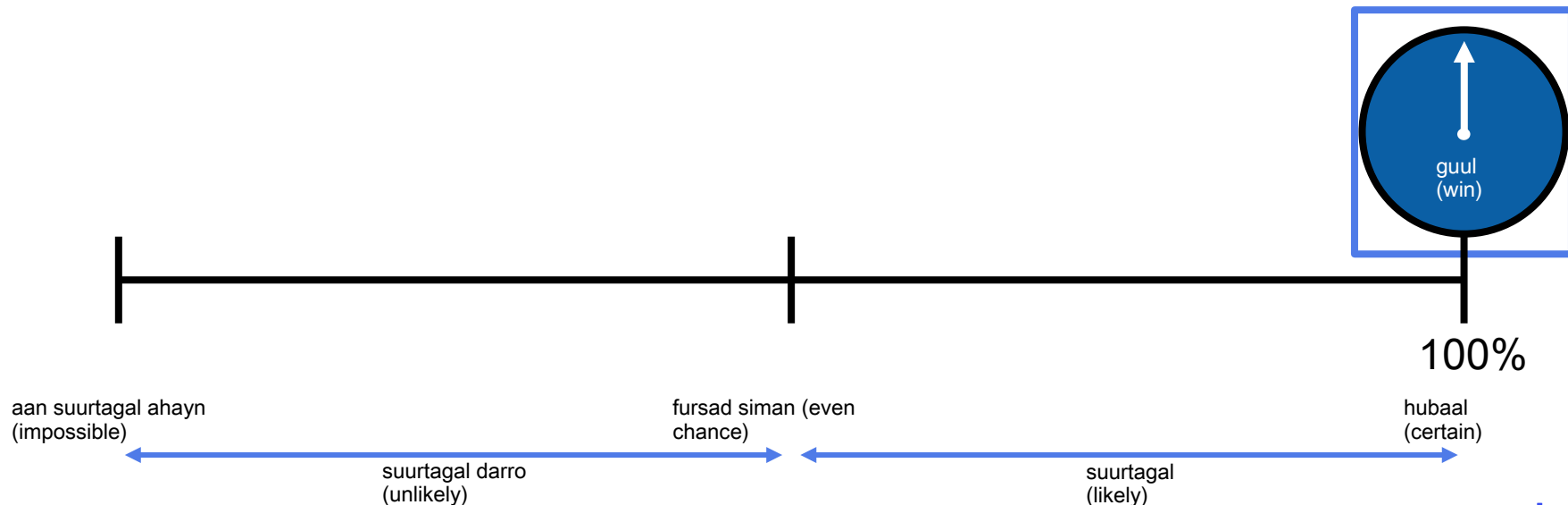
Itimaallada (probabilities) waxay si qeexan u qeexaan suurtoalnimada dhacdo iyagoo adeegsanaya qiime (value) tiro si ay u muujiyaan suurtoalnimadeeda.

Itimaalka (probability) in dhacdo dhacdo waa saamiga (proportion) jeer ee dhacdada la filayo inay dhacdo tijaabo (experiment) ku habboon oo weyn.

Muujinta itimaalka (probability): boqolleyda iyo jajab tobanle (decimals)

Dhacdo hubaal ah (certain) waxay leedahay itimaal (probability) 100% inay dhacdo.

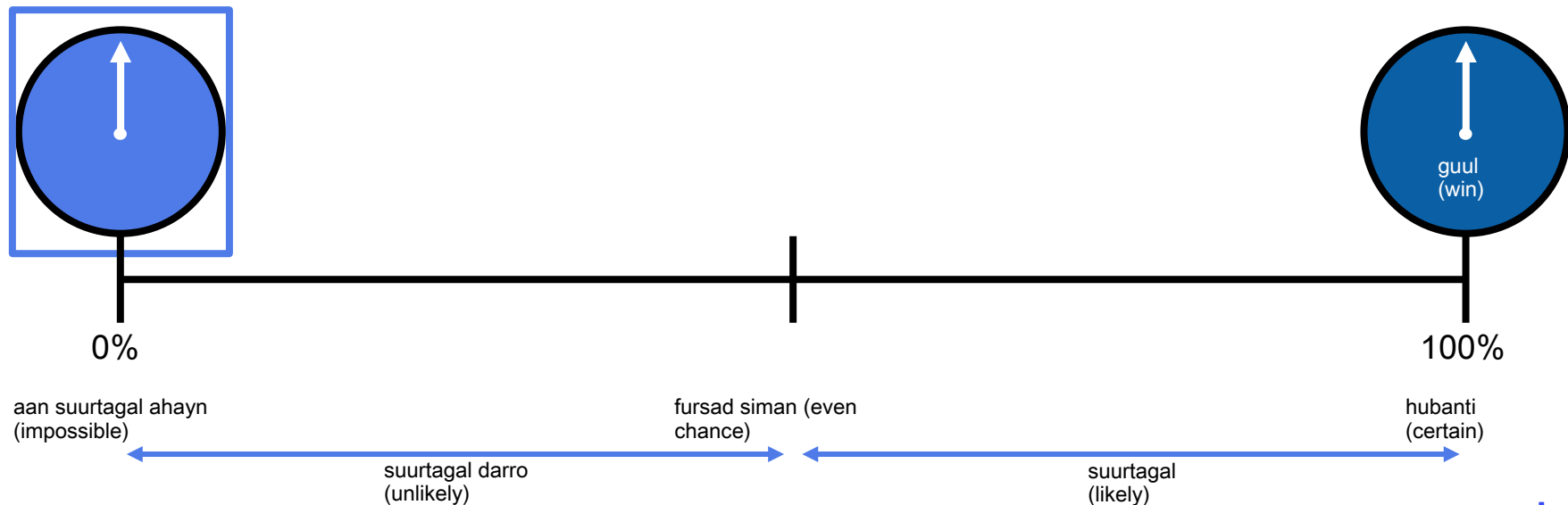
Tusaale: 100% tijaabooyinka (trials) lagu sameeyay wareeggan (spinner) waxay noqon doonaan 'guul'.



Muujinta itimaallada (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)

Dhacdo aan suurtagal ahayn (impossible) waxay leedahay 0% itimaal (probability) inay dhacdo.

Tusaale ahaan, 0 ka mid ah tijaabooyinka (trials) lagu sameeyay wareeggan (spinner) waxay noqon lahaayeen 'guul (win)'.



