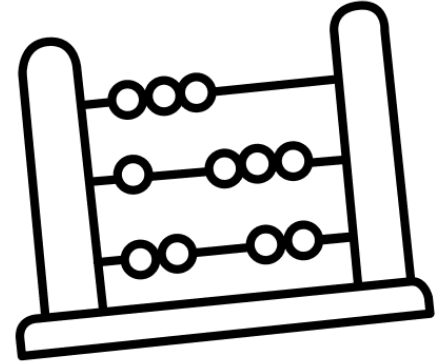


Codsashada shuruudaha isku midnimada (congruence)



Maths

Cutub: Sifooyinka joomatari: isku ekaansho (similarity) iyo aragtida Pythagoras

Natiijo

Waxaan aqoonsan karaa saddexagallo isku mid ah (congruent) oo caddayn karaa sababta ay isku mid u yihiin.

Erayada muhiimka ah

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

Codsashada shuruudaha isku midnimada (congruence)



Doorashada shuruudaha saxda ah

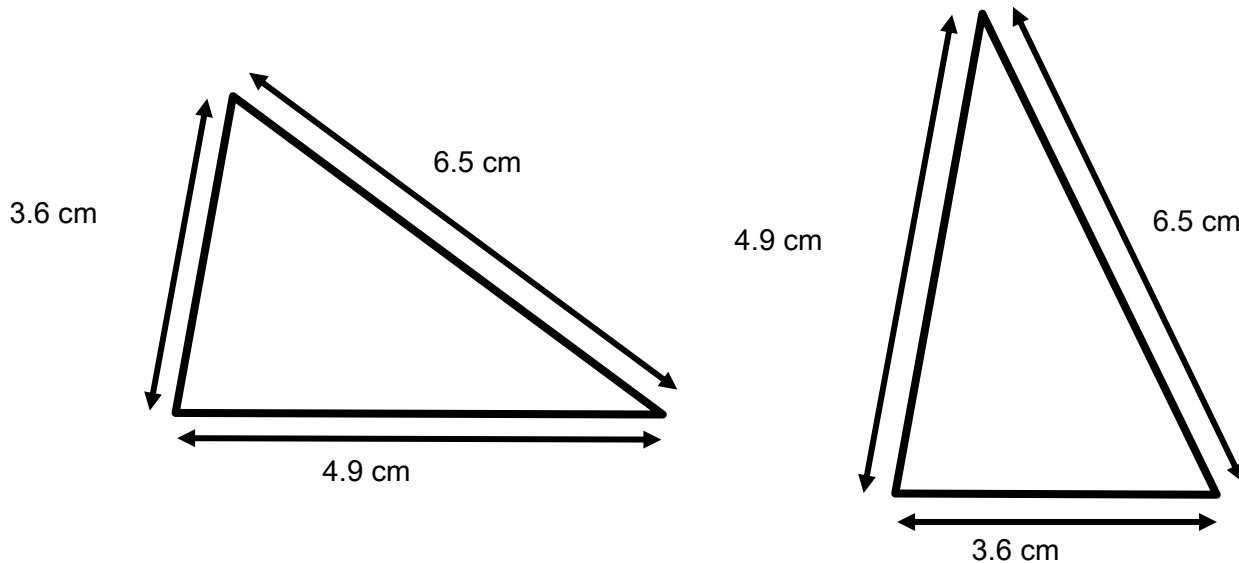


Isku mid (congruent) ama ma aha?



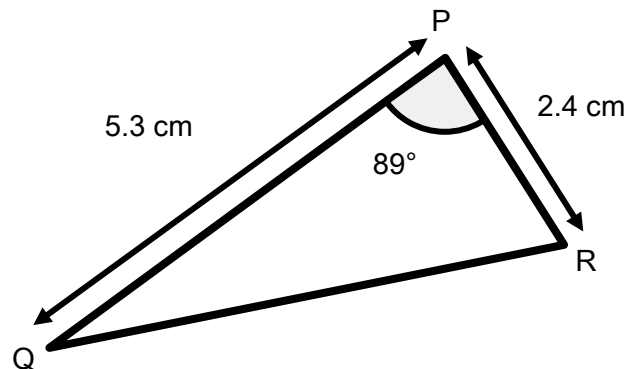
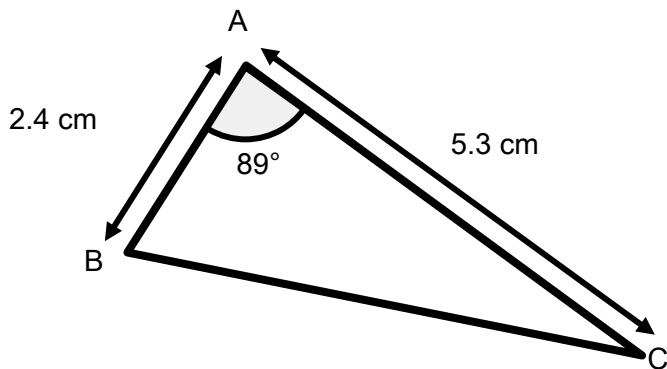
Isku midnimada qarsoon (Hidden congruence)

Labo saddexagal waxaa lagu caddayn karaa inay isku mid yihiin (congruent) haddii shuruudo gaar ah la codsado.



