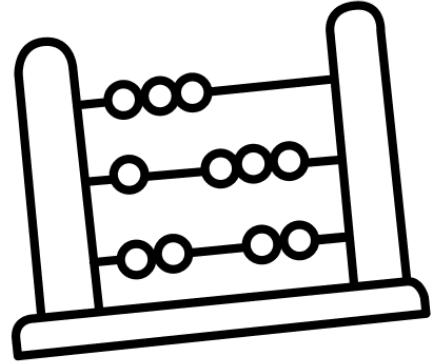


Xisaabinta ixtimaalka (theoretical probabilities) ee geedka ixtimaalka (hal dhacdo)

Maths

Cutub: Ixtimaalka: ixtimaalka aragtida



Natiijo

Waxaan heli karaa ixtimaalka aragtida ee geedka ixtimaalka oo muujinaya natiijooyinka suurtagalka ah ee hal dhacdo.

Erayada muhiimka ah

Geedka (tree diagrams) waa matalaad loo isticmaalo in lagu qaabeeyo su'aalaha tirakoobka/iddiimaalka. Laamuhu waxay u taagan yihiin dhacdooyin ama natiijooyin kala duwan.

Laan kasta oo geedka natiijada waxay muujinaysaa natiijo suurtagal ah oo ka timaadda dhacdo ama marxalad ijaabo ah. Geedka natiijada oo dhammaystiran wuxuu muujinayaa dhammaan natiijooyinka suurtagalka ah.

Meel muunad (sample space) waa dhammaan natiijooyinka suurtagalka ah ee ijaabo. Jaantuska meesha muunadu waa hab nidaamsan oo lagu soo saaro meel muunad.

Erayada muhiimka ah

Laan kasta oo geedka ixtimaalka waxay muujinaysaa natiijo suurtagal ah oo ka timaadda dhacdo ama marxalad tijaabo ah, iyadoo la socota ixtimaalka natiijadaas dhacdo.

Qaabka casharka

Xisaabinta ixtimaalka aragtida ee geedka ixtimaalka (hal dhacdo)

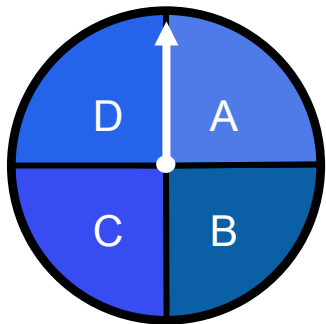


Geedaha ixtimaalka si loo muujiyo natiijooyinka



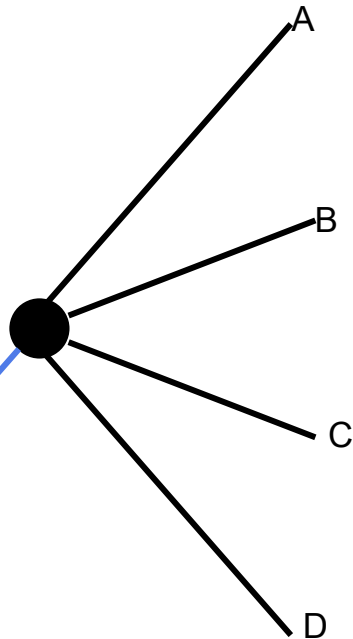
Isbarbardhigga geedaha muujinaya dhacdooyinka iyo natiijooyinka

Suad waxay wareejin doontaa wareeggan.



wareeg

Ka hor inta Suad aysan
wareejin wareegga.



Waxaan xusuustaa in aan u
isticmaali karno geed natijada si
aan u listo dhammaan natiijooyinka
suurtagalka ah ee tijaabo.

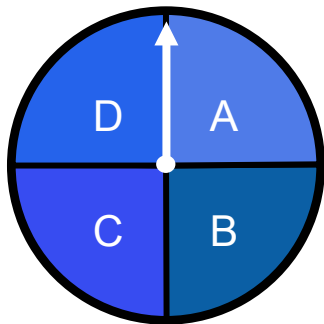


Suad

A, B, C, D waa afarta natiiyo ee ka yimaadda
wareejinta wareeggan.

Ma suurtagal tahay in ixtimaalka
sidoo kale lagu matalo geed?

Suad ayaa wareejin doonta wareejinta (spinner) tan.



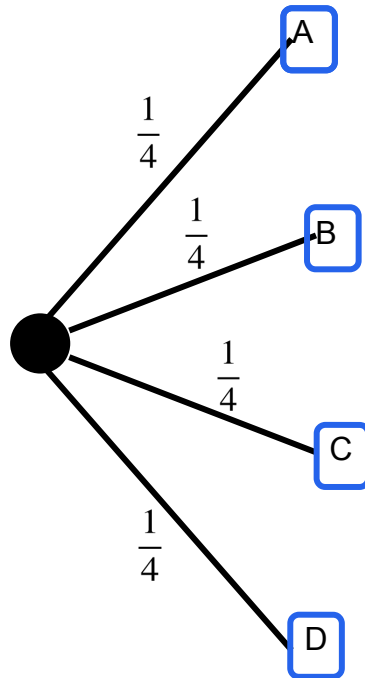
wareejin
(spinner)

Wareeggan wuxuu leeyahay afar qaybood oo isle'eg.

Marka wareejintu (spinner) waxay ku degi doontaa qayb kasta qiyaastii hal mar afartii wareejin (spin) kasta.

Ixtimaalka (probability) ah in wareejintu (spinner) ku degto A waa

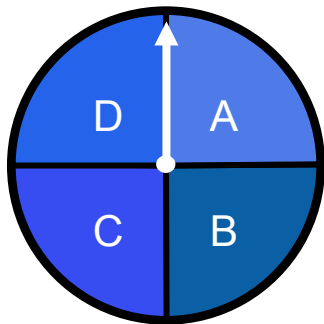
$$\frac{1}{4}$$



Waxaan eegnaa natiijada dhamaadka laan kasta...

Oo calaamadee laan kasta ixtimaalka (probability) dhacdadaas.

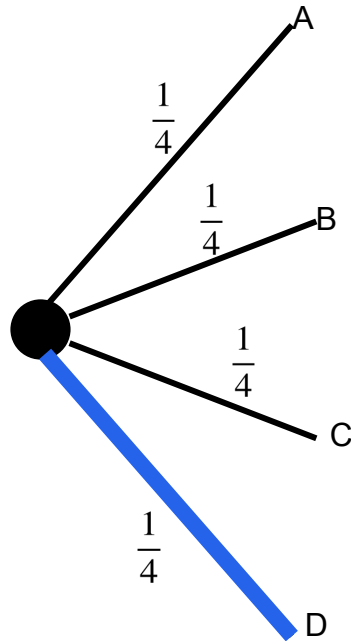
Suad ayaa wareejin doonta wareejinta (spinner) tan.



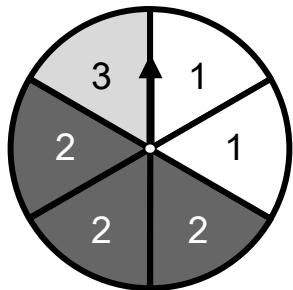
wareejin
(spinner)

Laantan waxay muujinaysaa in natiijada D ay dhacdo jeer
marka Suad wareejiiso (spin) wareejinta (spinner).

$\frac{1}{4}$



Dhammaan natiijooyinka tijaabada
(trial) waa in lagu muujiyaa geed
ixtimaal (probability tree).



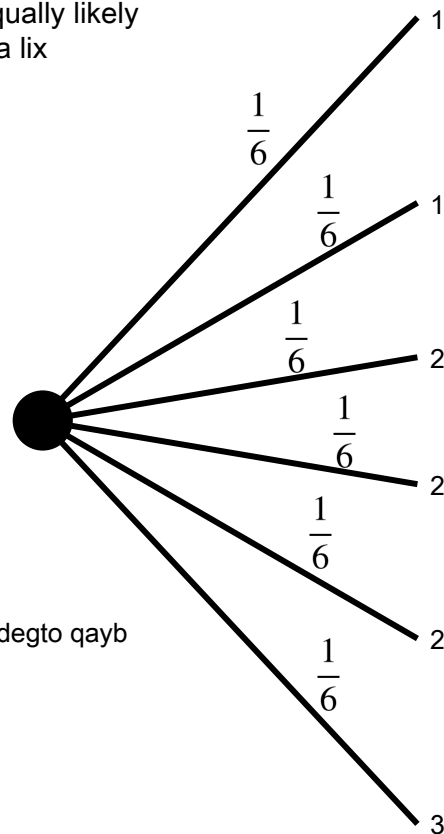
wareejin (spinner)

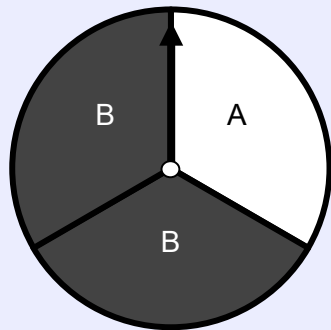
Geed ixtimaal (probability tree) sidoo kale waa la dhisi karaa marka tijaabadu (trial) leedahay natiijooyin soo noqnoqda (repeated outcomes).

Wareejintan (spinner) waxay leedahay lix natiijo oo isku mid ah (equally likely outcomes):
{1, 1, 2, 2, 2, 3}

Lix natiijo oo isku mid ah (equally likely outcomes) macneheedu waa lix laamood.

Iyadoo wareejintu (spinner) ku degto qayb kasta waqtiga.
 $\frac{1}{6}$



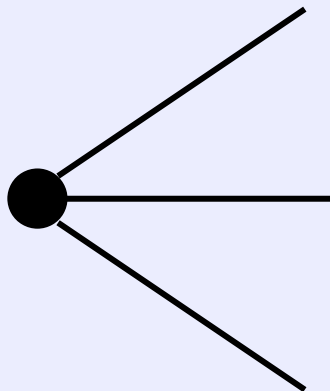


wareejin (spinner)

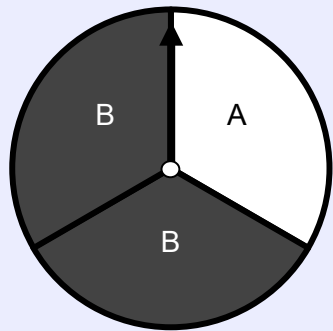
Suad ayaa wareejin doonta wareejinta (spinner) tan hal mar.