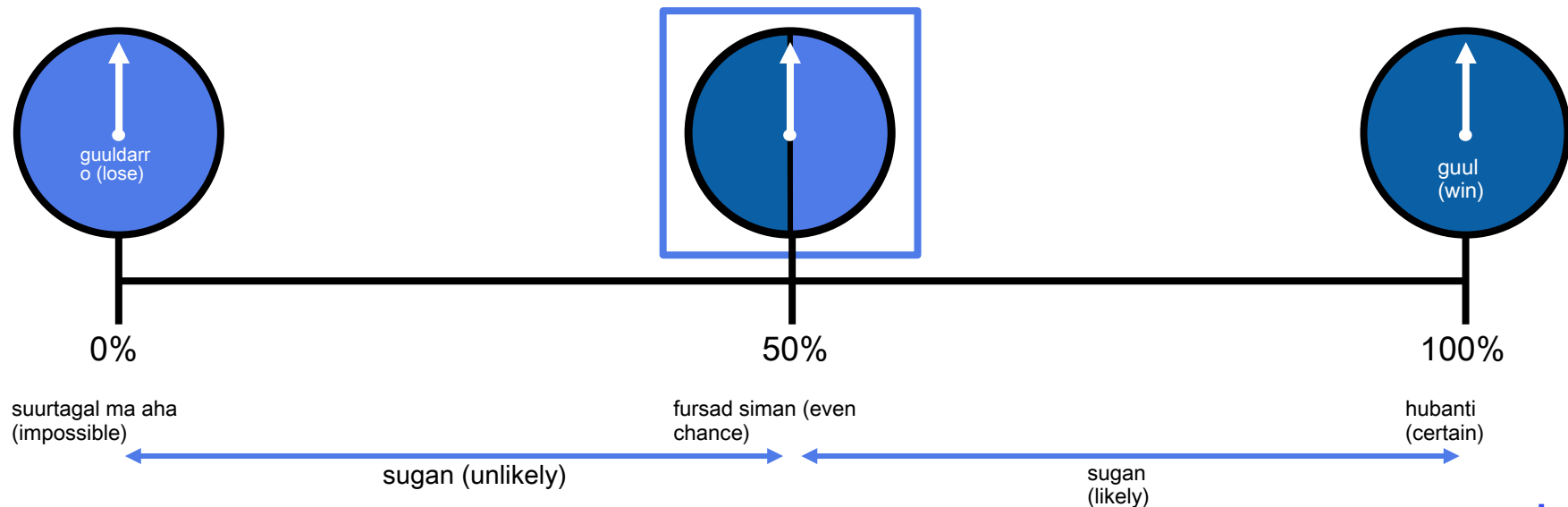
Muujinta itimaallada (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)



Sharaxaad

Dhacdo leh fursad siman (even chance) waxay leedahay 50% itimaal (probability) inay dhacdo.

Tusaale ahaan, haddii aan sameynno tiro badan oo tijaabooyin (trials) ah oo wareeggan (spinner) ah, waxaan filaynaa in qiyaastii 50% natiijooyinka (outcomes) ay noqdaan 'guul (win)'.



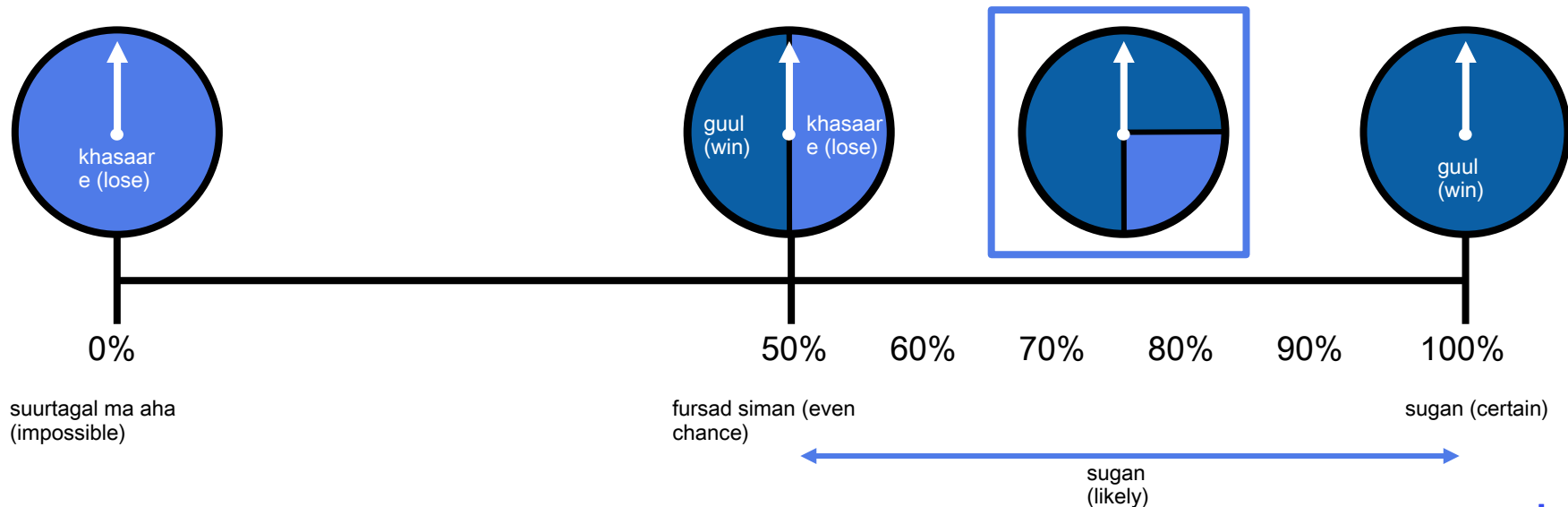
Muujinta itimaalka (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)



Sharaxaad

Itimaalka (Probabilities) ka weyn 50% waxay leeyihiin fursad ka siman (even chance) inay dhacaan.

Tusaale: Haddii aan sameyn lahayn tiro badan oo tijaabooyin (trials) ah oo leh wareeggan (spinner), markaas waxaan filan lahayn inuu ku dhaco 'guul' (win) marar ka badan 'khasaare' (lose).



