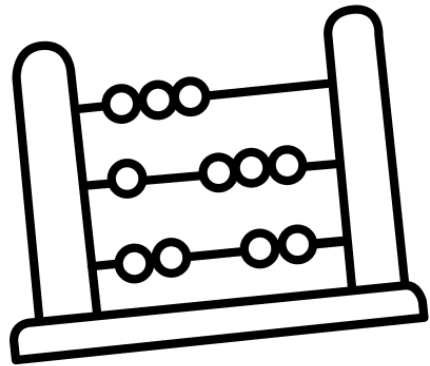


Isku ekaanshaha qaababka

Maths

Cutub: Sifooyinka joomatari iyo aragtida Pythagoras



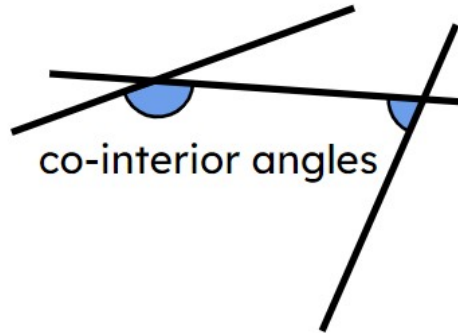
Natiijo

Waxaan garan karaa in qaababka isku ekaanshaha leh dhererka dhinacyada iyo cabbirka xaglaha labadaba la ilaaliyo.

Erayada muhiimka ah

Haddii qaab uu si sax ah ugu habboonaado korka qaab kale iyadoo la adeegsanayo wareeg (rotation), milicsi (reflection), ama turjumaad (translation), markaas qaababku waa isku ekaansho (congruent).

Xaglaha co-interior waxay ku yaalliin dhinaca isku midka ah ee khadka transversal iyo dhexdooda labada khad ee kale.



Isku ekaanshaha qaababka



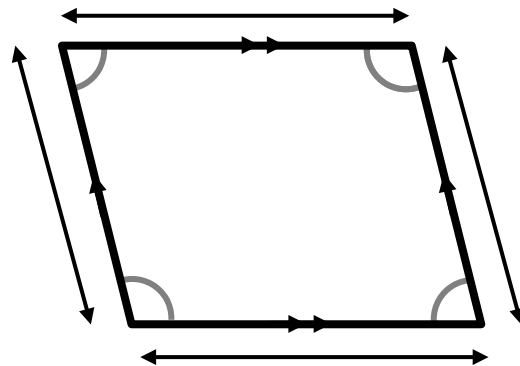
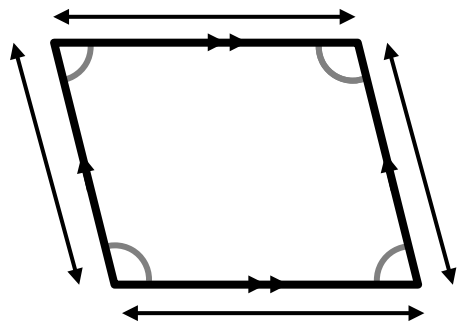
Aqoonsiga isku ekaanshaha



Xallinta mashaakilaadka qaababka isku ekaanshaha leh

Qaababka leh dhererka iyo xaglaha isku midka ah waa isku ekaansho (congruent).

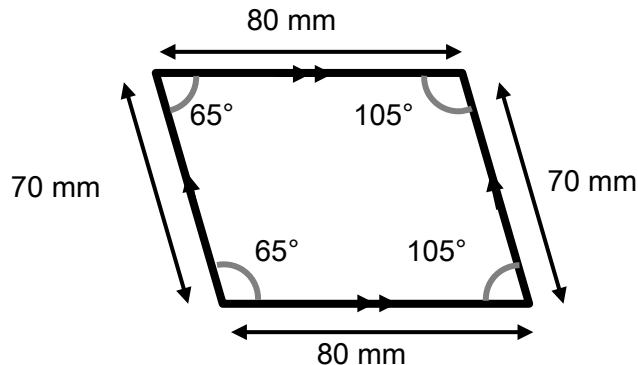
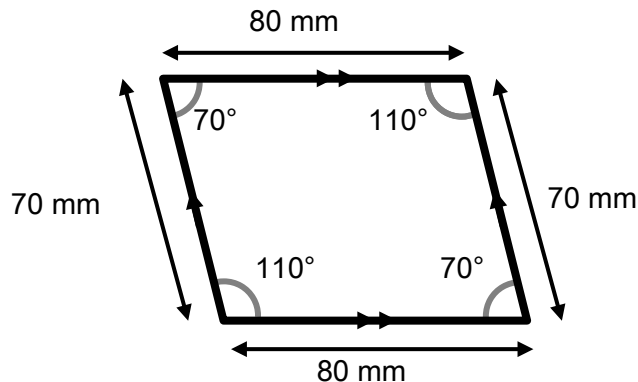
Marka qaababku aan isku ekaansho ahayn, waxay yihiin kuwa aan isku ekaansho ahayn (incongruent).



Qaababkani waxay leeyihiin xaglaha isku midka ah laakiin ma aha isku ekaansho (incongruent) sababtoo ah dhererka way kala duwan yihiin.

Qaababka leh dherer iyo xaglo isku mid ah waa isku mid (congruent).

Marka qaababku aan isku mid ahayn, waa kuwo aan isku mid ahayn (incongruent).

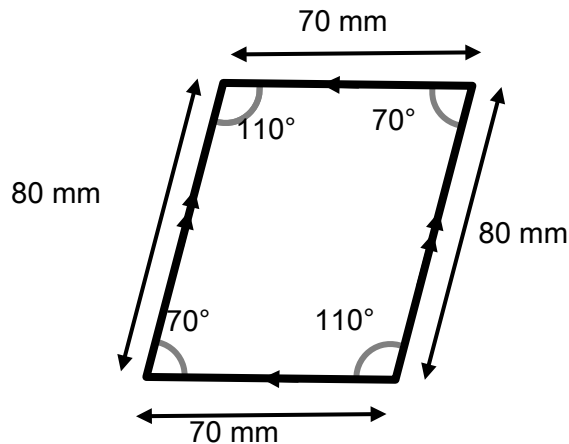
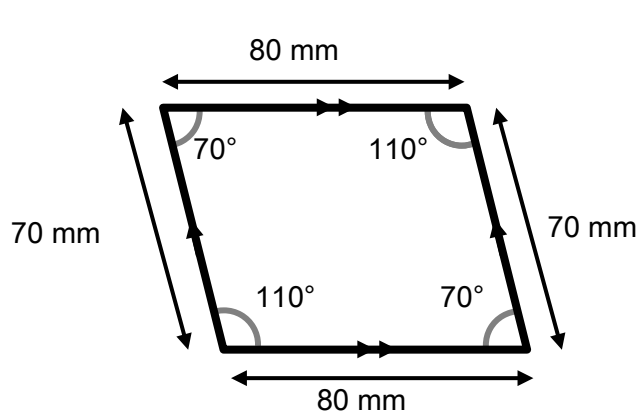


Qaababkani waxay leeyihiin dherer isku mid ah laakiin ma aha isku mid (incongruent) sababtoo ah xagluhu way kala duwan yihiin.

Aqoonsiga isku midnimada (congruence)

Qaababka leh dherer iyo xaglo isku mid ah waa isku mid (congruent).

Marka qaababku aan isku mid ahayn, waa kuwo aan isku mid ahayn (incongruent).



Qaababkani waxay ku jiraan jihooyin kala duwan laakiin waa isku mid (congruent) sababtoo ah waxay leeyihiin dherer iyo xaglo isku mid ah.

Isbeddellada (Transformations) ee isku midnimada (congruence)

Run mise been?

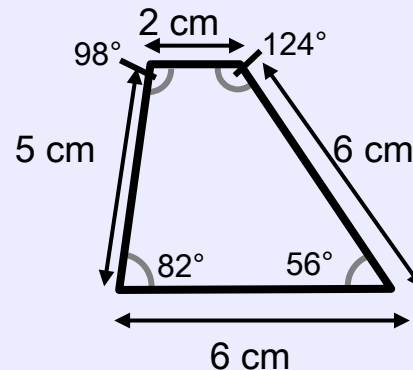
Laba qaab waa isku mid (congruent).