Suad waxay rabtaa inay ku muujiso geed ixtimaal (probability tree) natiijo kasta oo ka timaadda wareejinta (spinner), iyo ixtimaalkooda (probabilities).

Waa imisa tirada laamaha geedka itimaalka (probability tree) ay tahay inuu yeesho?



Saddex laamood, mid kasta oo loogu talagalay natiijada ay muujinayaan saddexda qaybood ee isla eg.

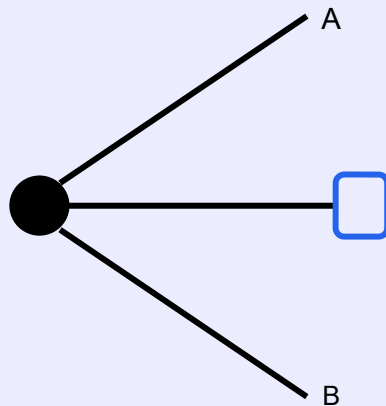


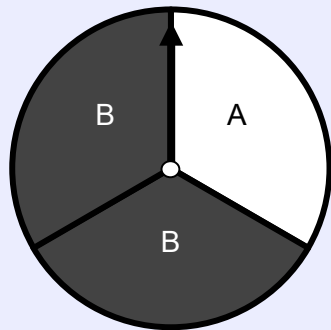
wareeg (spinner)

Suad waxay wareejin doontaa wareeggan hal mar.

Suad waxay rabta inay ku muujiso natiijo kasta oo ka timaadda wareegga (spinner), iyo itimaalkooda, geed itimaal (probability tree).

Maxaa geli lahaa sanduuqan gudihiisa?



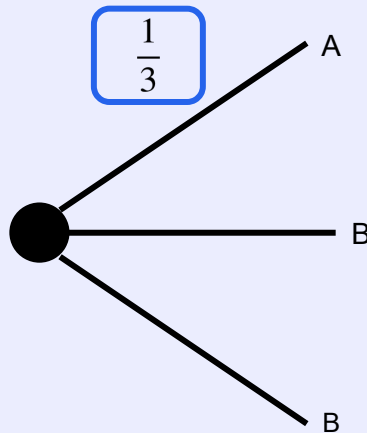


wareeg (spinner)

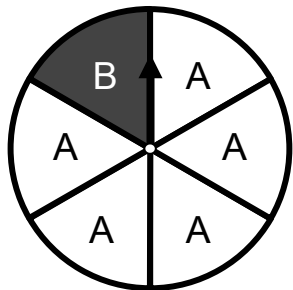
Suad waxay wareejin doontaa wareeggan hal mar.

Suad waxay rabta inay ku muujiso natiijo kasta oo ka timaadda wareegga (spinner), iyo itimaalkooda, geed itimaal (probability tree).

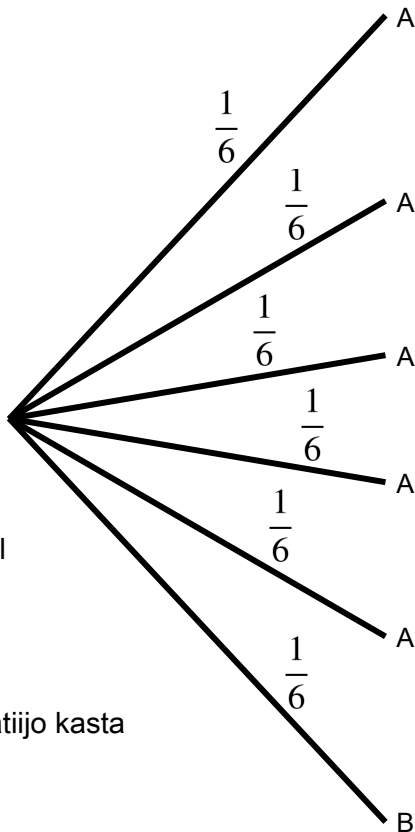
Maxaa geli lahaa sanduuqan gudihiisa?



Itimaalka natiijada dhamaadka laanta ayaa la dhigaa laanta lafteeda.

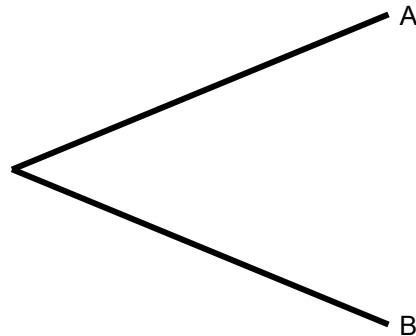


wareeg (spinner)

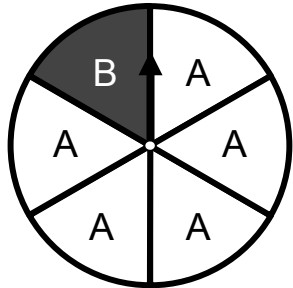


Waxaan horey u aragnay geedo itimaal (probability trees) oo sidan u eg.

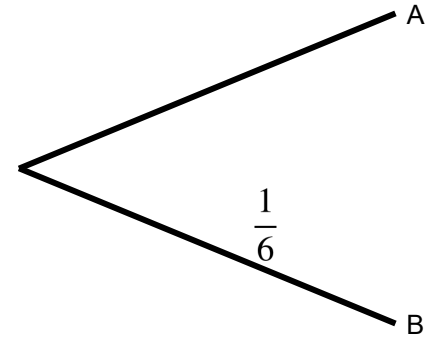
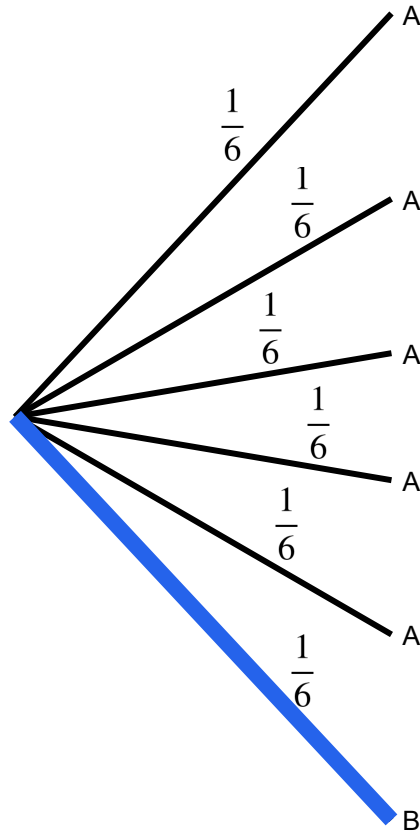
Laan kastaa waxay ka dhigan tahay natiijo kasta oo gaar ah.



Laakiin, waxaan sidoo kale dhisi karnaa geedo itimaal (probability trees) oo laamahoodu muujiyaan kaliya natiijooyinka gaarka ah.

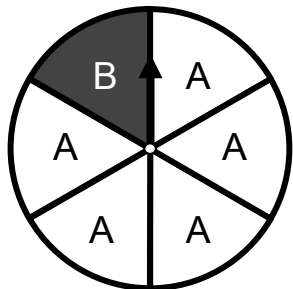


wareejiye (spinner)

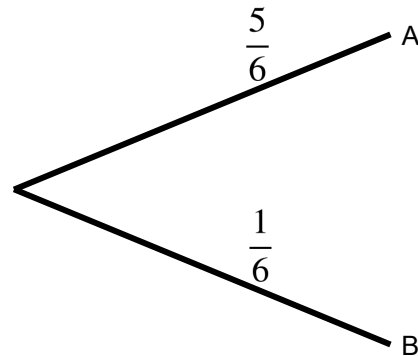
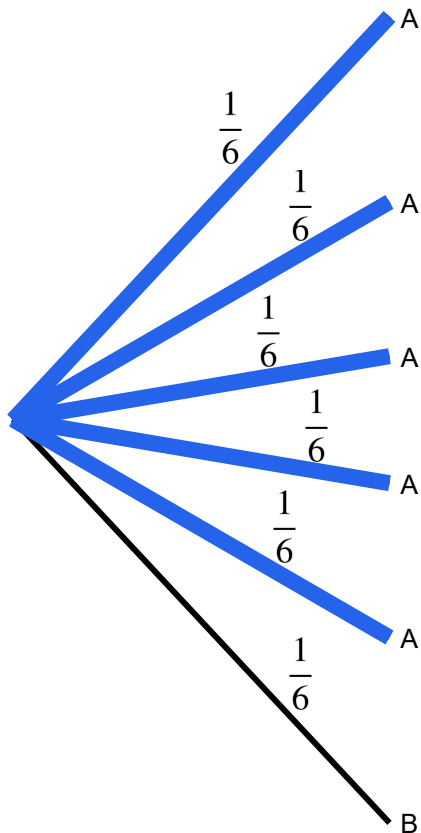


Itimaalka wareeggu uu ku soo degayo B wali waa maadaama ay jirto kaliya hal natiijo oo B ah.

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



wareejiye (spinner)



Si kastaba ha ahaatee, waxaa jira shan natiijo oo wareejiyuhu (spinner) ku soo degayo A.

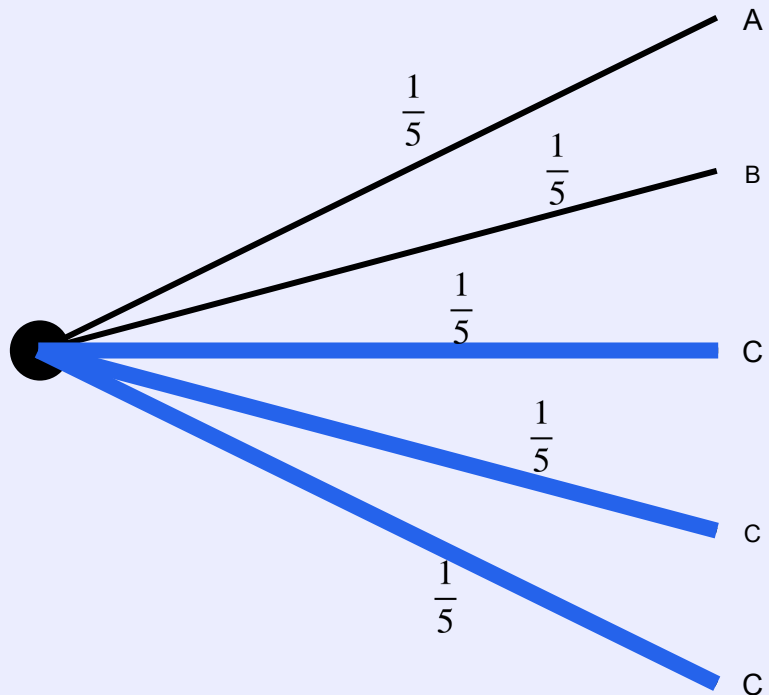
Waxaan isku geeynaa ixtimaalka (probability) mid kasta oo ka mid ah natiijooyinkan shakhsi ahaaneed.

$$\frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{5}{6}$$

Geedkan ixtimaalka (probability tree) wuxuu muujinayaa ixtimaalka (probability) wareejiye (spinner) uu ku soo dego natiijo gaar ah.