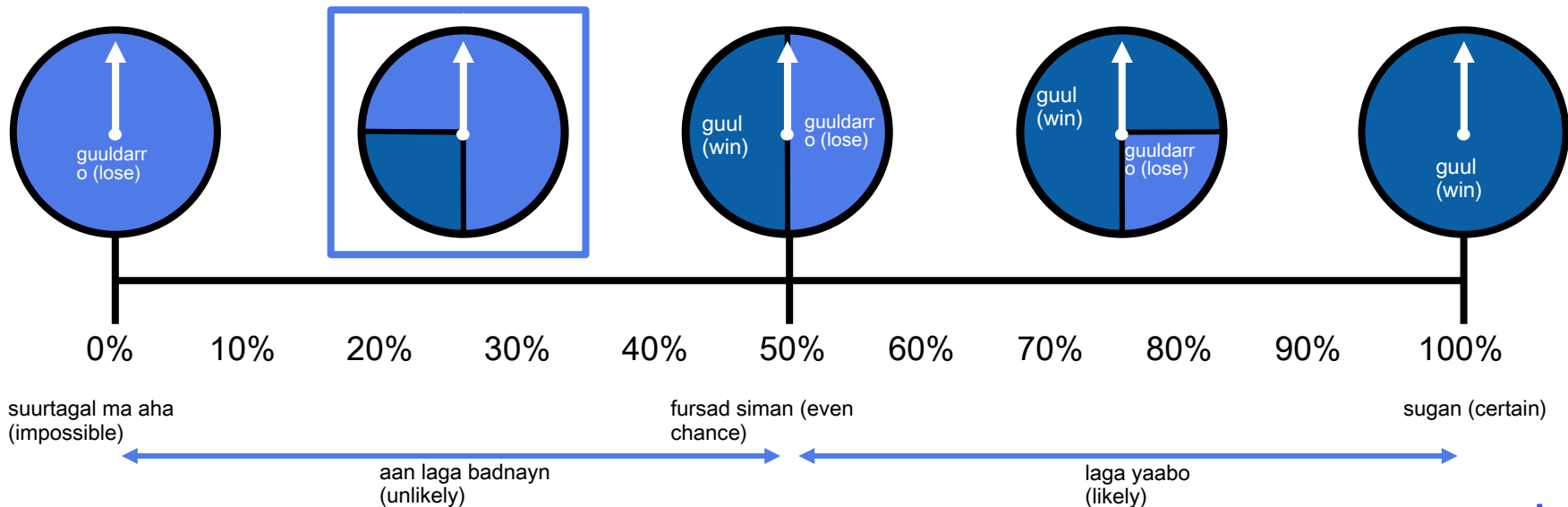
Muujinta itimaalka (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)



Sharaxaad

Itimaalka (Probabilities) ka yar 50% waxay leeyihiin fursad ka yar fursad siman (even chance) inay dhacaan.

Tusaale: Haddii aan sameyn lahayn tiro badan oo tijaabooyin (trials) ah oo leh wareeggan (spinner), markaas waxaan filan lahayn inuu ku dhaco 'guul' (win) marar ka yar 'khasaare' (lose).



Muujinta itimaalka (probability): boqolleyda (percentages) iyo jajab tobanle (decimals)

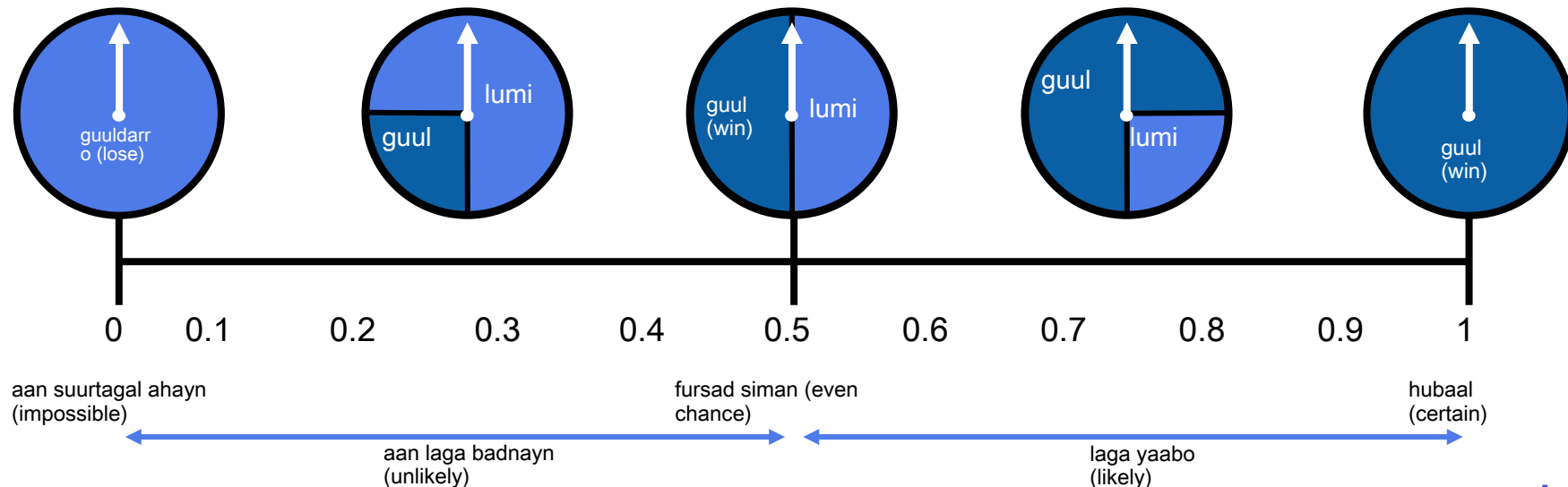


Itimaalka (probability) waxaa sidoo kale lagu muujin karaa iyadoo la isticmaalayo jajab tobanle (decimals) u dhigma.

Itimaal (probability) 0 wuxuu ka dhigan yahay in dhacdadu (event) tahay mid aan suurtagal ahayn (impossible).

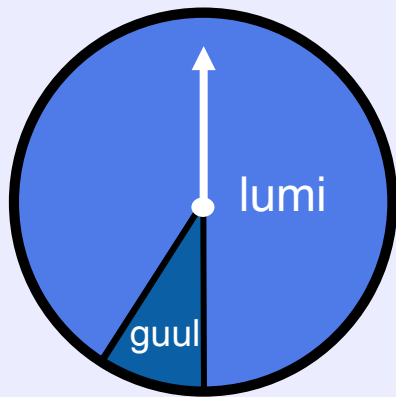
Itimaalka (probability) 1 wuxuu macnaheedu yahay dhacdo (event) waa hubaal (certain).

Tirada weynaanta waxay muujinaysaa inta ay u badan tahay in dhacdo (event) dhacdo.