Run



Been



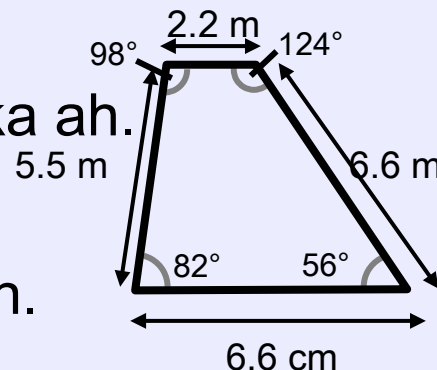
Sabab u sheeg jawaabtaada

a

Qaababku waxay leeyihiin xaglaha isku midka ah.

b

Qaababku waxay leeyihiin dherer kala duwan.



Run mise been?

Laba qaab waa isku mid (congruent).



Run



Been

Sabab u sheeg jawaabtaada

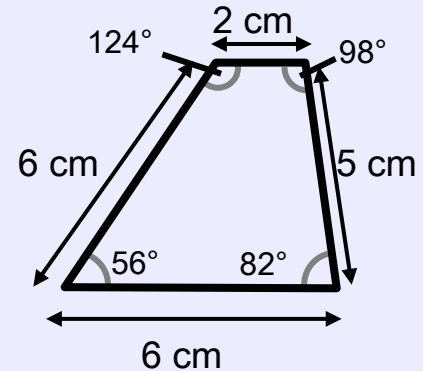
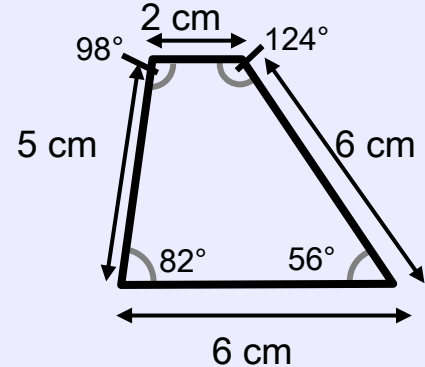
a

Qaababku waxay leeyihiin dherer iyo xaglo isku mid ah.



b

Qaababku waxay ku jiraan jihooyin kala duwan.



Qaababka leh dherer iyo xaglo isku mid ah waa isku-dhigma (congruent).

Dhammaan dhererka iyo xaglaha looma baahna in la ogaado si loo go'aamiyo isku-dhigma (congruence).

Xaqiiqooyinka ku saabsan xaglaha iyo dhererka siman ayaa laga yaabaa in loo isticmaalo si loo xisaabiyo cabbirada maqan ee qaabka.

Isku-dhigma (congruence) waa la go'aamin karaa haddii macluumaad ku filan la ogyahay si loo hubiyo inaysan jirin fursado kale.

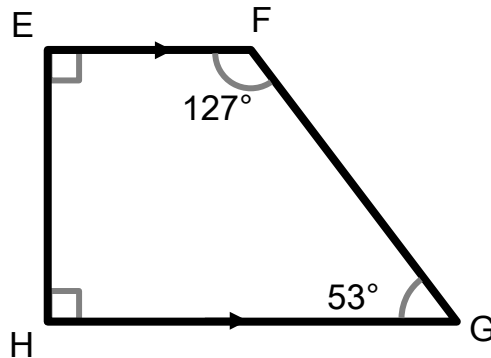
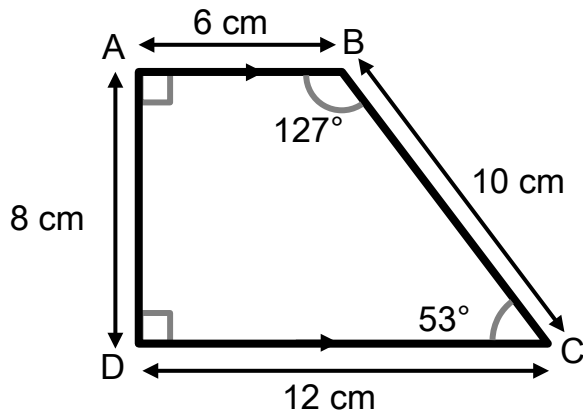
Ma jiraa macluumaad ku filan oo lagu go'aamin karo in qaababkani isku-dhigma (congruent) yihiin?

Waxaan arkaa in dhammaan xaglaha ay isku mid yihiin labada qaab, laakiin ma aqaano dhererka.

Sidaas darteed, ma jiro macluumaad ku filan oo lagu go'aamin karo inay isku-dhigma (congruent) yihiin.



Cabdi

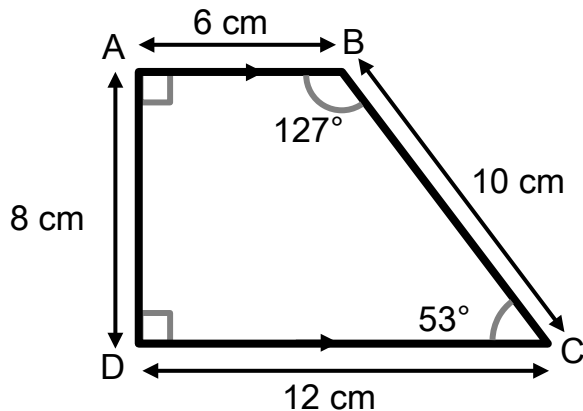


Isra

Maxaa dhacaya haddii aan idiin sheego dhammaan dhererrada?
Ma go'aamin kartaan haddii ay siman yihiin (congruent) hadda?



Cabdi

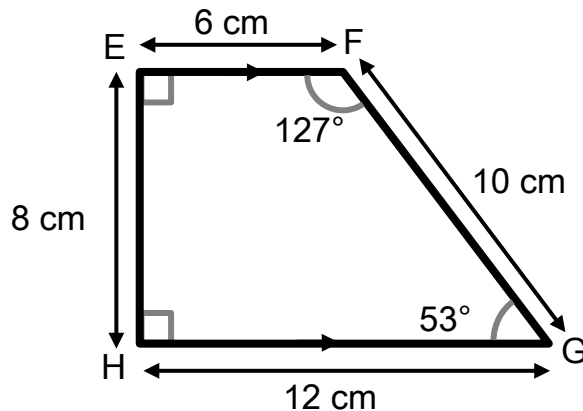


Waxaan arkaa in dhammaan xaglaha iyo
dhererka ay isku mid yihiin qaab kasta.

Sidaas darteed, haa, hadda waan hubaa inay
isku-dhigma (congruent) yihiin.



Isra

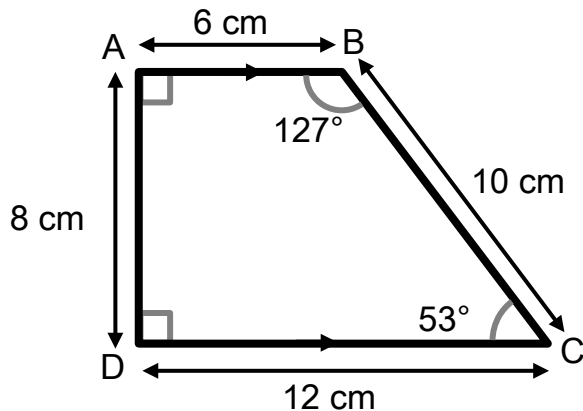


Waxaan ka saaray $\angle EFG$.

Miyaa wali jira macluumaad ku filan oo lagu go'aamiyo simanaanta (congruence)?



Cabdi

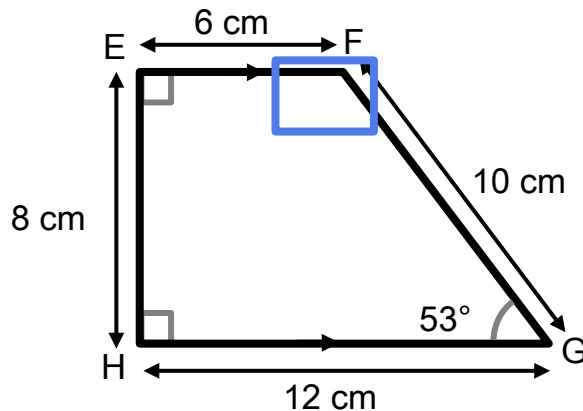


Waxaan xisaabin karaa $\angle EFG$ adoo ka jaraya saddexda xagal ee hadhay 360° .

Marka, haa, wali waan hubsan karaa inay siman yihiin (congruent).