Waa maxay ixtimaalka (probability) wareejiyuhu (spinner) uu ku soo dego C?

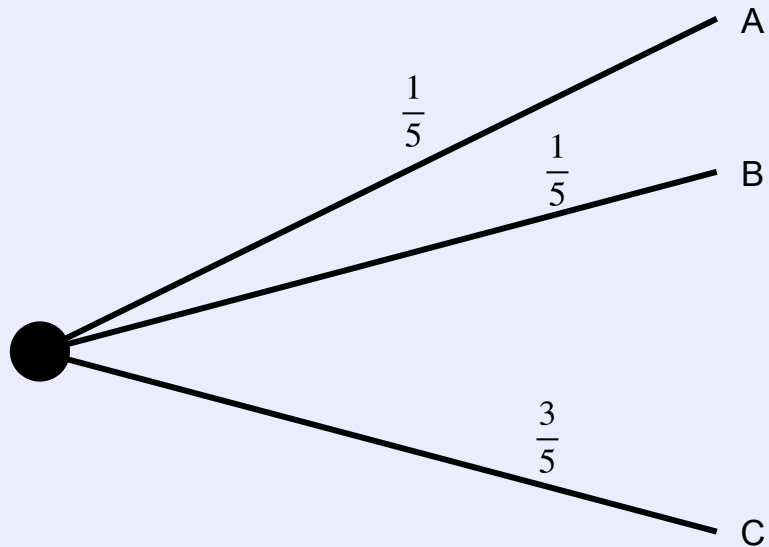
Waxaa jira saddex natiijo oo wareejiyuhu (spinner) ku soo degayo C.



Geedkan ixtimaalka (probability tree) wuxuu muujinayaa ixtimaalka (probability) wareejiye (spinner) uu ku soo dego natiijo gaar ah.

Waa maxay ixtimaalka (probability) wareejiyuhu (spinner) uu ku soo dego C?

$$\frac{3}{5}$$

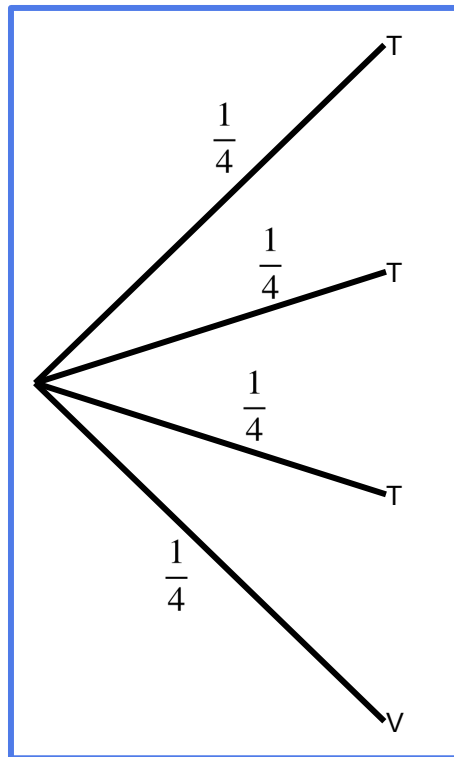


1) Labadan geed ee ixtimaalka (probability trees) waxay muujinayaan natiijooyinka iyo ixtimaallada (probabilities) isku tijaabo ah (wareejinta wareejiyaha (spinner)).

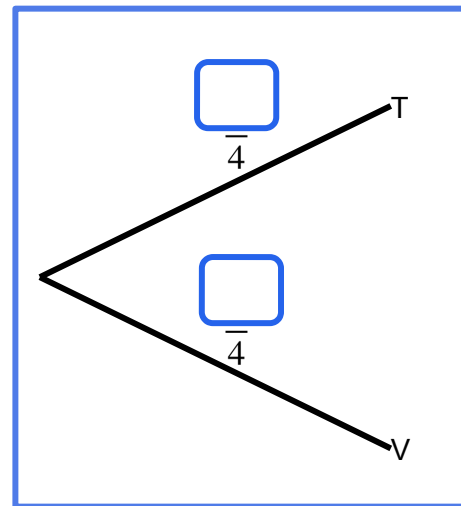
a) Isticmaal geedka ixtimaalka (probability tree) 1 si aad u dhamaystirto geedka ixtimaalka (probability tree) 2.

b) Isticmaal labadan geed ee ixtimaalka (probability trees) si aad u dhamaystirto jumladan soo socota:

“Ixtimaalka (probability) wareejiyuhu (spinner) uu ku soo dego T waa _____”.



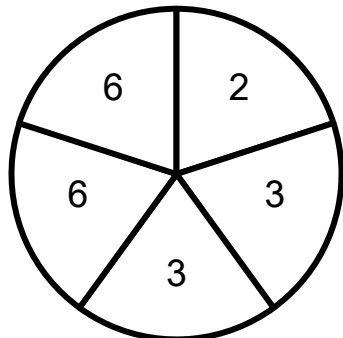
geedka ixtimaalka (probability tree) 1



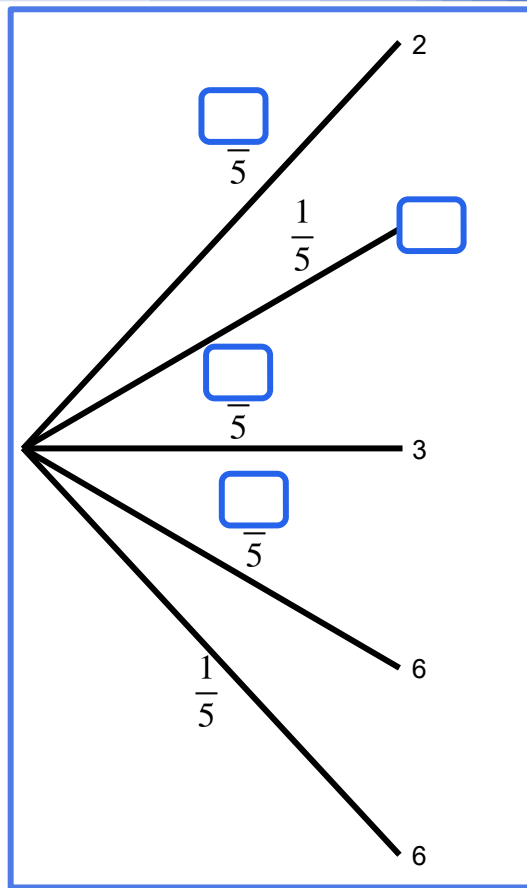
geedka ixtimaalka (probability tree) 2

2) Suad ayaa wareejiin doonta wareejiye (spinner) A hal mar.

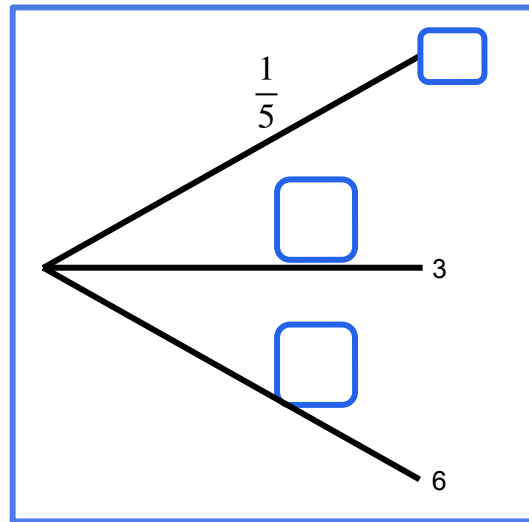
a) Dhamaystir geedka ixtimaalka (probability tree) oo leh shan laamood (branches) oo tijaabadan ah.