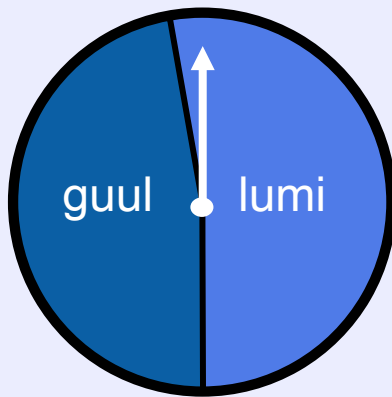


Muujinta itimaalka (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)

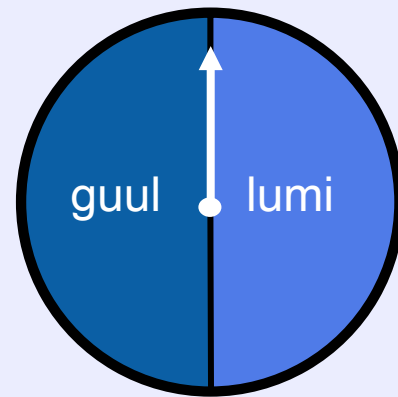
Kee (spinner) ayaa leh itimaal (probability) 48% inuu ku soo degto 'guul'?



a



b ✓



c

Spinner wuxuu leeyahay afar natiiyo (outcomes): $\xi = \{A, B, C, D\}$

Natiijooyinka (outcomes) uma badna inay dhacaan si isku mid ah.

- Itimaalka (probability) spinner uu ku soo degto A waa 25%
- Itimaalka (probability) spinner uu ku soo degto B waa 18%
- Itimaalka (probability) spinner uu ku soo degto C waa 34%
- Itimaalka (probability) spinner uu ku soo degto D waa 23%

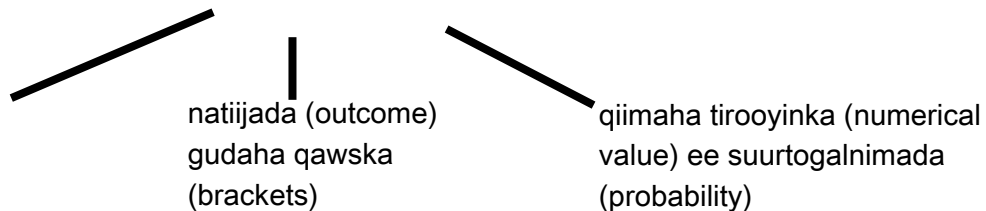


Tani waxay u egtahay qaab dheer oo lagu sheegayo suurto galnimadan (probabilities). Waxaan la yaabanahay haddii ay jirto calaamad (notation) loo isticmaali karo in lagu gaabiyo macluumaadkan?

Muujinta suurtoqalnimada (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)

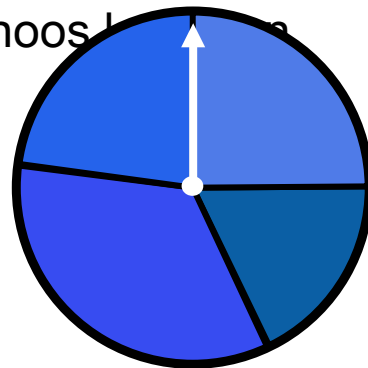
Oraahda ku saabsan suurtoqalnimada (probability) waxaa loo qeexi karaa si hufan iyadoo la isticmaalayo calaamadda (notation) 'P(natiijada) = '.

Tusaale: Suurtoqalnimada (probability) in wareeggu (spinner) ku soo baxo A waa 25%.



Wareeggu (spinner) wuxuu leeyahay afar natiijood (outcomes): $\xi = \{A, B, C, D\}$

Suurtoqalnimada (probabilities) natiijo kasta (outcome) ayaa hoos ku xarxariisa



Natiijo (outcome) intee le'eg ayaad filanaysaa inay inta badan dhacdo?

Natiijo (outcome) intee le'eg ayaad filanaysaa inay ugu yar dhacdo?

Haddii ay jiraan 2000 tijaabo (trials), qiyaas ahaan imisa jeer ayaa wareegga (spinner) laga filan karaa inuu ku soo baxo A?

Muujinta suurtoalnimada (probabilities): boqolleyda (percentages) iyo jajab tobanle (decimals)



Hubi

Ciyaar fiidiyoow (video game) oo ku salaysan bakhtiyaa-nasiib (chance) waxay leedahay 25% suurtoalnimo (probability) 'guul'.
Lambarka hoose ee ugu macquulsan (most reasonable estimate) waa kan qiyaasaha ugu fiican ee guulaha laga filan karo 1000 ciyaar?

a

b

c

yaabaha:

50

250

500

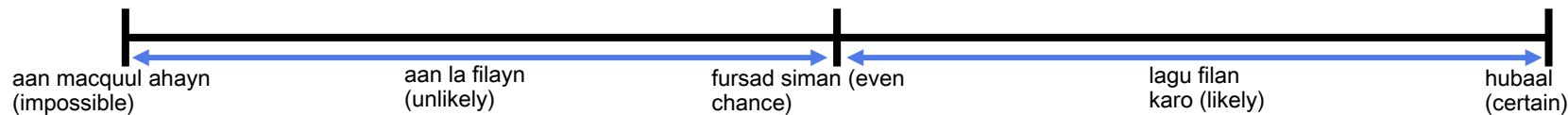
1000

d



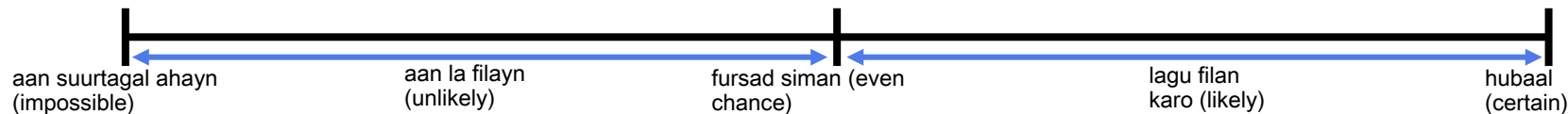
1) Qor suurtoalnimada (probabilities) hoose si habboon oo ku qoran miisaanka suurtoalnimada (probability scale).