Isra

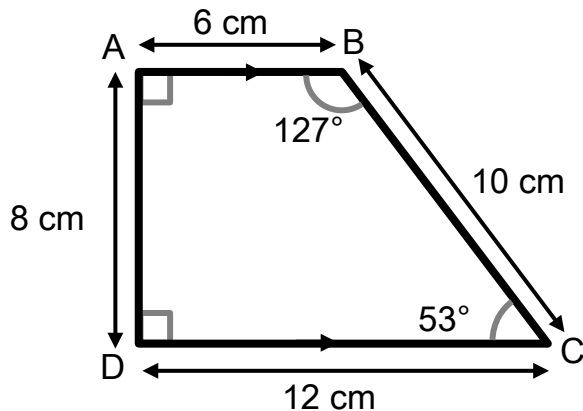


Maxaa dhacaya haddii aan sidoo kale ka saaro $\angle HEF$?

Ma wali waxaa jira macluumaad ku filan oo lagu go'aamin karo isku-dhigmaanta (congruence)?



Cabdi

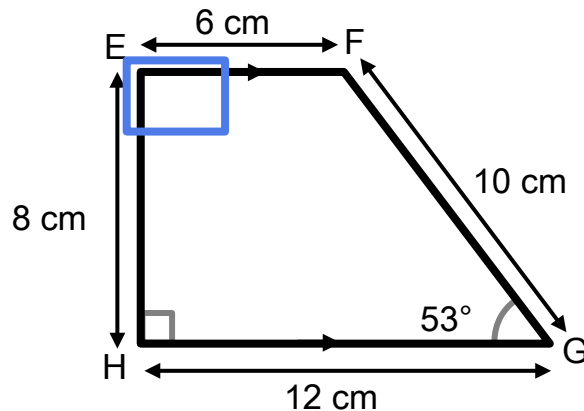


Waxaan arkaa in laba dhinac oo ka mid ah ay isbarbar yihiin. Waxaan isticmaali karaa xaqiiqda ah in xaglaha co-interior ay isku yimaadaan 180° si aan u xisaabiyo labada xaglood ee maqan.

Marka, haa, wali waan hubsan karaa inay isku-dhigmaan (congruent) yihiin.



Isra

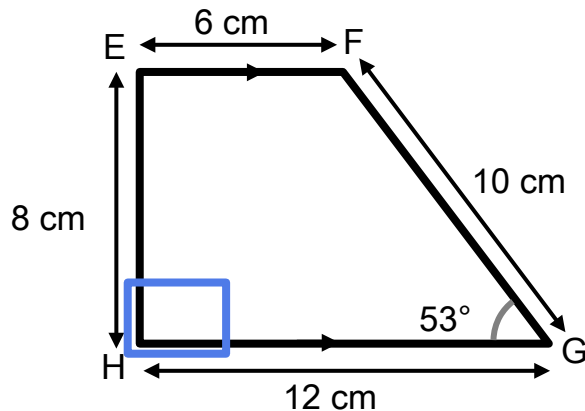
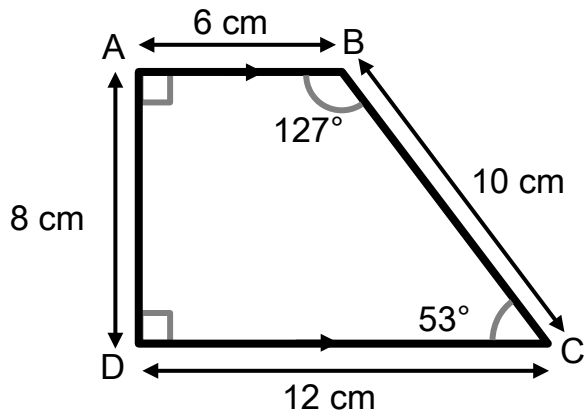


Maxaa dhacaya haddii aan sidoo kale ka saaro $\angle GHE$?

Ma wali waxaa jira macluumaad ku filan oo lagu go'aamin karo isku-dhigmaanta (congruence)?



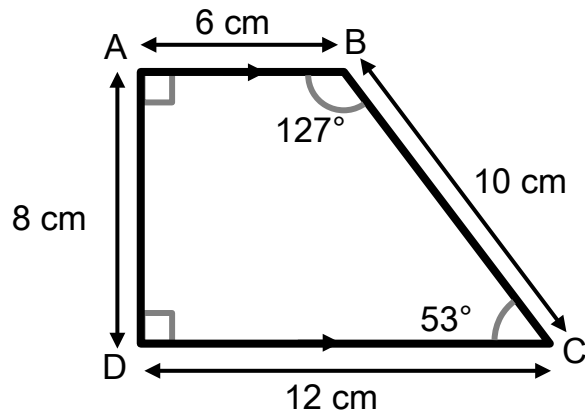
Cabdi



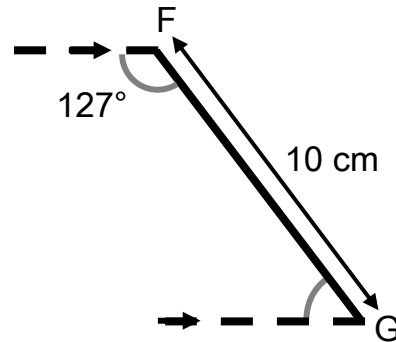
Isra



Cabdi



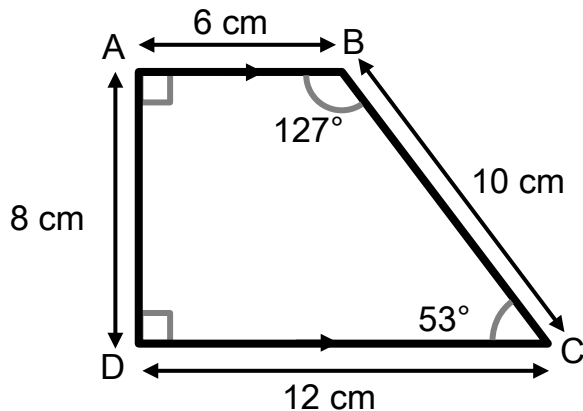
Hagaag, waxaan xisaabin karaa $\angle GHE$ adigoo isticmaalaya xaglaha gudaha ee isku-xiga (co-interior angles) ee u dhexeeya sadarrada isbarbar socda.



Isra

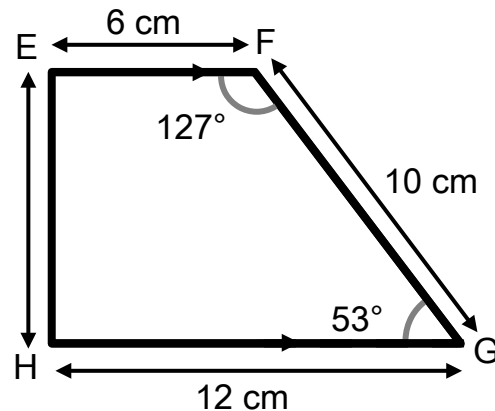


Cabdi



Kadib, haddii aan sawiro EF oo ah 6 cm iyo GH oo ah 12 cm...

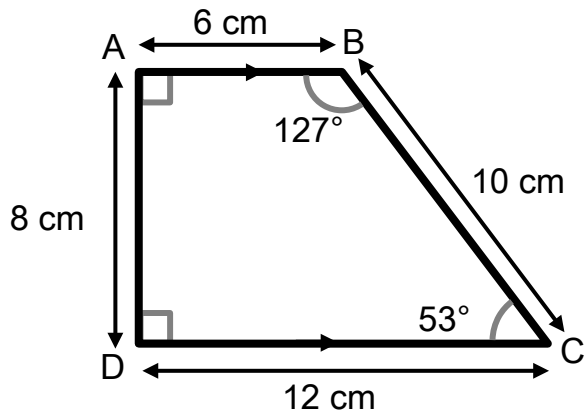
...waxaa jira hal hab oo keliya oo lagu sawiro dhererka 8 cm ee hadhay.



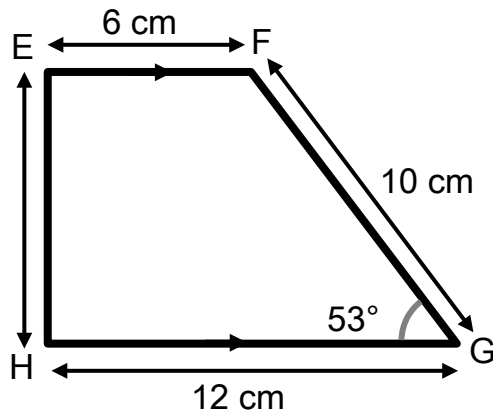
Isra



Cabdi



Haa, waa sax. Tan weli waa macluumaad ku filan oo lagu go'aamin karo isku-dhigma (congruence).