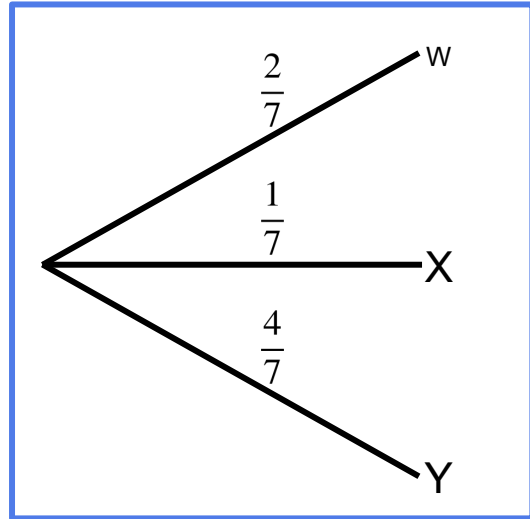
wareeg A



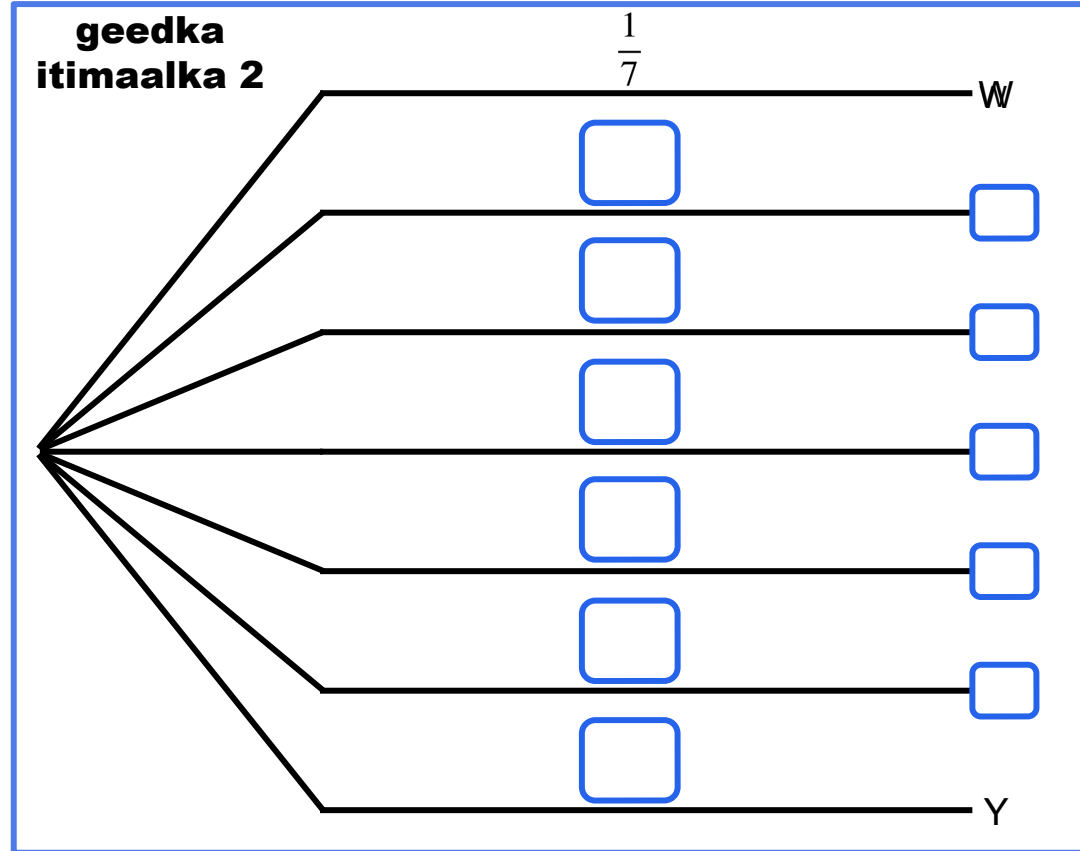
b) Sidaas awgeed, dhammaystir geedka itimaalka (probability tree) kaas oo muujinaya natiijooyinka gaarka ah ee tijaabadan.



3) Isticmaal geedka itimaalka 1 si aad u dhammaystirto geedka itimaalka 2.



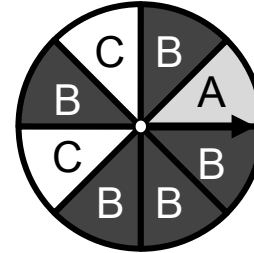
geedka itimaalka 1



geedka itimaalka 2

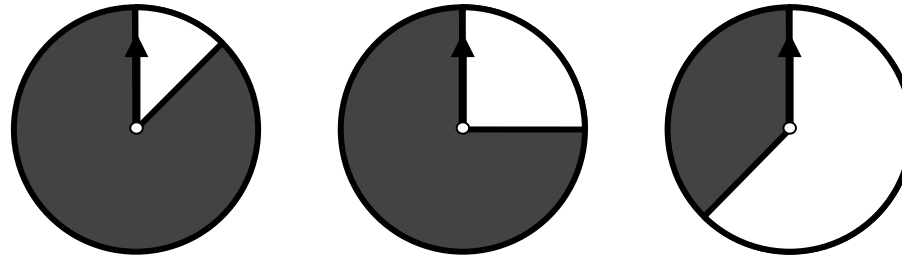
4) Nuur ayaa wareeggan hal mar wareejin doona.

a) Adoo dhisaya geed itimaal habboon, tax itimaalka natiijo kasta oo gaar ah.



wareeg

b) Ku calaamadee qaybta khafiifka ah ee wareegyada natiijada kasta A, B, ama C si ay u matalaan itimaalka in wareeggu ku soo degto natiijadaas.



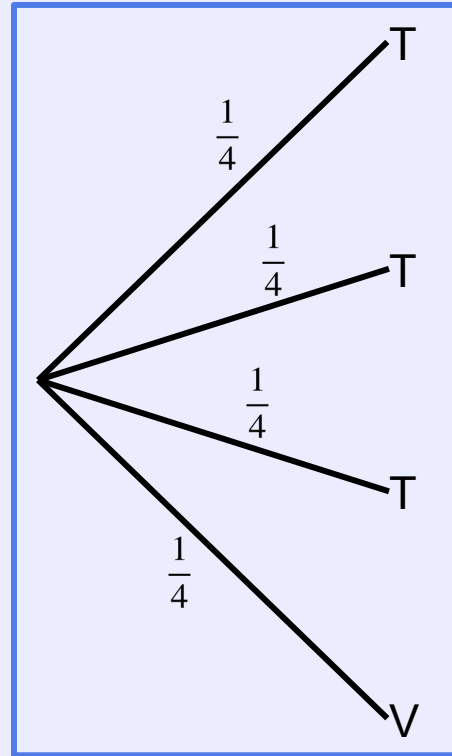
1) Labadan geed itimaal waxay muujinayaan natiijooyinka iyo itimaalka isku midka ah tijaabada (wareejinta wareeg).

a) Isticmaal geedka itimaalka 1 si aad u dhammaystirto geedka itimaalka 2.

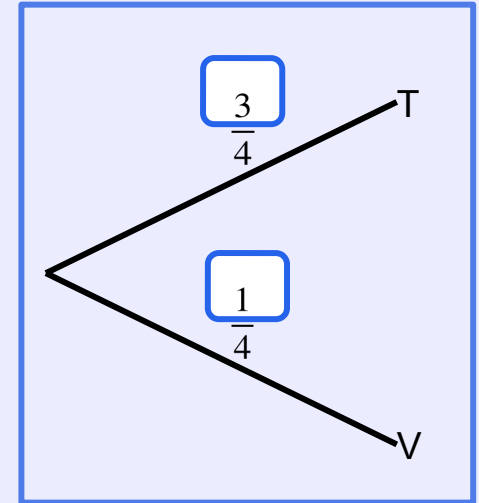
b) Isticmaal labadan geed itimaal si aad u dhammaystirto jumladan:

“Itimaalka in wareeggu ku soo degto T waa ama 0.75 ama 75%”.

$$\frac{3}{4}$$



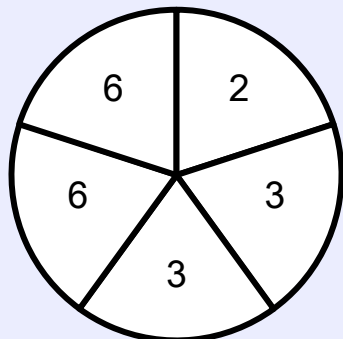
geedka itimaalka 1



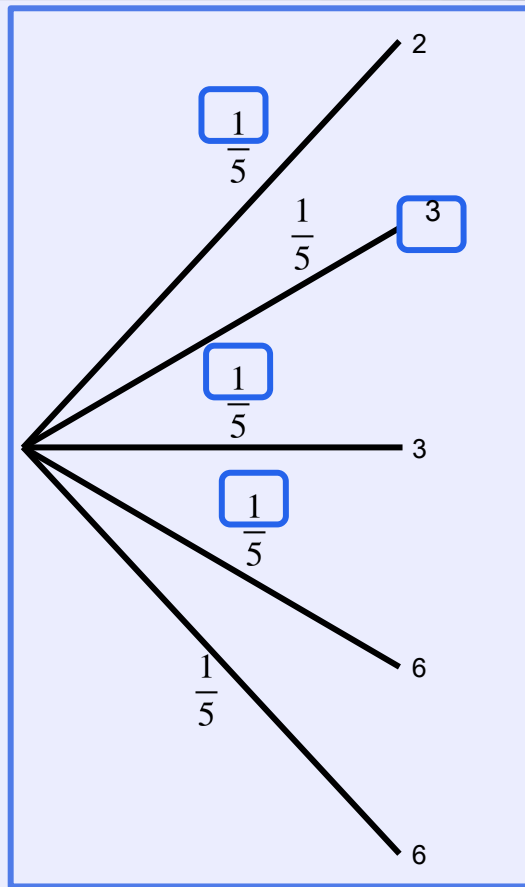
geedka itimaalka 2

2) Suad ayaa wareeg A hal mar wareejin doona.

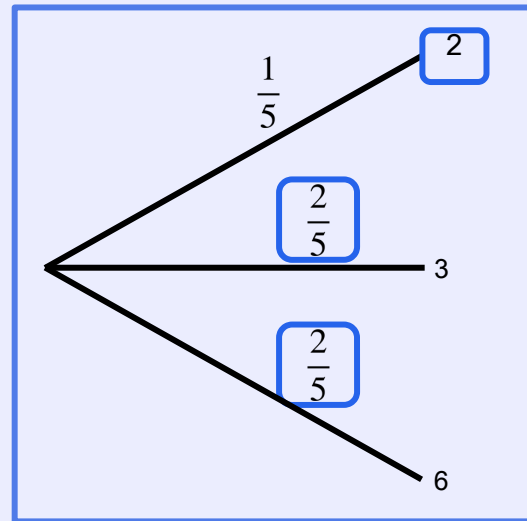
a) Dhammaystir geedka itimaalka oo leh shan laamood oo tijaabadan ah.