0%, 100%, 20%, 75%, 50%, 45%, 55%

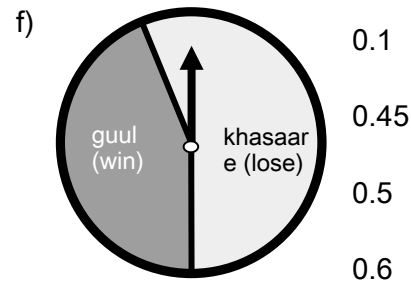
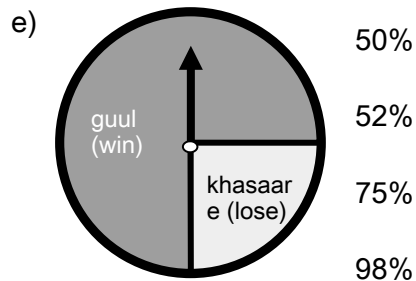
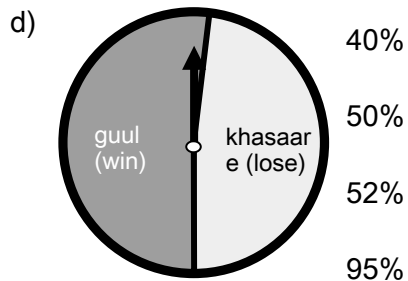
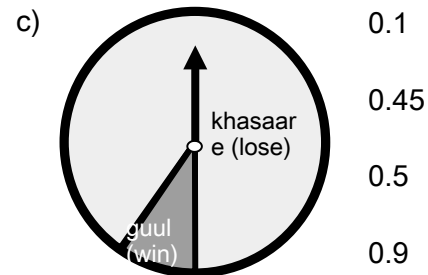
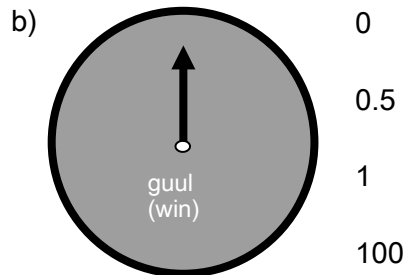
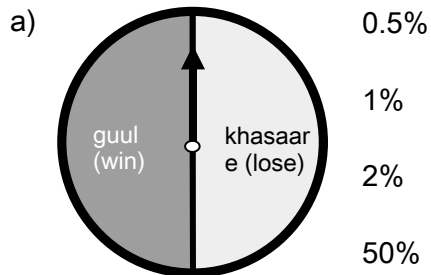


2) Ku qor itimaalka (probabilities) hoos ku qoran sida saxda ah ee miisaanka itimaalka (probability scale).

1, 0, 0.5, 0.1, 0.35, 0.95, 0.6

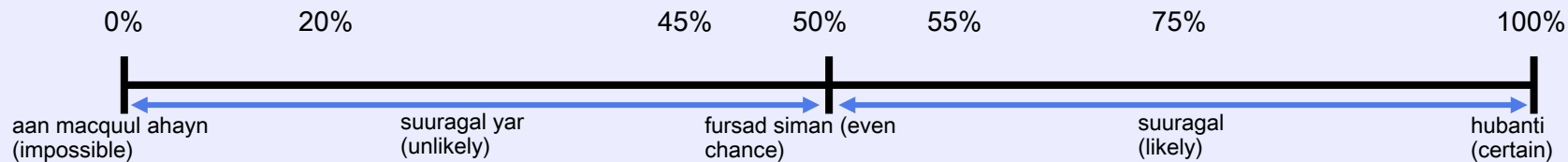


3) Su'aal kasta waxaa lagu siinayaa wareeg (spinner) iyo doorasho afar itimaal (probabilities) ah. Su'aal kasta, calaamadee itimaalka (probability) uu wareeggu (spinner) ku soo degi doono 'guul' (win).



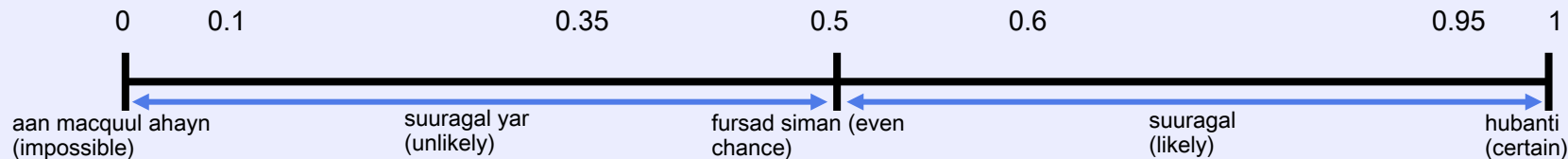
1) Ku qor itimaalka (probabilities) hoose nidaamka saxda ah ee miisaanka itimaalka (probability scale).

0%, 100%, 20%, 75%, 50%, 45%, 55%

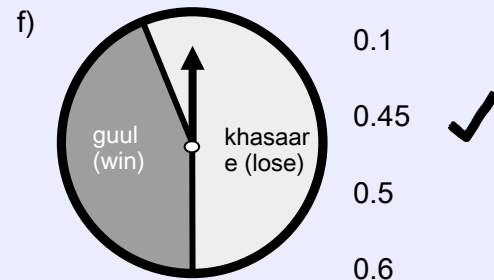
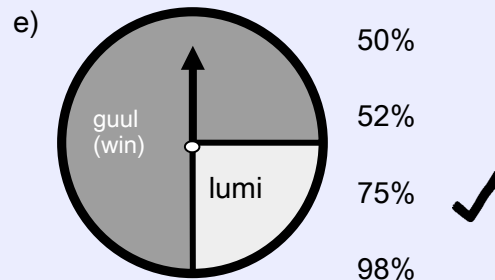
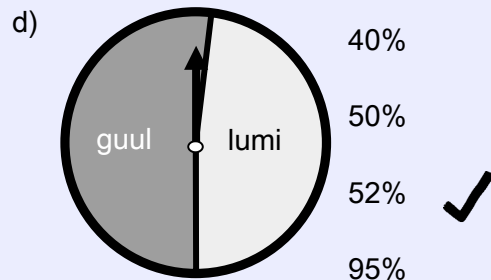
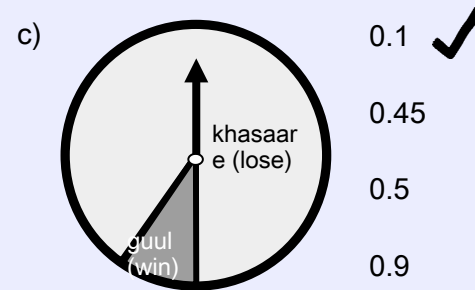
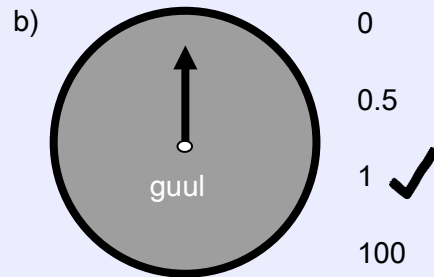
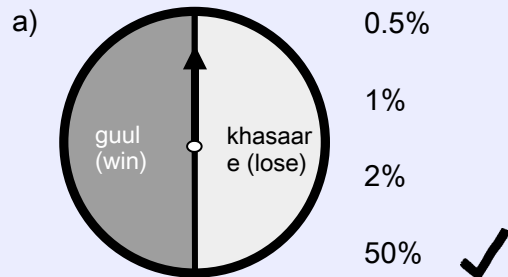


2) Ku qor itimaalka (probabilities) hoose nidaamka saxda ah ee miisaanka itimaalka (probability scale).