Isra

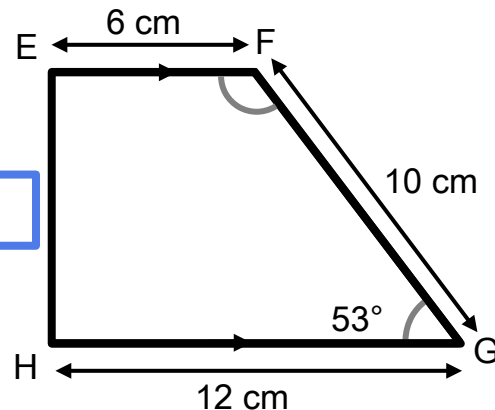
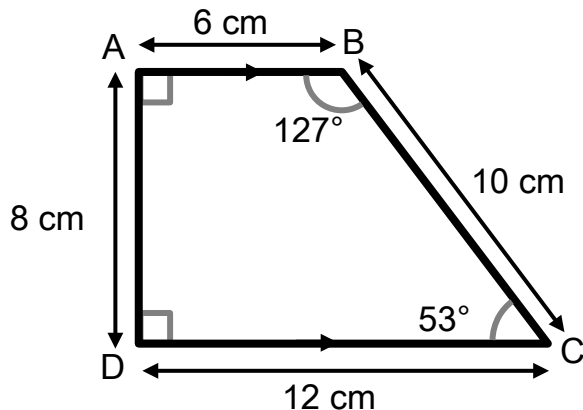
Ma jiraan macluumaad ku filan oo lagu go'aamin karo isku midnimada (congruence)?

Sida hore, waxaan xisaabin karaa xagasha co-interior oo sawiri karaa saddex geesood oo aan aqoon. Markaas ma aha wax aan fiirsado in aan ogaado dhererka EH, sababtoo ah waxaa jira hal meel oo ay tegi karto.

Haa, sidaas darteed, waxaan weli hubsan karaa inay isku mid yihiin (congruent).



Cabdi



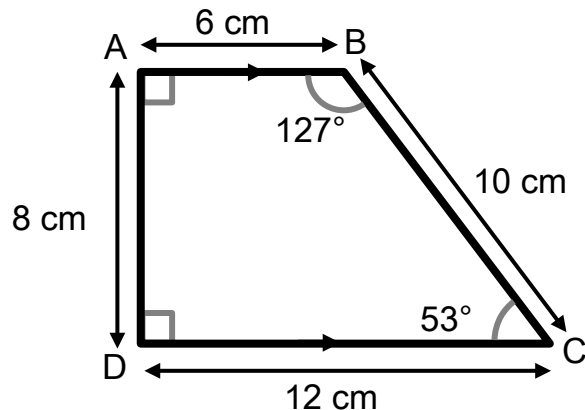
Isra

Hadii aan ka saaro calaamadaha isbarbar socda (parallel)?

Ma wali waxaa jira macluumaad ku filan oo lagu go'aamin karo isku-xidhnaan (congruence)?



Cabdi



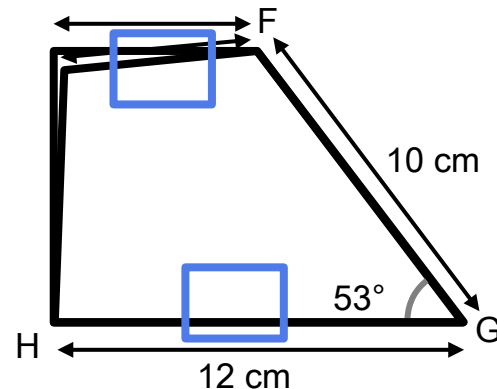
Taas macnaheedu waa ma xisaabin karo $\angle EFG$.

Hadda waxaa jira ikhtihaar loogu talagalay habka EF u socon karo, taas oo saameyn ku yeelan karta dhererka EH.

Sidaas darteed, maya, ma hubin karo inay isku mid yihiin (congruent).

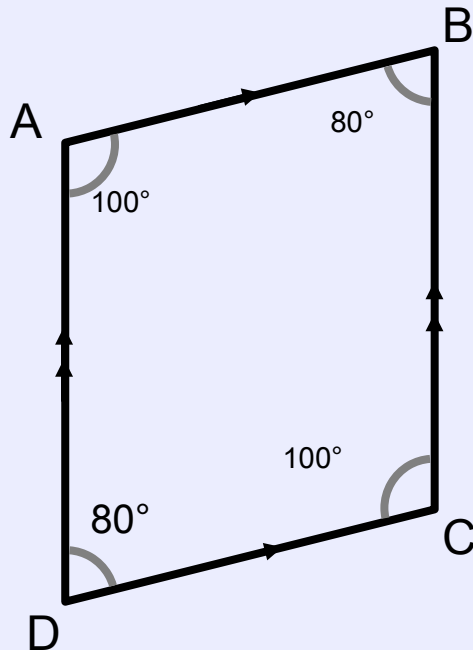


Isra



Aqoonsiga isku-xidhnaanta (congruence)

Soo hel cabbirka saddexda xagal gudaha ee hadhay.



$$\angle DAB = 100^\circ$$

$$\angle ABC = 80^\circ$$

$$\angle BCD = 100^\circ$$

Aqoonsiga isku-xidhnaanta (congruence)

Run mise been?

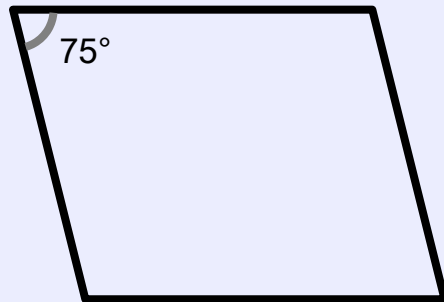
Waa suurtagal in la xisaabiyo dhammaan xaglaha gudaha ee hadhay ee qaabkan.



Run



Been



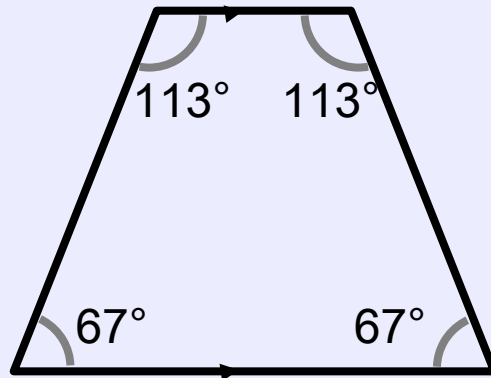
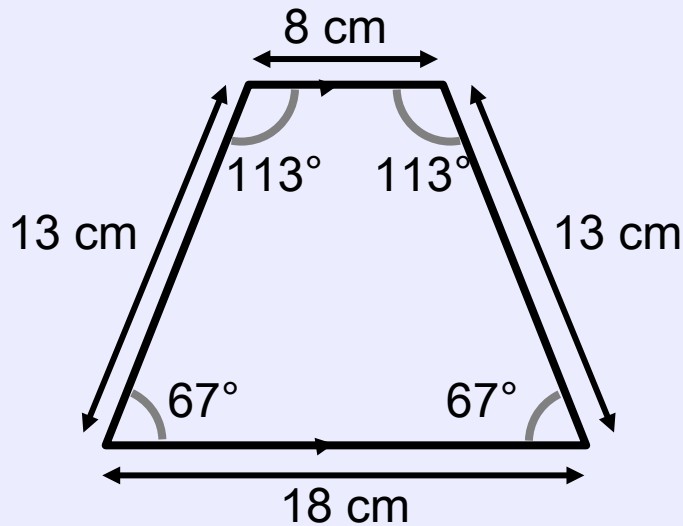
Sabab u sheeg jawaabtaada

a Ma jiro macluumaad ku filan oo ku yaal jaantuska si loo isticmaalo xaqiiqooyin xagal (angle facts) oo ku saabsan xaglaha hadhay.

b Xaqiiqooyinka ku saabsan xaglaha wada-jira (co-interior angles) ayaa loo isticmaali karaa in lagu xisaabiyo xaglaha hadhay.