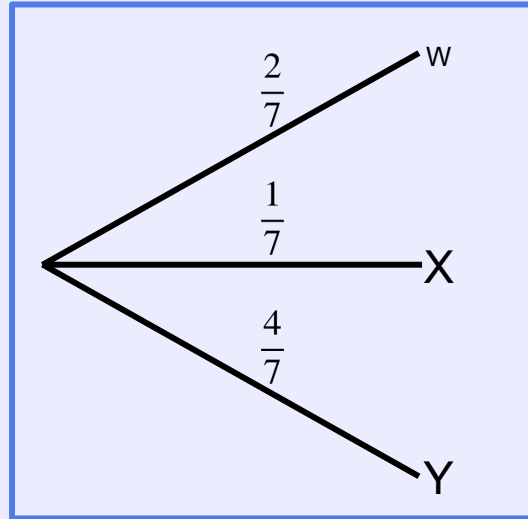
wareejiyaha A (spinner A)



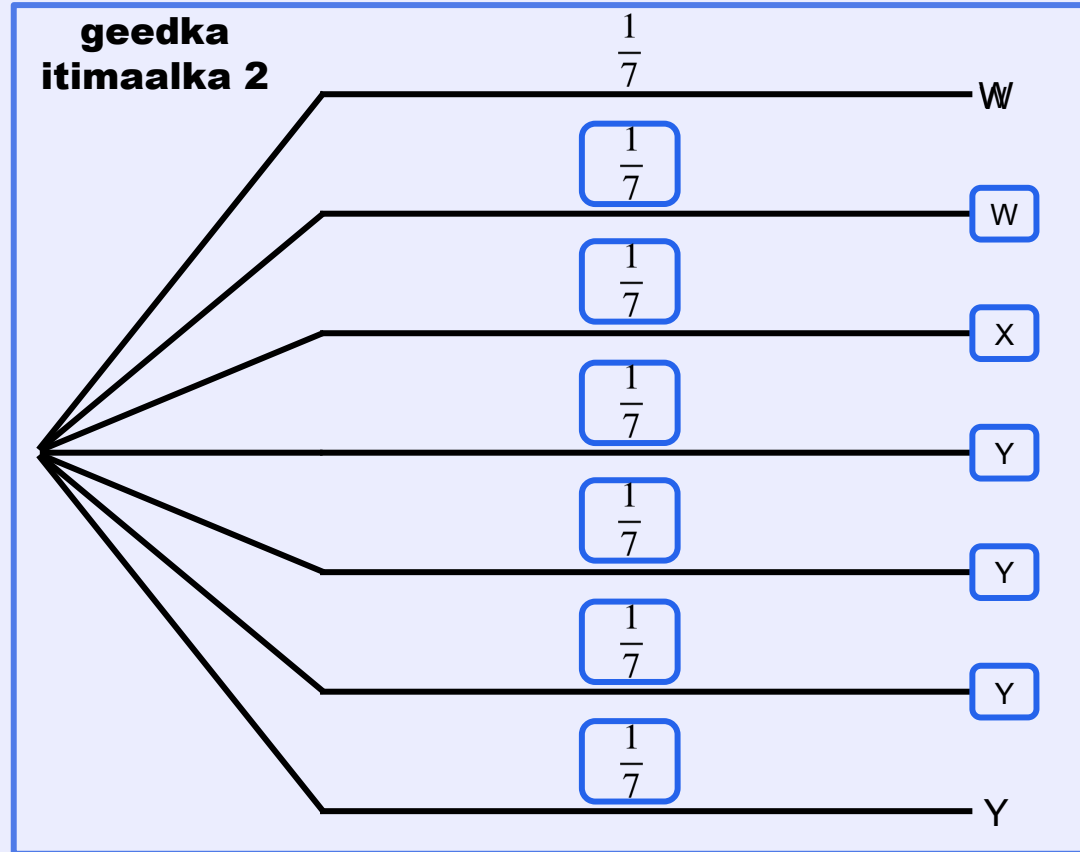
b) Sidaas awgeed, dhammaystir geedka itimaalka kaas oo muujinaya natiijooyinka gaarka ah ee tijaabadan.



3) Isticmaal geedka itimaalka 1 si aad u buuxiso geedka itimaalka 2.



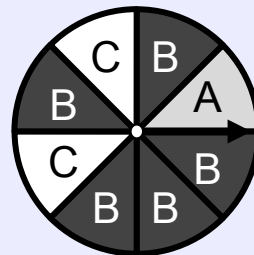
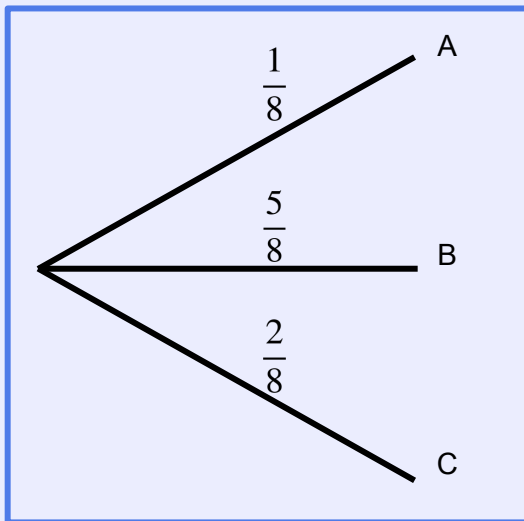
geedka itimaalka 1



geedka itimaalka 2

4) Nuur ayaa wareejiyahan hal mar wareejin doonaa.

a) Adigoo dhisaya geed itimaal oo ku habboon, tax itimaalka natiijo kasta oo gaar ah.

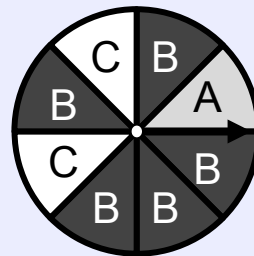


wareejiye
(spinner)

Inkastoo la dhisii karo geed itimaal siddeed-laamood ah si uu u matalo dhammaan siddeedda qaybood ee wareejiyaha, tani maahan mid lagama maarmaan (ama wax ku ool ah) marka la taxayo itimaalka seddexda natiijo ee gaar ah: {A, B, C}.

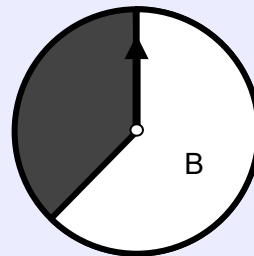
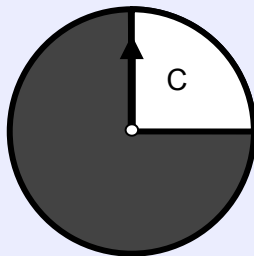
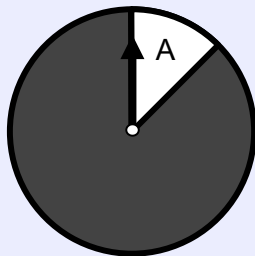
4) Nuur ayaa wareejiyahan hal mar wareejin doonaa.

a) Adigoo dhisaya geed itimaal oo ku habboon, tax itimaalka natiijo kasta oo gaar ah.



wareejiye
(spinner)

b) Ku calaamadee qaybta khafiifka ah ee wareejiyaha natiijada kasta A, B, ama C si ay u matasho itimaalka in wareejiyaha ku soo degto natiijadaas.



Qaabka casharka

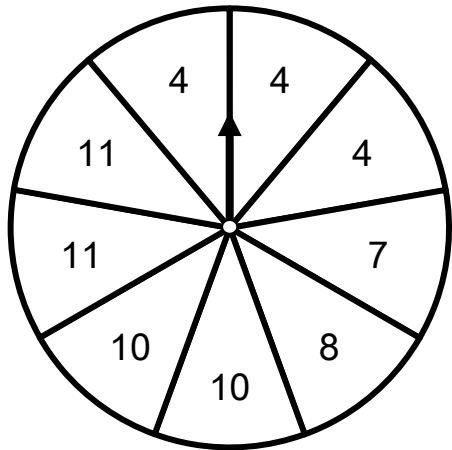
Xisaabinta itimaalka aragtida (theoretical probabilities) iyadoo laga duulayo jaantusyada geedka itimaalka (hal dhacdo)



Geedaha itimaalka si loo muujiyo natiijooyinka



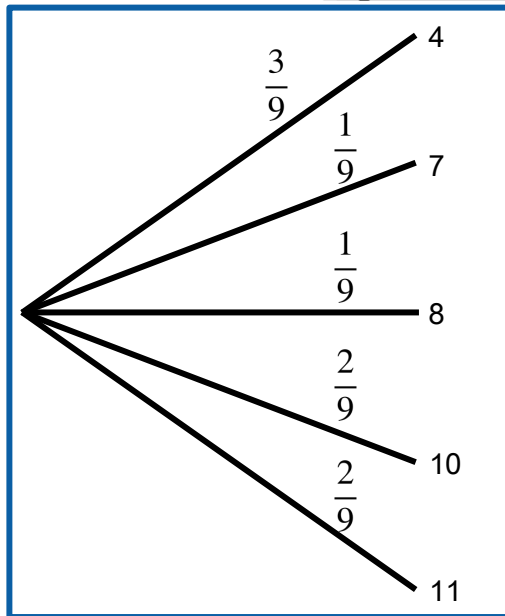
Isbarbardhigga geedaha muujinaya dhacdooyinka iyo natiijooyinka



Nuur wuxuu doonayaa inuu ciyaaro ciyaar ka dhacda carwada gudaha.

Haddii uu wareejiyo wareejiyaha oo uu ku soo dego nambar laba-godoodle ah (double-digit number), wuxuu ku guuleystaa abaal.

Si aan u xisaabiyo itimaalka inaan ku guuleysto ciyaartan, waxaan dhisi karaa geed itimaal shan-laamood ah!

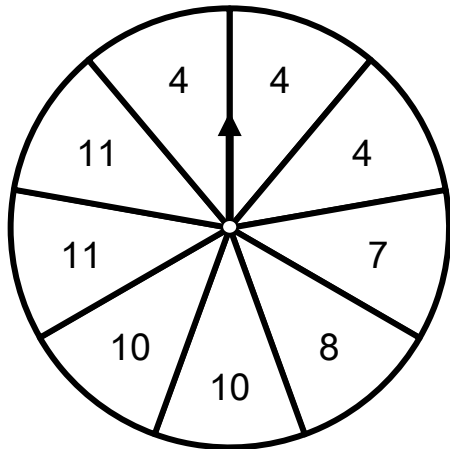


Nuur

Waxaan qori karaa itimaalka (probability) ee ku degista lambar kasta oo laamaha kasta.

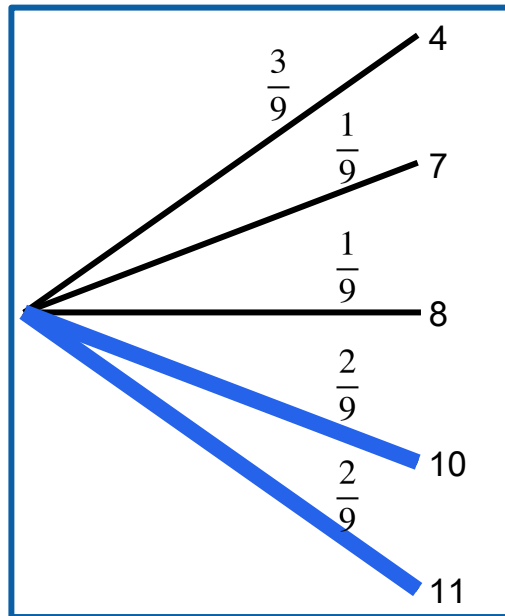


Nuur



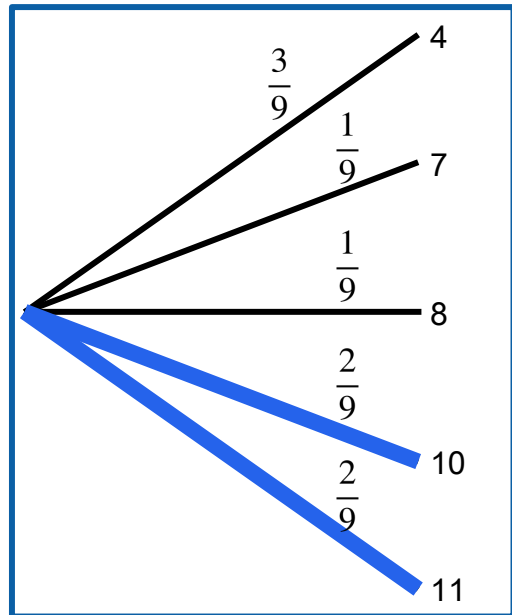
Nuur wuxuu rabaa inuu ciyaaro ciyaar ka dhacda suuqa deegaanka.