1, 0, 0.5, 0.1, 0.35, 0.95, 0.6



3) Su'aal kasta, waxaa lagu siinayaa wareejiye (spinner) iyo doorasho afar itimaal (probability) ah. Su'aal kasta, calaamadee itimaalka (probability) uu wareejiyuhu (spinner) ku soo degi lahaa 'guul (win)'.



Qaabka casharka

Miisaanka ixtimaalka (probability scale)



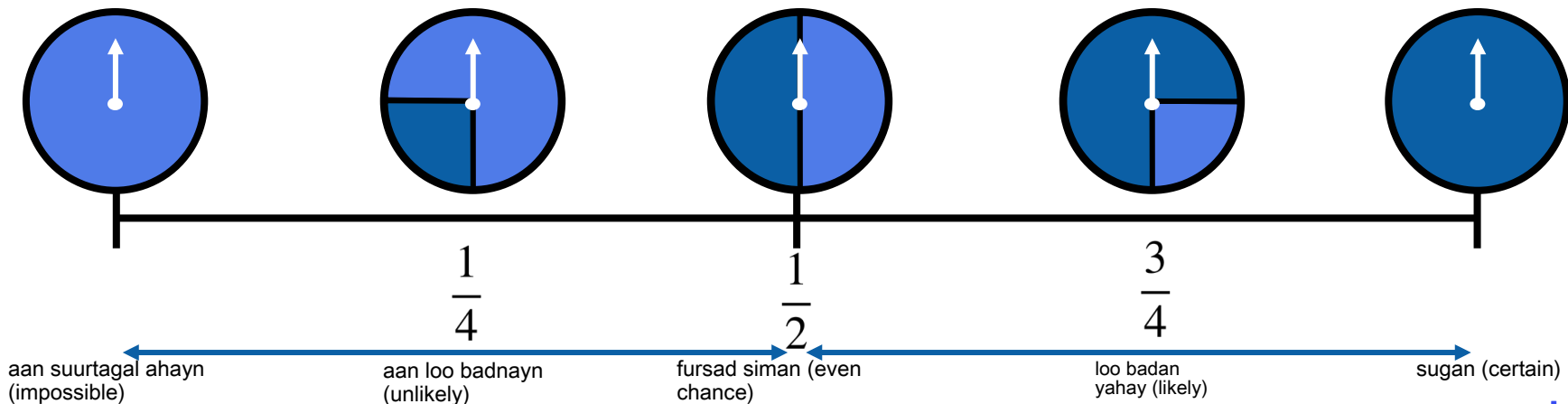
Muujinta ixtimaalka (probability): boqolleyda iyo jajab tobanle (decimals)



Muujinta ixtimaalka (probability) sida jajab (fractions)

Ixtimaalka (probability) waxaa sidoo kale lagu muujin karaa iyadoo la isticmaalo jajab (fractions) u dhigma.

- Ixtimaalka (probability) 0 wuxuu ka dhigan yahay in dhacdadu tahay mid aan suurtagal ahayn (impossible).
- Ixtimaalka (probability) 1 dhan wuxuu ka dhigan yahay in dhacdadu tahay mid sugan (certain).
- Ixtimaalka (probability) nus wuxuu ka dhigan yahay in dhacdadu leedahay fursad siman (even chance).
- **Ixtimaalaadka (Probabilities) ka yar nus waxay muujinayaan dhacdo aan dhici doonin.**
- **Ixtimaalaadka (Probabilities) ka weyn nus waxay muujinayaan dhacdo dhici doonta.**



Muujinta ixtimaalaadka (probabilities) jajab ahaan (fractions)

Cali, Isra iyo Layla waxay ciyaarayaan ciid sabuurad (board game) oo ku lug leh duubista (rolling) lix-geesood (six-sided dice) caadi ah. Mid kasta wuxuu xusay tirooyinka ka caawin kara duubista (dice roll) xigta.



Ixtimaalka (probability) in
aan duubo (roll) tiro aan
doonayo markay tahay .

$$\frac{3}{6}$$



Cali

Ixtimaalka (probability) in
aan duubo (roll) tiro aan
doonayo markay tahay .

$$\frac{1}{6}$$



Isra

Ixtimaalka (probability) in
aan duubo (roll) tiro aan
doonayo markay tahay .

$$\frac{4}{6}$$



Layla

Yaa ugu badan inuu duubo (roll) tiro uu doonayo marka xigta?

Muujinta ixtimaalaadka (probabilities) jajab ahaan (fractions)

Cali, Isra iyo Layla waxay ciyaarayaan ciid sabuurad (board game) oo ku lug leh duubista (rolling) lix-geesood (six-sided dice) caadi ah. Mid kasta wuxuu xusay tirooyinka ka caawin kara duubista (dice roll) xigta.



Ixtimaalka (probability) in
aan duubo (roll) tiro aan
doonayo markay tahay .

$$\frac{3}{6}$$



Cali

Ixtimaalka (probability) in
aan duubo (roll) tiro aan
doonayo markay tahay .

$$\frac{1}{6}$$



Isra

Itimaalka (probability) in
aan ku duubo nambarka
aan doonayo markay
tahay .

$$\frac{4}{6}$$



Layla

Yaa leh fursad siman (even chance) inuu ku duubo nambarka uu doonayo?

Muujinta itimaalka (probabilities) sida jajab (fractions)

Cali, Isra iyo Layla waxay ciyaarayaan ciyaar sabuurad (board game) oo ku lug leh duubista dice (six-sided dice) caadi ah. Mid kastaa wuxuu xusay namburada ka caawin doona duubista xigta.



Itimaalka (probability) in
aan ku duubo nambarka
aan doonayo markay
tahay . $\frac{3}{6}$



Cali

Itimaalka (probability) in
aan ku duubo nambarka
aan doonayo markay
tahay . $\frac{1}{6}$



Isra

Itimaalka (probability) in
aan ku duubo nambarka
aan doonayo markay
tahay . $\frac{4}{6}$



Layla

wuxuu leeyahay itimaal (probability) saddex jeer ka badan si uu u helo nambarka uu doonayo.