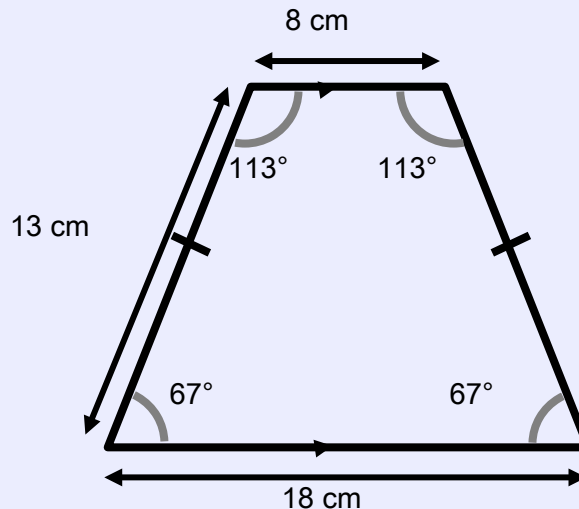
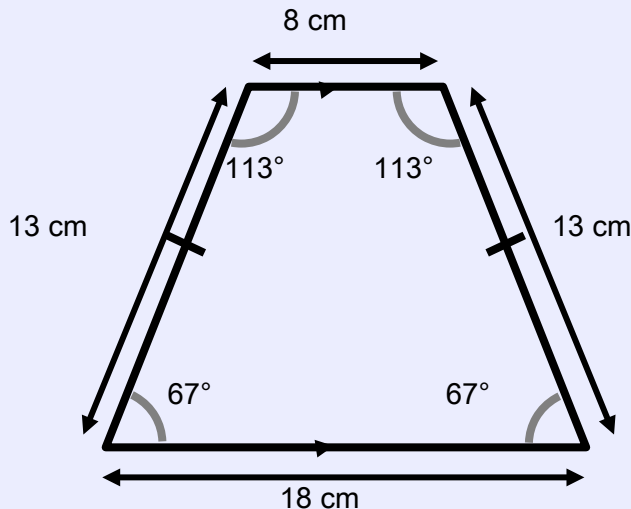
Aqoonsiga isku-xidhnaanta (congruence)

Ma jiraa macluumaad ku filan oo lagu go'aamin karo in qaababku isku-xidhan yihiin (congruent)? Sharax sababta.



Maya. Isku-xidhnaanta (congruence) lama go'aamin karo iyada oo aan la garanayn dhererka (tusaale, qaabka kale wuxuu noqon karaa weyneyn (enlargement) kan kale).

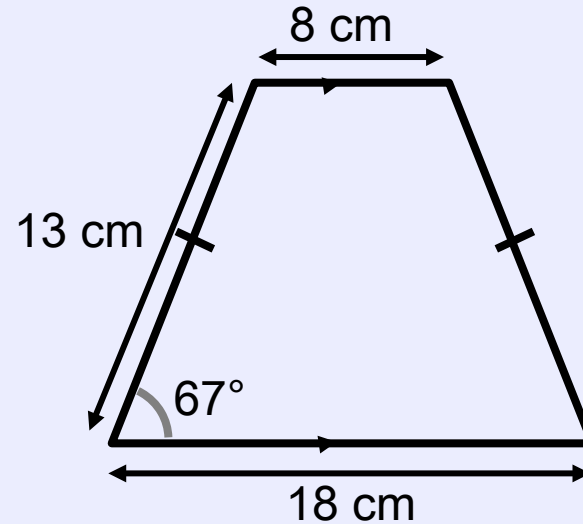
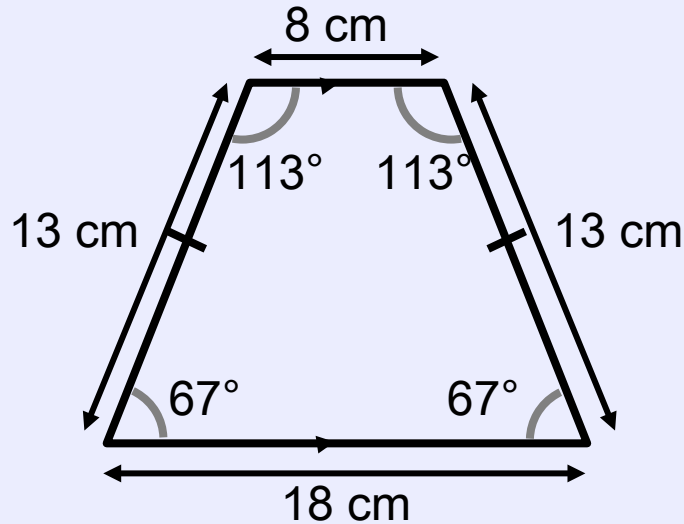
Ma jiraan macluumaad ku filan oo lagu ogaan karo in qaababku isku mid yihiin (congruent)? Sharax sababta.



Haa. Calaamadaha xariijimaha ee geesaha waxay muujinayaan in dhererka maqan uu yahay 13 cm. Sidaas darteed, waxaan ognahay in dhammaan dhererka iyo xaglaha qaab kasta ay isku mid yihiin.

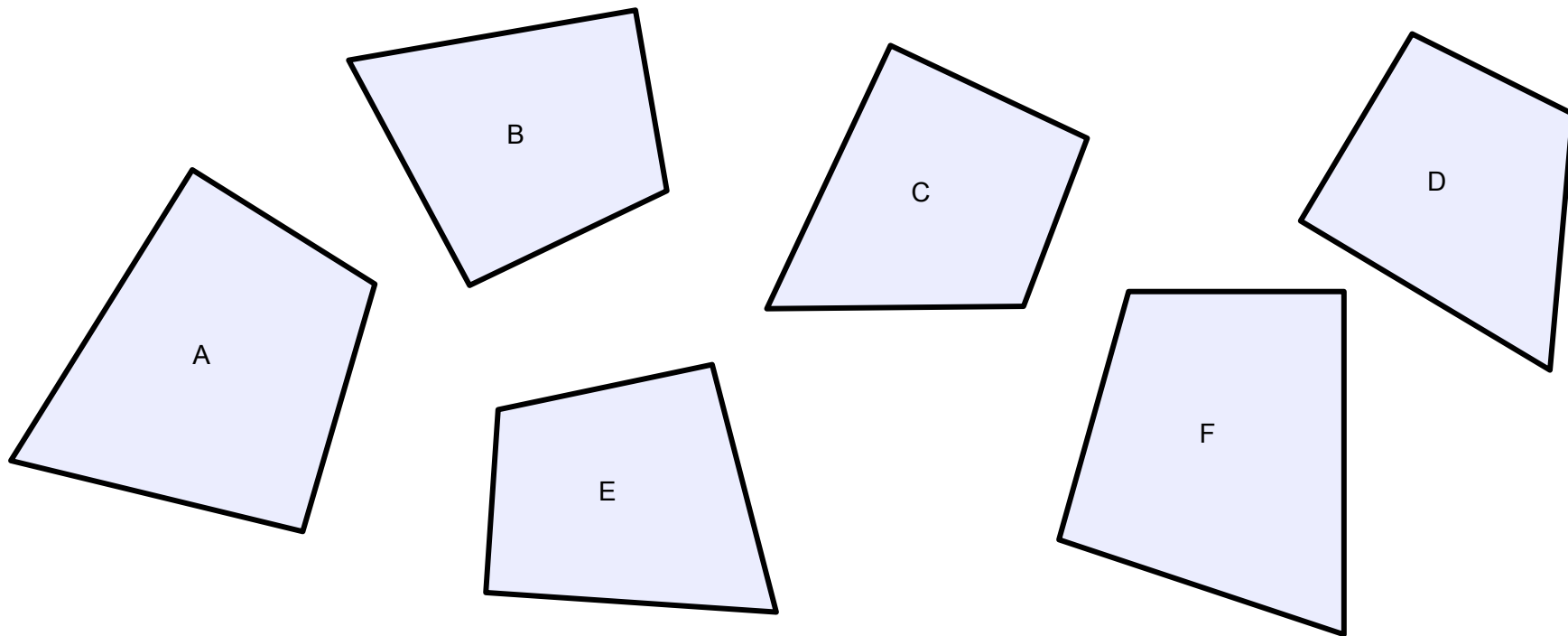
Aqoonsiga isku midnimada (congruence)

Ma jiraan macluumaad ku filan oo lagu ogaan karo in qaababku isku mid yihiin (congruent)? Sharax sababta.