Haddii uu wareejiyo wareegga (spinner) oo ku dego lambar laba-god ah, wuxuu helayaa abaalmarin.



Itimaalka (probability) ee Nuur guuleysiga waa:

$$\frac{2}{9} + \frac{2}{9} = \frac{4}{9}$$



Ma jirtaa hab lagu yareeyo geedka itimaalka (probability tree) si ka yar oo ka waxtar badan?



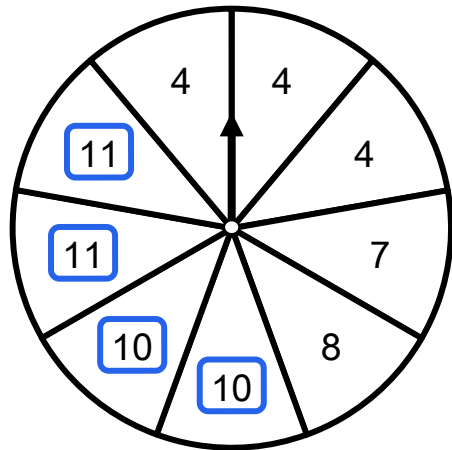
Suad

Laan muujinaysa itimaalka (probability) guuleysiga, iyo mid kale oo muujinaysa dhacdada ka soo horjeeda: guuldarada.

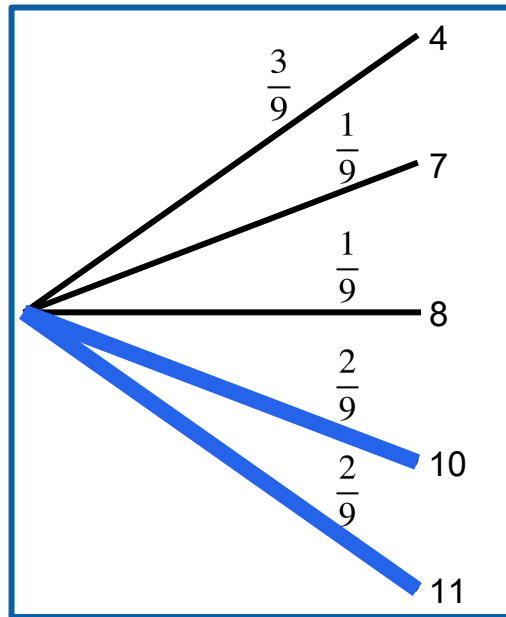


Nuur

Nuur wuxuu guuleystaa haddii wareegga (spinner) uu ku dego lambar laba-god ah:

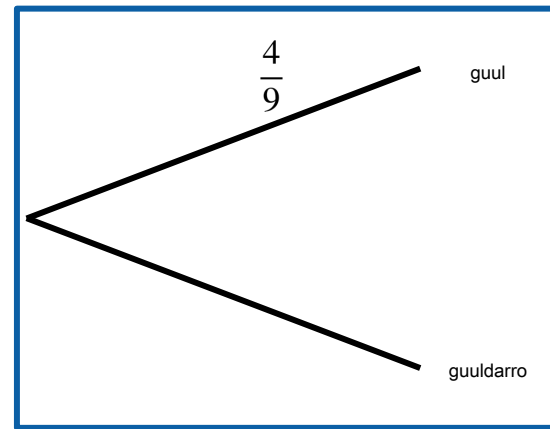


wareegga (spinner)



geedka itimaalka (probability tree) ee natiijooyinka

$$\frac{2}{9} \quad \frac{2}{9} \quad \frac{4}{9}$$



geedka itimaalka (probability tree) ee labada dhacdo

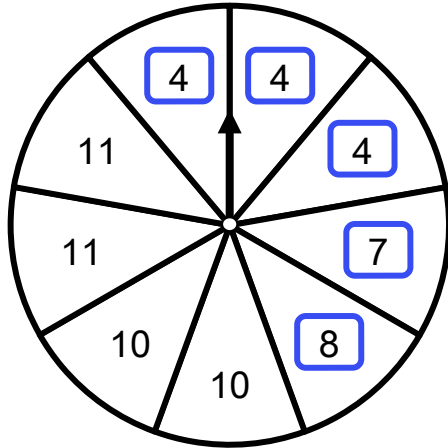
Isbarbardhigga geedaha (trees) muujinaya dhacdooyinka iyo natiijooyinka



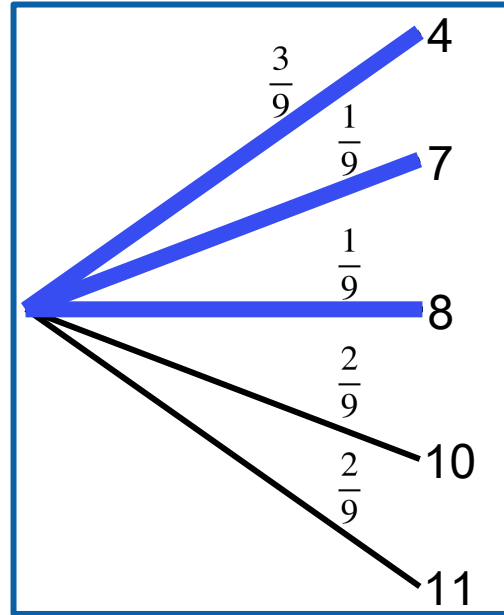
Sharaxaad

Jun wuu guuldareystaa haddii wareeggu uusan ku degin lambar laba-godoodle ah:

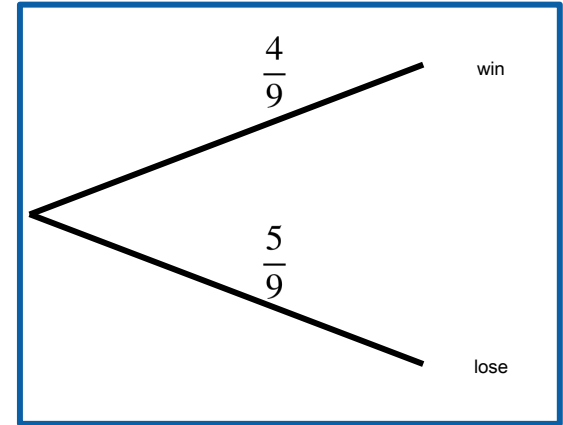
$$\frac{3}{9} + \frac{1}{9} + \frac{1}{9} = \frac{5}{9}$$



spinner



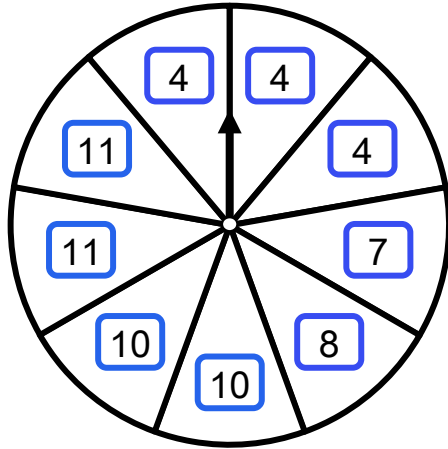
probability tree of outcomes



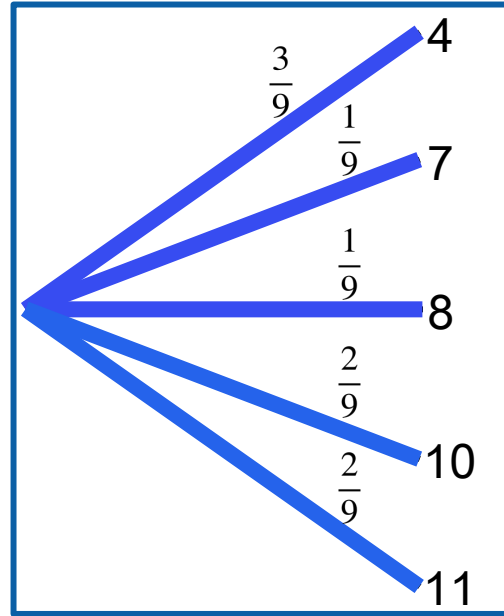
probability tree of two events

Isbarbardhigga geedaha muujinaya dhacdooyinka iyo natiijooyinka

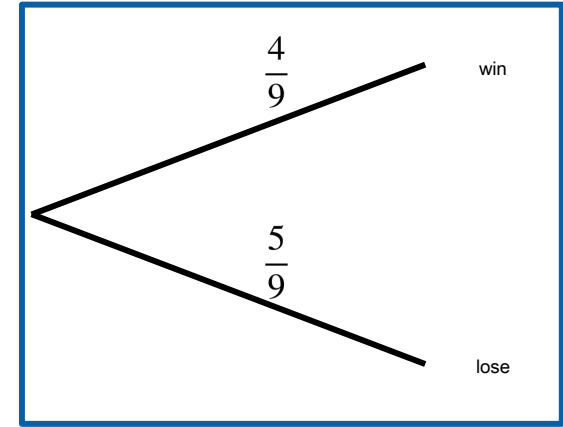
Geedankan ixtimaalka ee muujinaya dhacdooyinka guusha ama guuldarada waa dhammaystiran yahay, maadaama uu matalo dhammaan sagaalka natiijada wareegga ee labadiisa laamood.



spinner



probability tree of outcomes

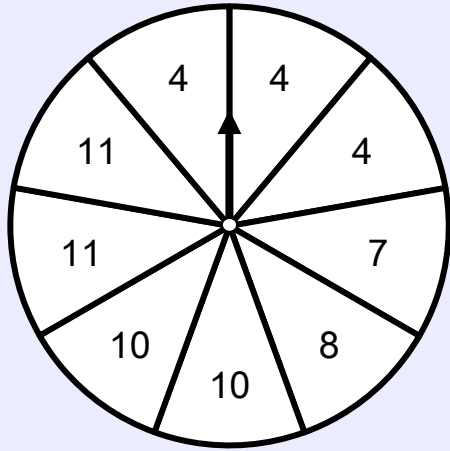


probability tree of two events

Isbarbardhigga geedaha muujinaya dhacdooyinka iyo natiijooyinka



Hubi



Haddii wareeggu ku dego 7, Sofia iyo Laura way isku mid yihiin waxayna helaan hal nacnac midkiiba.