Itimaalka (probabilities) saddex dhacdo (events) oo aan xiriir lahayn ayaa hoos ku qoran.

$$P(A) = \frac{5}{10}$$

$$P(B) = \frac{7}{10}$$

$$P(C) = \frac{10}{10}$$

Dhacdo (event) kee ayaa ugu yar inuu dhaco?

A

Itimaalka (probabilities) saddex dhacdo (events) oo aan xiriir lahayn ayaa hoos ku qoran.

$$P(A) = \frac{5}{10}$$

$$P(B) = \frac{7}{10}$$

$$P(C) = \frac{10}{10}$$

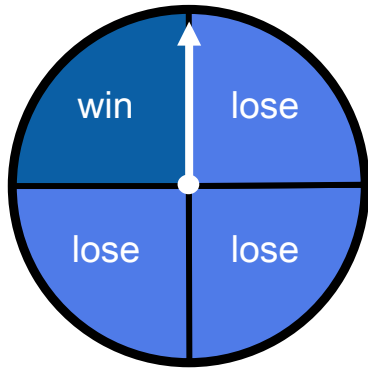
Dhacdo (event) kee ayaa hubaal inuu dhaco?

C

Muujinta itimaalka (probabilities) sida jajab (fractions)

Axmed wuxuu u socdaa inuu ku wareejiyo spinner (spinner) 40 jeer oo uu qoro natiijooyinkiisa.

Immisa jeer ayuu filayaa in wareeggu ku soo dego 'win'?



Waxaan filayaa in wareeggu ku soo dego 'win' qiyaastii jeer.

10



Taas waa sababta aan filayo inuu ku soo dego qayb kasta si siman.

Laakiin taasi ma aha inay dhacdo.

Expressing probabilities as fractions

An outcome with a **probability** of $\frac{1}{4}$ could be expected to happen in
qiyaastii wadarta $\frac{1}{4}$ tijaabooyinka la sameeyay.

E.g. In an experiment with 40 trials, we might expect the outcome to happen approximately 10 times.

$$\frac{1}{4} \quad 40 = 10$$

Tijaabooyin badan oo tijaabo ku jira, waxay u badan tahay in saamiga natiijooyinka uu la mid noqdo waxa la filayo.

Expressing probabilities as fractions



Wareeggu wuxuu leeyahay afar lambar. Itimaalka wareeggu ku soo dego lambar kasta waa hoose.

$$P(1) = \frac{1}{10} \qquad P(2) = \frac{3}{5}$$

$$P(3) = \frac{1}{20} \qquad P(4) = \frac{1}{4}$$

Inta lagu jiro ciyaar, wareegga waa la wareejiyaa wadarta 100 jeer.

Lambar kee ayaa la filan karaa inuu ku soo dego inta badan?

Expressing probabilities as fractions



Wareeggu wuxuu leeyahay afar lambar. Itimaalka wareeggu ku soo dego lambar kasta waa hoose.

$$P(1) = \frac{1}{10}$$

$$P(2) = \frac{3}{5}$$

$$P(3) = \frac{1}{20}$$

$$P(4) = \frac{1}{4}$$

Inta lagu jiro ciyaar, wareegga waa la wareejiyaa wadarta 100 jeer.

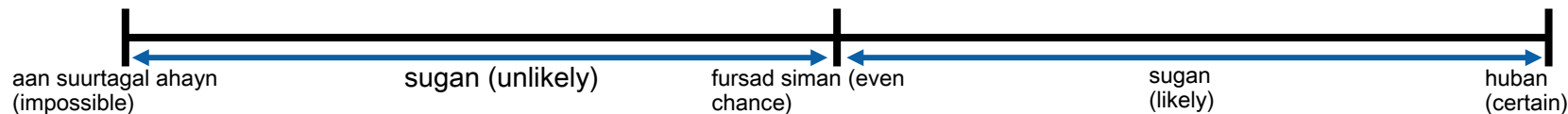
Qiyaastii, immisa jeer ayaa wareegga laga filan karaa inuu ku soo dego lambarka 4?

Hawsha B Muujinta ixtimaalka (probabilities) sida jajib (fractions)



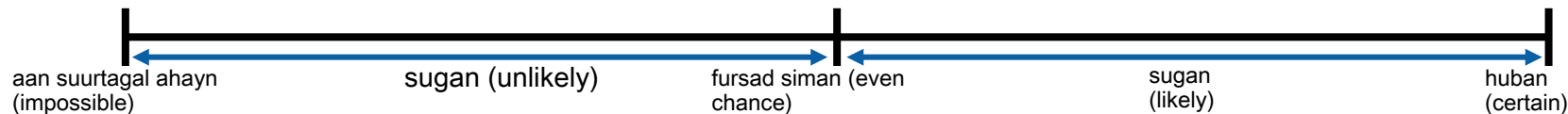
1) Qor ixtimaalka (probabilities) hoos ku qoran sida saxda ah ee miisaanka ixtimaalka (probability scale).

$$\frac{20}{20} \quad \frac{1}{20} \quad \frac{5}{20} \quad \frac{18}{20} \quad \frac{11}{20} \quad \frac{9}{20}$$



2) Qor ixtimaalka (probabilities) hoos ku qoran sida saxda ah ee miisaanka ixtimaalka (probability scale).

$$\frac{5}{6} \quad \frac{5}{5} \quad \frac{5}{1000} \quad \frac{5}{10} \quad \frac{5}{11} \quad \frac{5}{9}$$



Hawsha B Muujinta ixtimaalka (probabilities) sida jajab (fractions)



3) Buuxi meelaha bannaan ee shaxda (table).

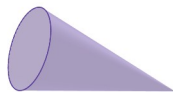
dhacdo (event)	ixtimaal (probability) sida jajab (fraction)	ixtimaal (probability) sida tobanle (decimal)	ixtimaal (probability) sida boqolkiiba (percentage)	sharraxaadda suurtagalnimada (likelihood)	soo noqoshada la filayo (expected frequency) ee 600 tijaabo (trials)
tusaale (example)	$\frac{1}{2}$	0.5	50%	fursad siman (even chance)	300
A		0.25		suurtogal darro (unlikely)	
B			75%		
C	$\frac{2}{5}$				
D					0

4) Koontad (cone) la tuuro waxay ku dhici kartaa laba siyaabood: 'saldhig hoos' ama 'qalooc hoos'.

Tijaabo (experiment) weyn ayaa soo gabagabeysay itimaalka (probabilities) soo socda:



$$P(\text{saldhig hoos}) = P(\text{qalooc hoos}) = \frac{3}{10}$$



$$\frac{7}{10}$$

a) Koontada (cone) ayaa hadda ku dhow in dib loo tuuro. Kee ayaa u badan inuu dhaco?

b) Tijaabo (experiment) 100 jeer ah, imisa jeer ayaad qiyaasi kartaa in koontadu (cone) ku dhici doonto qalooc hoos?