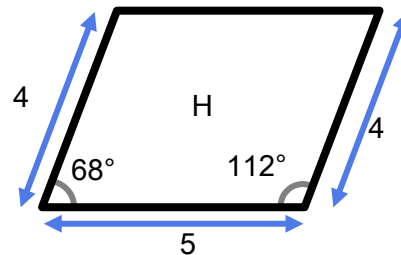
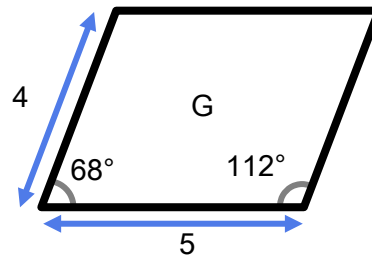
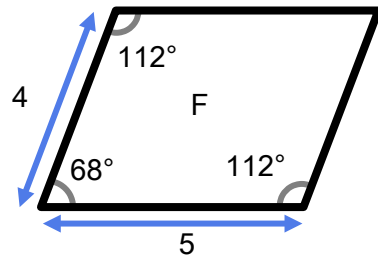
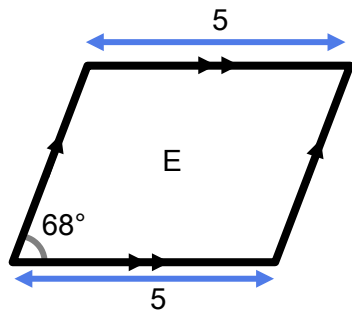
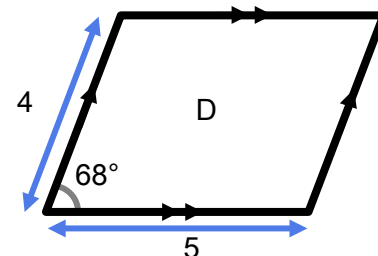
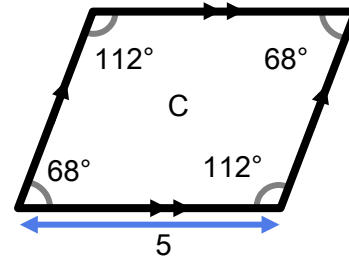
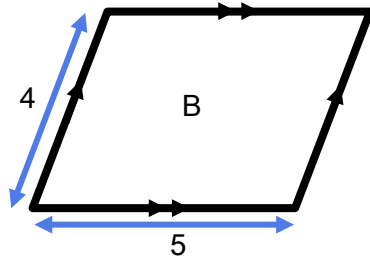
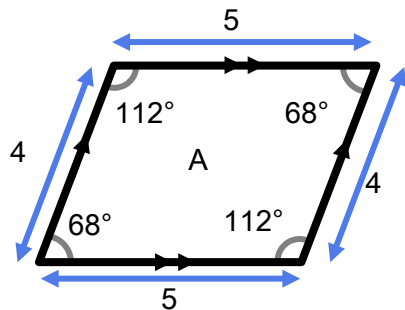
Haa. Waxaan ognahay in dhererka maqan uu yahay 13 cm. Xaglaha isku-dhafka ah (co-interior) iyo summetri (symmetry) ayaa loo isticmaali karaa in lagu helo dhammaan xaglaha haray.

1) Qaababka hoose waxay ka kooban yihiin saddex lammaane oo qaabab isku mid ah (congruent). Isku xir qaababka isku midka ah. Waxaad isticmaali kartaa xisaabta (ruler) iyo xagalbeeg (protractor) si aad u go'aamiso isku midnimada.



Hawsha A Aqoonsiga isku midnimada (congruence)

2) Kee ka mid ah qaababka ayaa leh macluumaad ku filan oo lagu ogaan karo inuu isku mid yahay qaabka A? Calaamadee qaababka lagu go'aamin karo isku midnimada. Jaantusyada (diagrams) ma aha kuwo si sax ah loo sawiray, dhammaan dhererka waxay ku jiraan halbeeg isku mid ah.



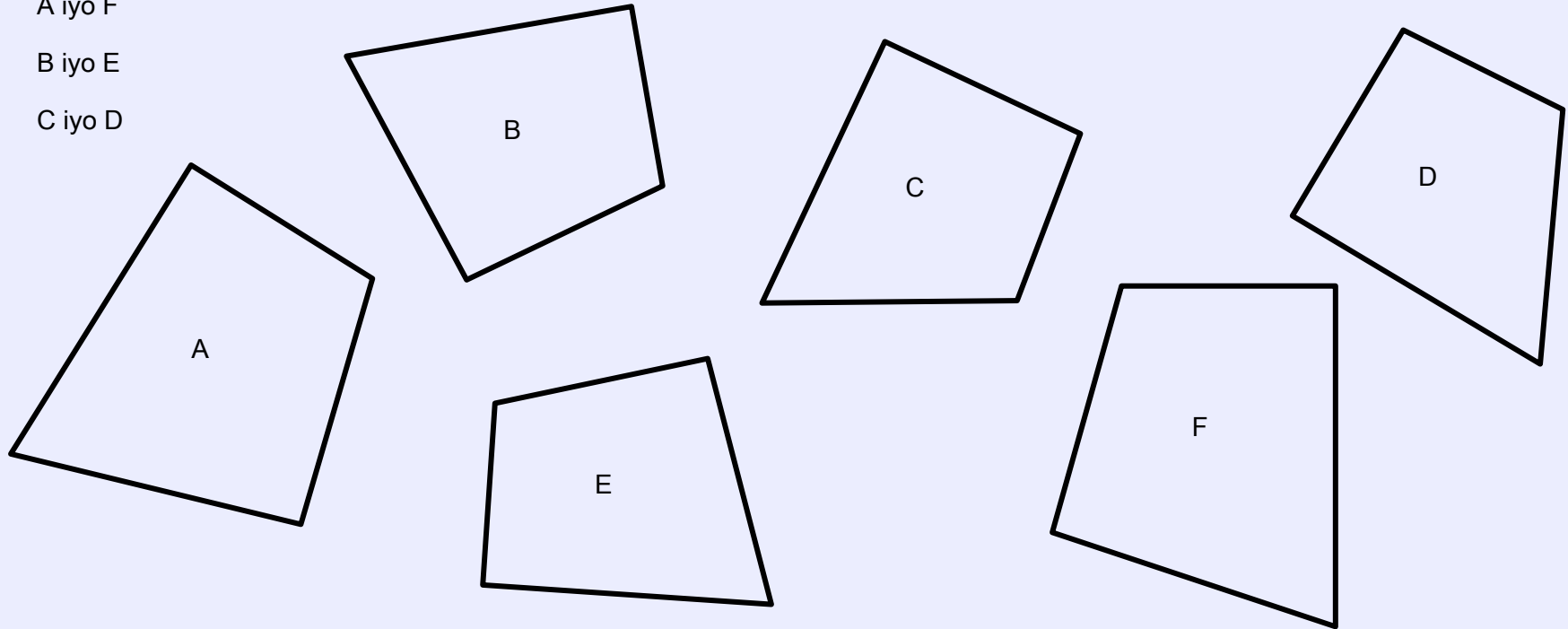
Hawsha A Aqoonsiga isku midnimada (congruence)

1) Qaababka hoose waxay ka kooban yihiin saddex lammaane oo qaabab isku mid ah (congruent). Isku xidh qaababka isku midka ah. Waxaad isticmaali kartaa xisaabiyaha (ruler) iyo xajmigooda (protractor) si aad u go'aamiso isku midnimada (congruence).