Haddii wareeggu ku dego lambar ka weyn 7, markaas Sofia waa guuleysataa (labada nacnac).

Haddii wareeggu ku dego lambar ka yar 7, markaas Laura waa guuleysataa (labada nacnac).

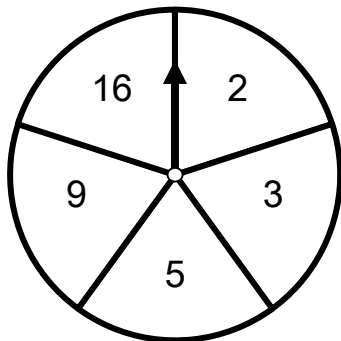
Sofia wants to construct a **probability tree** which shows the probability of her winning, Laura winning, or the game ending in a draw.

Waa imisa tirada ugu yar ee laamood ee geedkani yeelan karo?

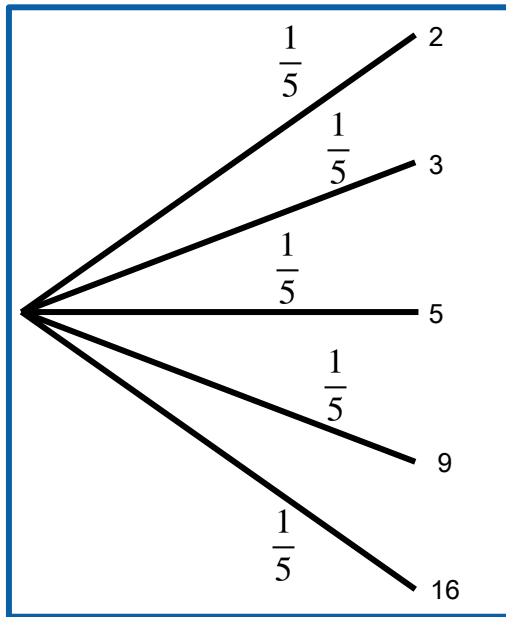
3 laamood: mid Sofia guuleysato, mid Laura guuleysato, iyo mid isku mid ah.

1) Isra wuxuu wareegi doonaa wareeg A hal mar oo wuxuu raadinayaa dhacdada ah in wareeggu ku dego tiro kooban. Isra wuxuu dhisayaa geed itimaal oo natiijooyin ah.

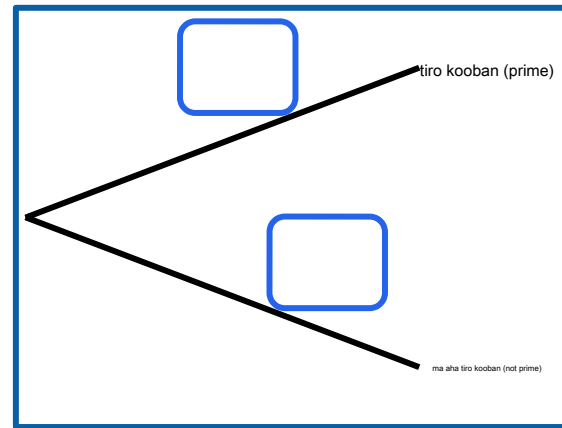
Dhammeystir geedka itimaalka oo muujinaya laba dhacdo: ku degid tiro kooban, ama ku degid tiro aan koobanayn.



wareeg A



geedka itimaalka ee
natiijooyinka

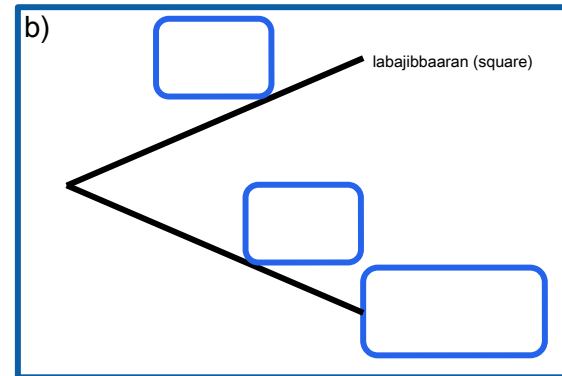
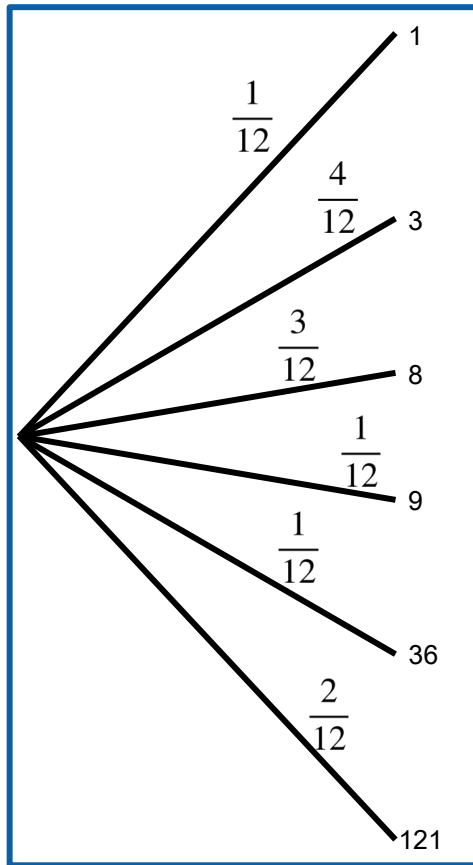


probability tree showing two events

2) Caasha waxay abuurtaa geed itimaal oo natiijooyin ah tijaabo ah wareejinta wareeg leh 12 qaybood.

a) Kee ka mid ah natiijooyinkan waa tirooyin labajibbaaran (square numbers)?

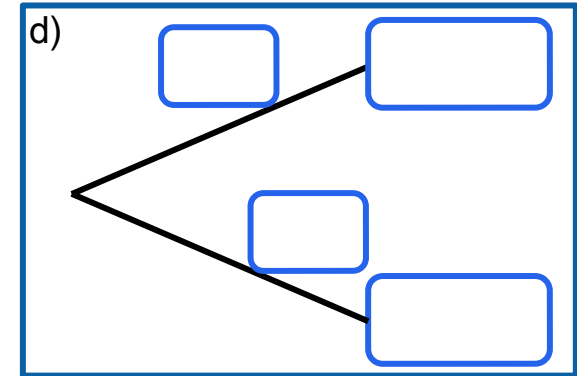
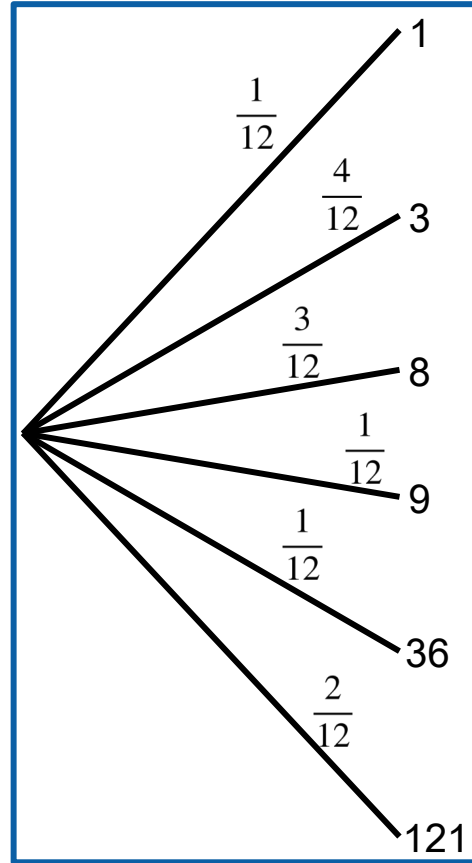
b) Dhammeystir geedka itimaalka ee laba dhacdo: ku degid tiro labajibbaaran, iyo ku degid tiro aan labajibbaaranayn.



2) Caasha waxay abuurtaa geed itimaal oo natiijooyin ah tijaabo ah wareejinta wareeg leh 12 qaybood.

c) Kee ka mid ah natiijooyinkan waa tirooyin siman (even numbers)?

d) Dhammeystir geedka itimaalka ee laba dhacdo, halkaas oo dhacdada kowaad ay tahay in wareeggu ku dego tiro siman.

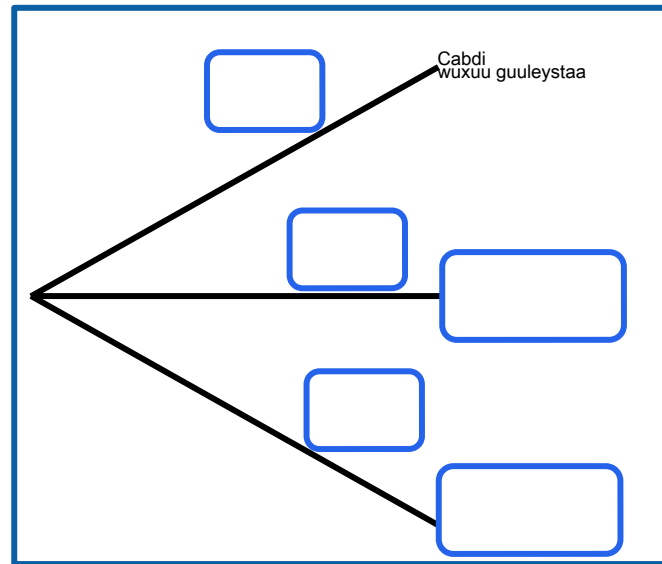
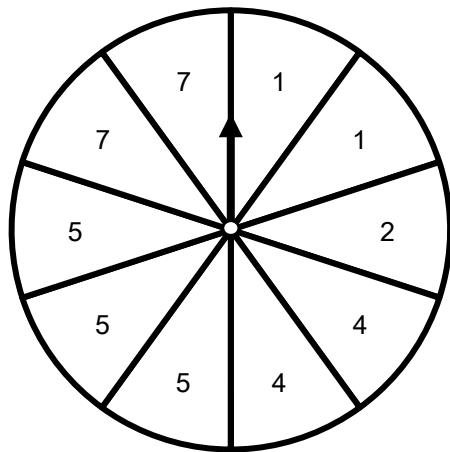


3) Cabdi iyo Cali waxay ciyaaraan ciyaar. Kii hela nambarka ugu sarreeya wuxuu guuleystaa, haddii ay helaan isku nambar, waxay isku dhejiyaan (draw).