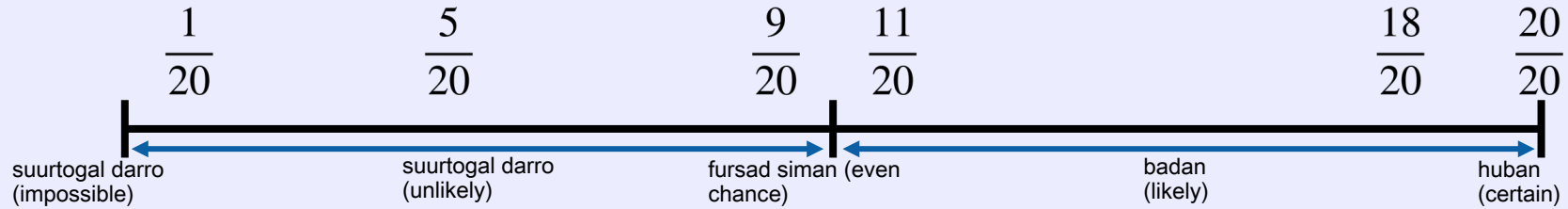
c) Isticmaal linkiga si aad u hesho jilitaanka (simulation) tijaabadan (experiment): Jilitaanka koontada (Cone simulation)  Sanduuqa 'count' wuxuu muujinayaa tirada tijaabooyinka (trials) la sameeyay. Riix badhanka 'run' si aad u bilowdo jilitaanka (simulation) oo u ogolow inuu socdo 100 tijaabo (trials).

Natijoooyinku ma la mid yihiin waxaad ku saadaalisay qaybta (b)?

Hawsha B Muujinta itimaalka (probabilities) jajib ahaan (fractions)

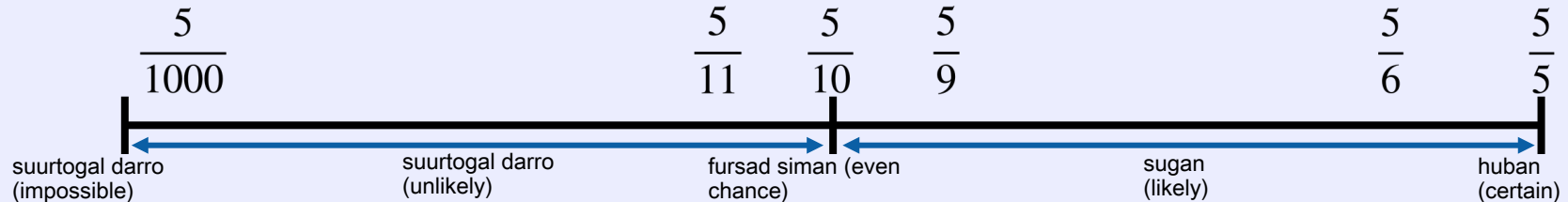
1) Ku qor itimaalka (probabilities) hoos ku qoran sida saxda ah ee miisaanka itimaalka (probability scale).

$$\frac{20}{20} \quad \frac{1}{20} \quad \frac{5}{20} \quad \frac{18}{20} \quad \frac{11}{20} \quad \frac{9}{20}$$



2) Ku qor itimaalka (probabilities) hoos ku qoran sida saxda ah ee miisaanka itimaalka (probability scale).

$$\frac{5}{6} \quad \frac{5}{5} \quad \frac{5}{1000} \quad \frac{5}{10} \quad \frac{5}{11} \quad \frac{5}{9}$$



3) Buuxi meelaha bannaan ee shaxda.

dhacdo (event)	ixtimaalka (probability) jajab ahaan	ixtimaalka (probability) tobanle ahaan	ixtimaalka (probability) boqolkiiba ahaan	sharraxaadda suurtogalnimada (likelihood)	soo noqnoqoshada la filayo ee 600 tijaabo (trials)
tusaale (example)	$\frac{1}{2}$	0.5	50%	fursad siman (even chance)	300
A	$\frac{1}{4}$	0.25		sugan (likely)	
B	$\frac{3}{4}$		75%		
C	$\frac{2}{5}$				
D					0

4) Koofiyad (cone) la tuuray waxay ku dhici kartaa laba siyaabood: 'salka hoose' ama 'qalooca hoose'.

Tijaabo (experiment) weyn ayaa soo gabagabeysay ixtimaalka (probability) soo socda:



$$P(\text{salka hoose}) = P(\text{qalooca hoose}) = \frac{3}{10}$$



$$\frac{7}{10}$$

a) Koofiyadda (cone) ayaa hadda la tuurayaa. Kee ayaa ugu badan inuu dhaco?

b) Tijaabo (experiment) 100 jeer ah, imisa jeer ayaad filan kartaa in koofiyaddu ku dhacdo qalooca hoose?

$$\frac{7}{10}$$

c) Isticmaal linkiga si aad u hesho jilitaanka tijaabadan: Jilitaanka koorta  Sanduuqa 'count' wuxuu muujinayaa tirada tijaabooyinka la sameeyay. Riix badhanka 'run' si aad u bilowdo jilitaanka oo u ogolow inuu socdo 100 tijaabo.

Are the results the same as what you predicted in part (b)?

Example answers:

'Natiijooyinku waxay la mid ahaayeen saadaashayda laakiin kuma ayna ahayn isku mid.'

'Waxaa jiray 89 natiijo oo qalooc hoos u ah, taasoo ka badan intii aan filayay.'

'Tirada jeer ee ay ku soo degtay qalooc hoos ayaa aad uga badnayd tirada jeer ee ay ku soo degtay sal hoos, taasoo ahayd waxa aan filayay. Laakiin tirada saxda ah ee jeer ee ay ku soo degtay dhinac kasta way ka duwanayd waxa aan filayay.'

Jawaabuhu way kala duwanaan karaan iyadoo ku xiran natiijooyinka jilitaanka.

- **Itimaalka (Probability) waa cabbirka suurto galnimada dhacdo.**
- **Probabilities** take numerical values between 0 and 1.
- Itimaalka 0 wuxuu ka dhigan yahay in dhacdadu tahay mid aan macquul ahayn.
- Itimaalka 1 wuxuu ka dhigan yahay in dhacdadu tahay mid hubaal ah.
- The **probability** that an event will occur is the proportion of times the event is expected to happen in a suitably large experiment.