A iyo F

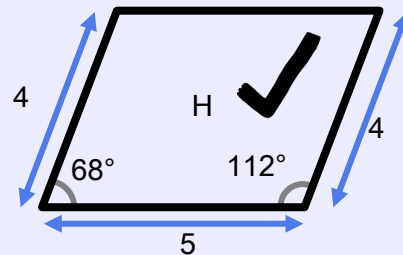
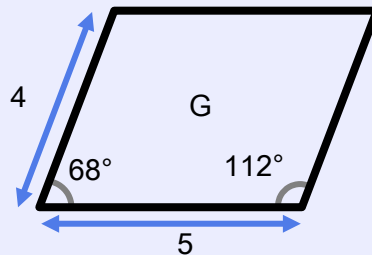
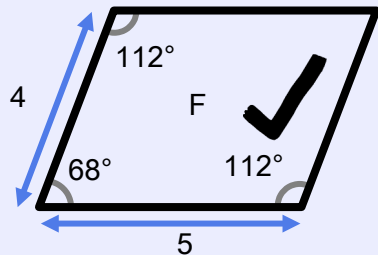
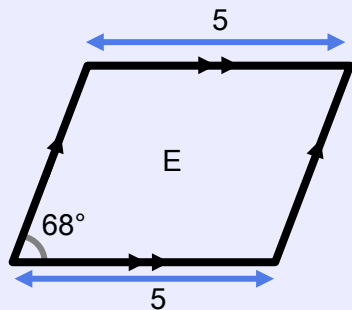
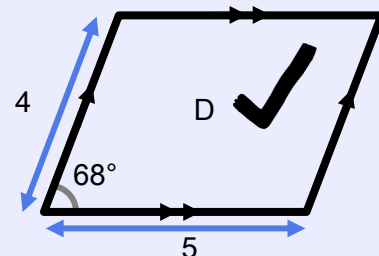
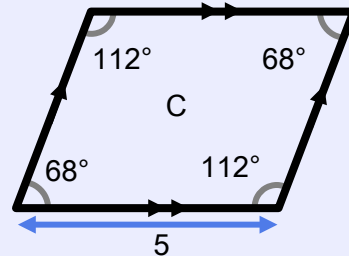
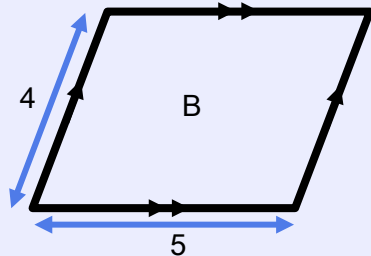
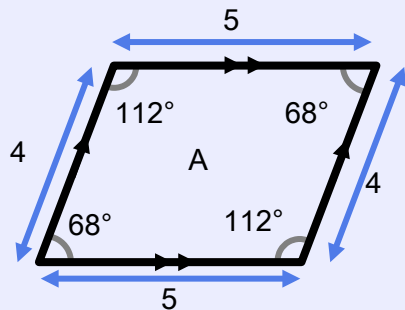
B iyo E

C iyo D



Hawsha A Aqoonsiga isku midnimada (congruence)

2) Qaababkee ayaa ka kooban macluumaad ku filan oo lagu ogaan karo inay la isku mid yihiin (congruent) qaabka A? Calaamadee qaababka isku midnimada (congruence) laga ogaan karo. Jaantusyada si sax ah looma sawirin, dhammaan dhererka waxay ku jiraan halbeeg isku mid ah.



Qaabka casharka

Isku midnimada (congruence) qaababka



Aqoonsiga isku midnimada (congruence)

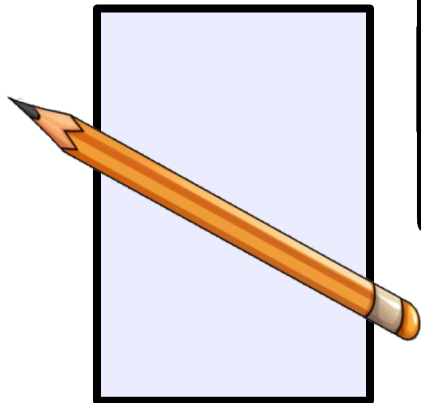


Xallinta mashaakilaadka qaababka isku midka ah (congruent shapes)

Xallinta mashaakilaadka isku midnimada (congruence)

Sawir leydi (rectangle).

Dul saar qalinkaaga leydiga si uu u kala qaybiyo laba qaab.



Waxaan u malaynayaa in labada qaab ay had iyo jeer isku mid (congruent) yihiin.



Waxaan u malaynayaa inay waligood isku mid (congruent) noqon karin.



Waxaan u malaynayaa inay mararka qaarkood isku mid (congruent) yihiin, mararka qaarkoodna aan isku mid ahayn.



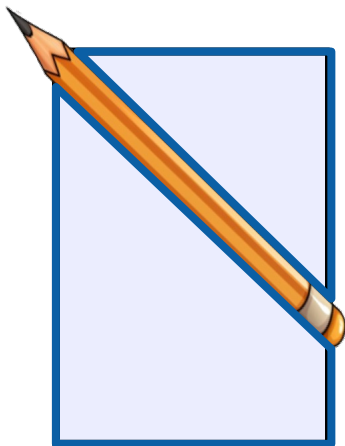
Xallinta dhibaatooyinka isku ekaanshaha (congruence)

Maxay Caasha u qaldan tahay?

Waxaan u malaynayaa in
labada qaab ay had iyo jeer
isku ekaan doonaan.



Caasha



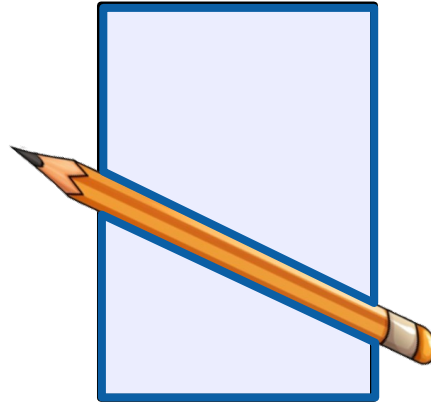
Maxay Caasha khalad u tahay?

Waxaan u malaynayaa in
labada qaab ay had iyo jeer
isku ekaan doonaan.



Caasha

tusaale qaabab aan isku ekeyn:



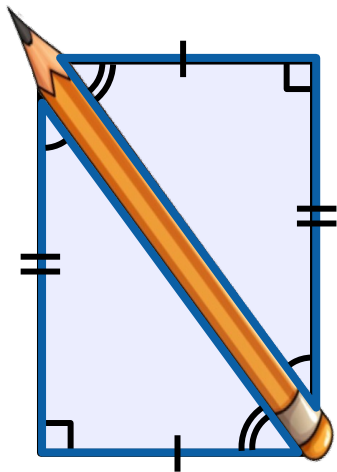
laba trapezium laakiin dhererka
tooska ah oo kala duwan

Maxay Nuur khalad u tahay?

Waxaan u malaynayaa
inay waligood isku
ekaan karin.



Nuur



laba saddexagal xagal qumman (right-angled)

Geesaha iska soo horjeeda ee leydigu waa isku dherer.

Geesaha iska soo horjeeda ee leydigu waa isbarbar yaal, xaglaha beddelka ah ee khadadka isbarbar yaalna waa isku qiyaas.

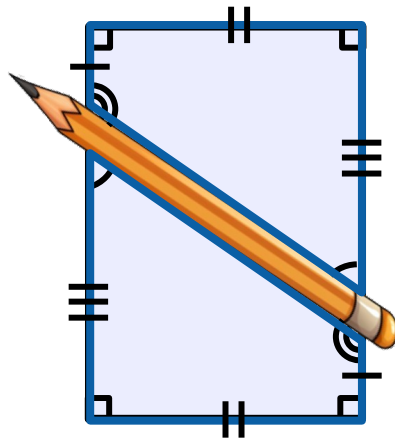
Maxay Nuur khalad u tahay?

Waxaan u malaynayaa inaanay waligood noqon karin kuwo isku mid ah (congruent).



Nuur

tusaale qaabab isku mid ah (congruent shapes):



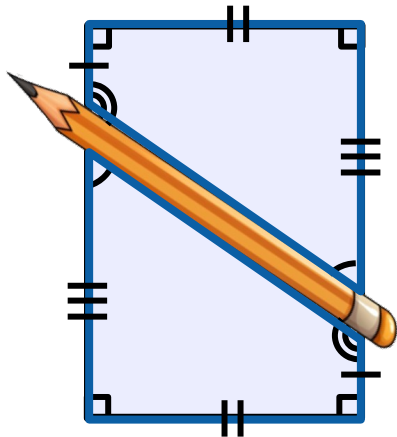
laba trapezium oo dhererka tooska ah isku mid yihiin

Labaduba waxay ka kooban yihiin laba xagal qumman (right angles) iyo xaglo isdaba joog ah (alternate angles) oo ku yaalla khadadka barbar socda (parallel lines) oo isku mid ah.

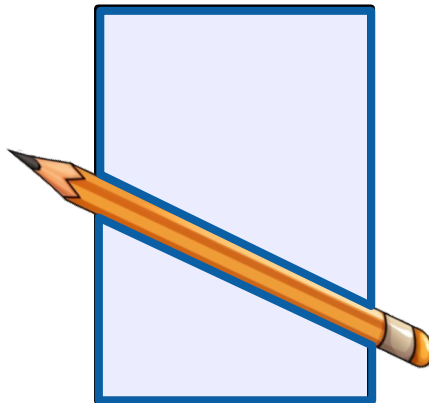
Xallinta mashaakilaadka isku midnimada (congruence)

Labada qaab mararka qaarkood waa isku mid (congruent).

isku mid (congruent)



aan isku mid ahayn
(incongruent)



Waxaan u malaynayaa inay
mararka qaarkood noqon
karaan kuwo isku mid
(congruent) iyo mararka
qaarkoodna maya.