Cabdi wuxuu wareejiyaa wareegga, kaas oo ku dega 5.

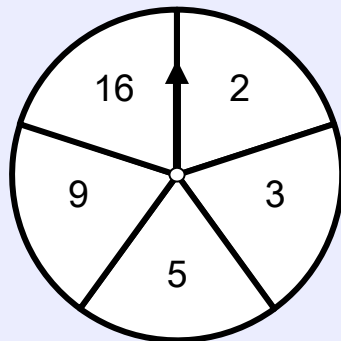
Cali wuxuu ku dhow yahay inuu wareejiyo wareegga.

Dhammeystir geedkan itimaalka si aad u muujiso dhacdooyinka cidda guuleysan karta.

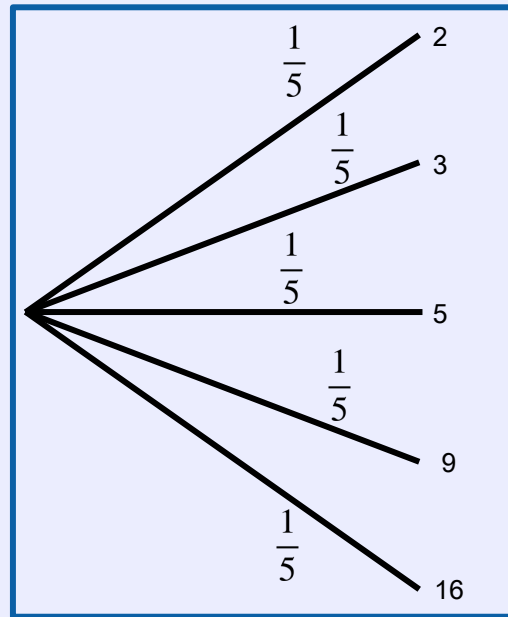


1) Isra wuxuu wareejin doonaa wareegiyaha A hal mar oo wuxuu raadin doonaa dhacdada ah in wareegiyuhu ku dego tiro asli. Isra wuxuu dhisayaa geed ixtimaal oo natiijooyin ah.

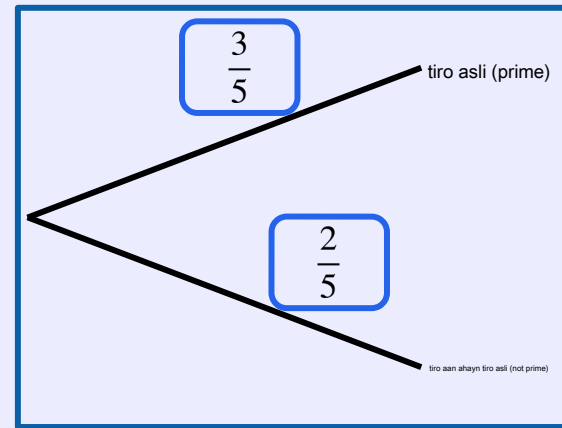
Dhammeystir geedka ixtimaalka oo muujinaya laba dhacdo: ku degid tiro asli, ama ku degid tiro aan ahayn tiro asli.



wareegiyaha A (spinner A)



geedka ixtimaalka ee natiijooyinka



geedka ixtimaalka oo muujinaya laba dhacdo (event)

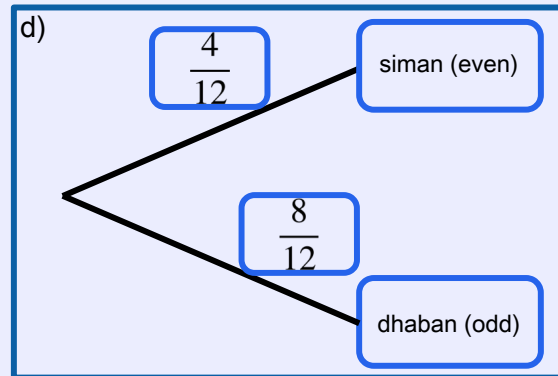
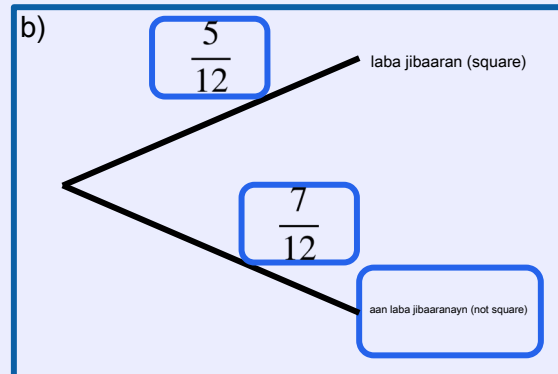
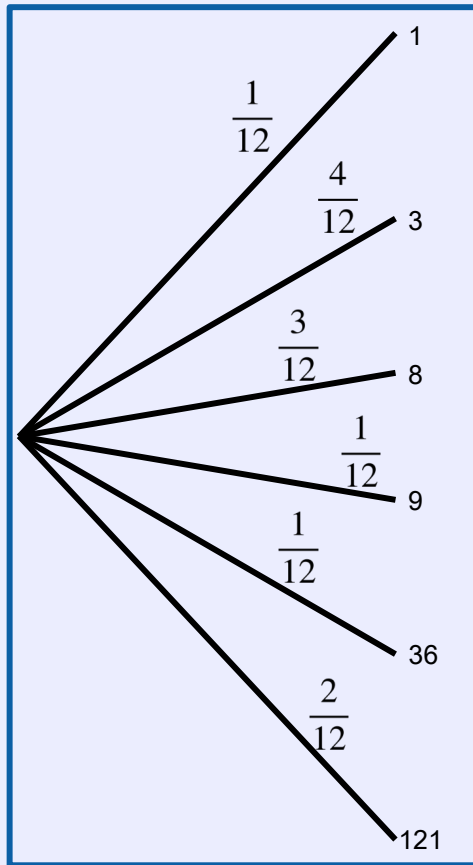
2) Caasha waxay abuurtaa geed ixtimaal oo natiijooyin ah tijaabo ah wareejinta wareegiyaha 12 qaybood leh.

a) Kee ka mid ah natiijooyinkan waa tiro laba jibaaran (square numbers)?

c) Kee ka mid ah natiijooyinkan waa tiro siman (even numbers)?

1, 9, 36, 121

8, 36



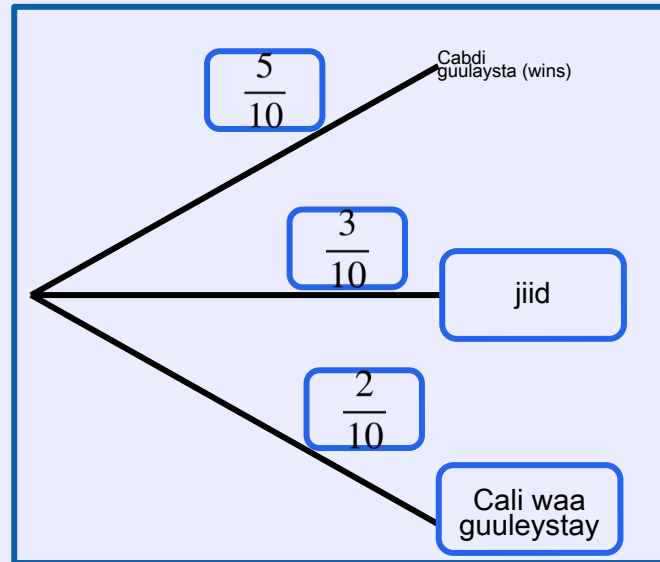
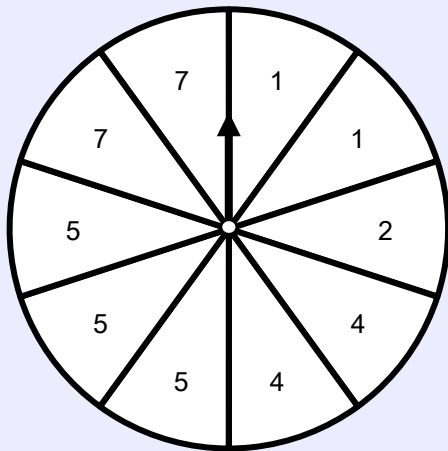
Dhaban (odd) sidoo kale wuxuu noqon karaa mid aan simanayn (not even).

3) Cabdi iyo Cali waxay ciyaaraan ciyaar. Qofka hela nambarka ugu sarreeya ayaa guuleysta, haddii ay isku nambor helaanna waa barbar (draw).

Cabdi wuxuu wareejiyaa wareegiyaha, kaas oo ku dega 5.

Cali wuxuu ku dhow yahay inuu wareejiyo wareegga (spinner).

Dhammeysti geedka ixtimaalka (probability tree) si aad u muujiso dhacdooyinka cidda guulaysan karta.



Soo koobid

Xisaabinta ixtimaalka aragtida (theoretical probabilities) ee jaantusyada geedka ixtimaalka (hal dhacdo)

Natiijo kasta oo shaqsiyeed oo tijaabo hal-mar ah waxaa lagu matali karaa geed ixtimaal (probability tree), halkaas oo laan kastaa ay u taagan tahay natiijo shaqsiyeed.

Geed ixtimaal muujinaya natiijooyinka waxaa loo dhigi karaa mid waxtar badan iyadoo la isku uruurinayo dhammaan natiijooyinka la doonayo hal laan.

Geed ixtimaal wuxuu kaloo muujin karaa ixtimaalka dhacdo (ama dhacdooyin) inay dhacdo, ilaa uu geedku matalo dhammaan natiijooyinka suurtagalka ah ee tijaabada.