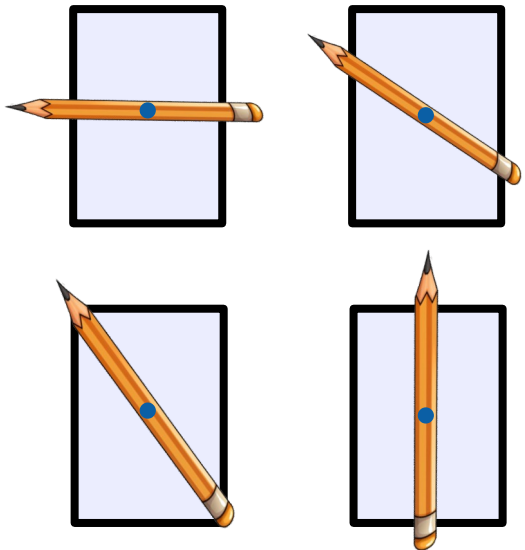
Suad

Xaaladee bay qaababku isku mid (congruent) yihiin?

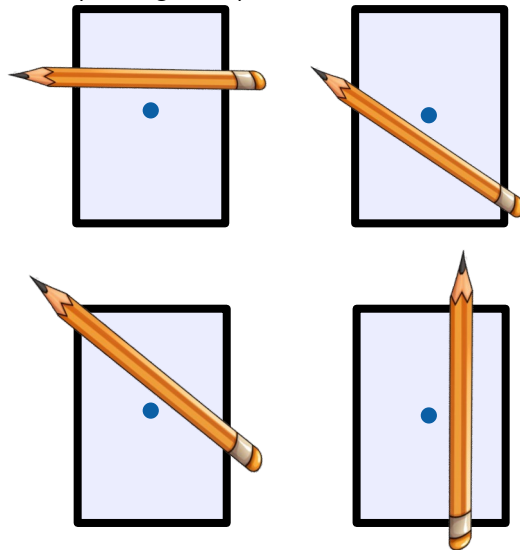
Xallinta mashaakilaadka isku midnimada (congruence)

Xaaladee bay qaababku isku mid (congruent) yihiin?

isku mid (congruent):



aan isku mid ahayn
(incongruent):



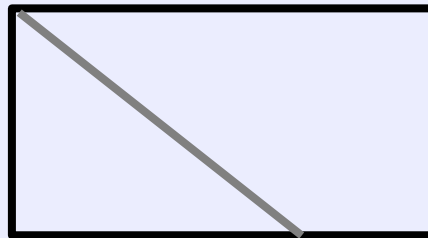
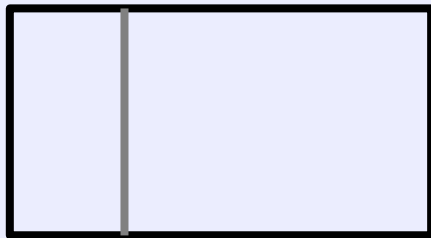
Qaababku waxay isku mid (congruent) yihiin marka qalinka (pencil) uu dhex maro xarunta leyliga (centre of the rectangle).

- 1) Su'aal kasta, sawir leyl (rectangle) ka dibna u kala qaybi sida tilmaamaha.
 - a) U kala qaybi leyliga (rectangle) laba qaab oo aan isku mid ahayn (incongruent).
 - b) U kala qaybi leyliga (rectangle) laba qaab oo isku mid ah (congruent).
 - c) U kala qaybi leyliga (rectangle) saddex qaab oo aan isku mid ahayn (incongruent).
 - d) U kala qaybi leyliga (rectangle) saddex qaab oo isku mid ah (congruent).
 - e) U kala qaybi leydiga si laba qaab ay isku mid u yihiin (congruent) kan kalena uu ka duwan yahay (incongruent).
 - f) U kala qaybi leydiga afar qaab oo ka duwan (incongruent).
 - g) U kala qaybi leydiga afar qaab oo isku mid ah (congruent).
 - h) U kala qaybi leydiga laba lammaane oo qaabab isku mid ah (congruent).

1) Su'aal kasta, sawir leydi ka dibna u kala qaybi sida tilmaamaha lagu sheegay.

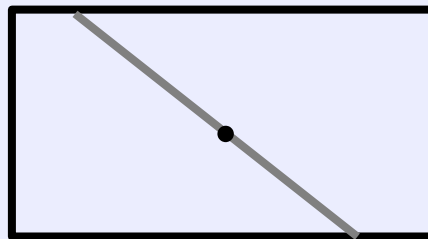
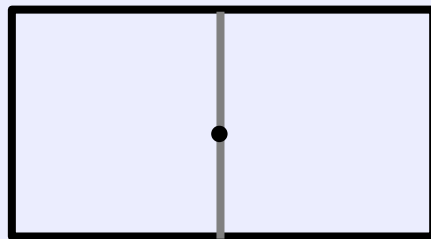
a) U kala qaybi leydiga laba qaab oo ka duwan (incongruent).

tusaalooyin:



b) U kala qaybi leydiga laba qaab oo isku mid ah (congruent).

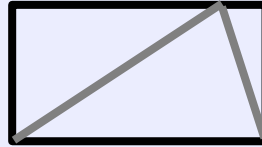
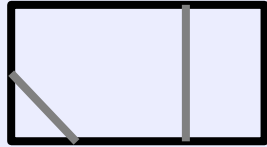
tusaalooyin:



1) Su'aal kasta, sawir leydi ka dibna u kala qaybi sida tilmaamaha lagu sheegay.

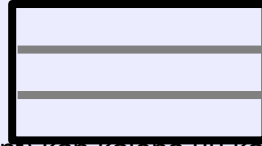
c) U kala qaybi leydiga saddex qaab oo ka duwan (incongruent).

tusaalooyin:



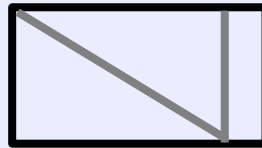
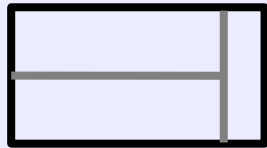
d) U kala qaybi leydiga saddex qaab oo isku mid ah (congruent).

tusaalooyin:



e) U kala qaybi leydiga si laba qaab ay isku mid u yiniin (congruent) kan kalena uu ka duwan yahay (incongruent).

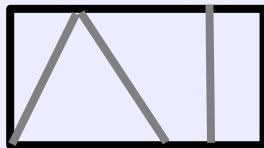
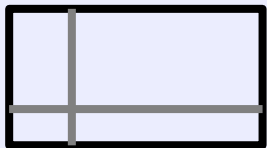
tusaalooyin:



1) Su'aal kasta, sawir leydi ka dibna u kala qaybi sida tilmaamaha lagu sheegay.

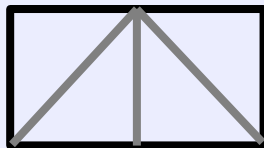
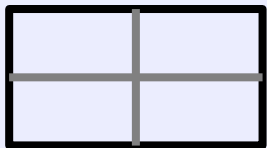
f) U kala qaybi leydiga afar qaab oo ka duwan (incongruent).

tusaalooyin:



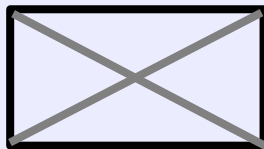
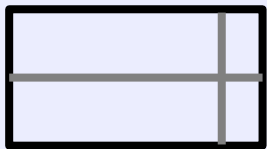
g) U kala qaybi leydiga afar qaab oo isku mid ah (congruent).

tusaalooyin:



h) U kala qaybi leydiga laba lammaane oo qaabab isku mid ah (congruent).

tusaalooyin:



Soo koobid Isku midnimo (Congruence) ee qaababka

- Haddii hal qaab si sax ah ugu habboonaan karo kan kale iyadoo la isticmaalayo wareejin (rotation), milicsi (reflection), ama turjumaad (translation), markaas qaababku waa isku mid (congruent).
- Qaababka leh dherer iyo xaglo isku mid ah waa isku mid (congruent).
- Isku midnimo (congruence) macneheedu ma aha in jihada (orientation) ay tahay mid isku mid ah.
- Dhererka iyo xaglaha maqan ayaa laga yaabaa in la xisaabiyo si loo go'aamiyo isku midnimada (congruence).
- Dhammaan dhererka looma baahna in la ogaado si loo go'aamiyo isku midnimada (congruence).