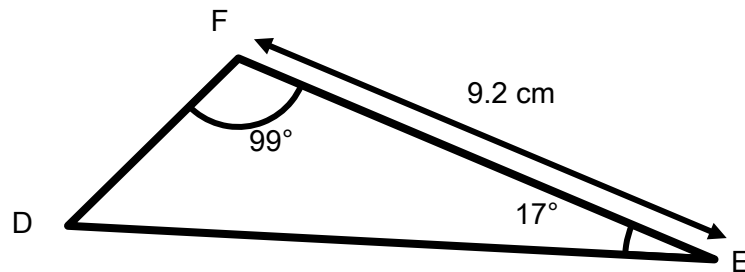
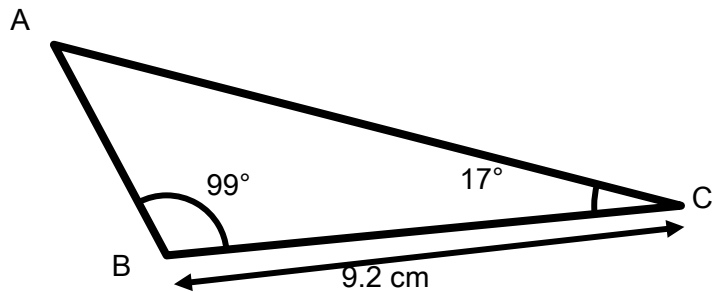
Kuwani waa isku mid (congruent) iyadoo la isticmaalayo SSS (dhinac-dhinac-dhinac).

Labo saddexagal waxaa lagu caddayn karaa inay isku mid yihiin (congruent) haddii shuruudo gaar ah la codsado.



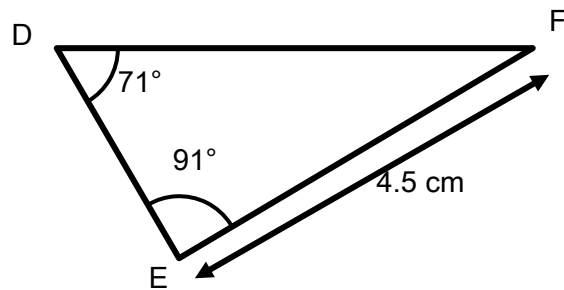
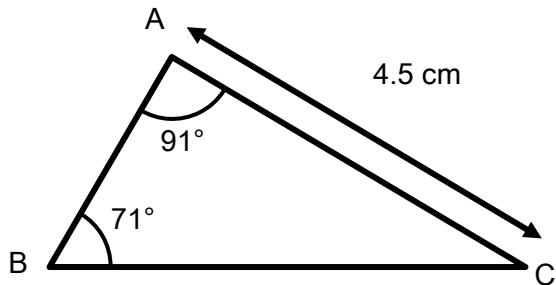
Kuwani waa isku mid (congruent) iyadoo la isticmaalayo SAS (dhinac-xagal-dhinac).

Labo saddex-xagal ayaa la caddayn karaa inay isku mid yihiin (congruent) haddii shuruudaha qaarkood la dabakhi karo.



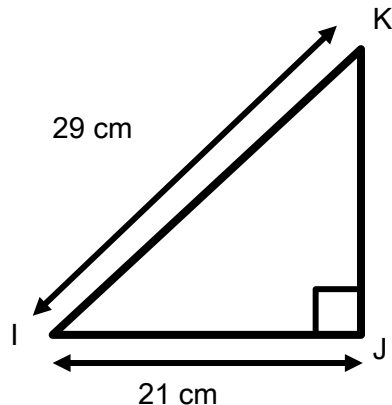
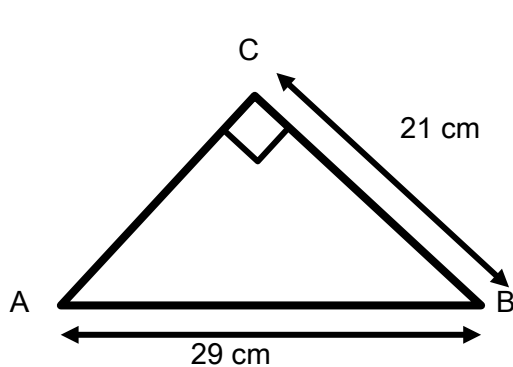
Kuwani waxay isku mid yihiin (congruent) iyadoo la adeegsanayo ASA (angle-side-angle).

Labo saddex-xagal ayaa la caddayn karaa inay isku mid yihiin (congruent) haddii shuruudaha qaarkood la dabakhi karo.



Kuwani waxay isku mid yihiin (congruent) iyadoo la adeegsanayo AAS (angle-angle-side).

Labo saddex-xagal ayaa la caddayn karaa inay isku mid yihiin (congruent) haddii shuruudaha qaarkood la dabakhi karo.



Kuwani waxay isku mid yihiin (congruent) iyadoo la adeegsanayo RHS (right angle-hypotenuse-side).

Doorashada shuruudaha saxda ah

Kee ka mid ah kuwani ma aha shuruud (criteria) lagu caddeeyo isku midnimada (congruence) saddex-xagallada?

a

dhinac-xagal-dhinac (SAS)

b

xagal-xagal-dhinac (AAS)

c

xagal-xagal-xagal (AAA)



d

dhinac-dhinac-xagal (SSA)



e

dhinac-dhinac-dhinac (SSS)

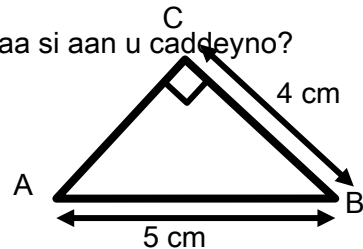
f

xagal-dhinac-xagal (ASA)

g

xagal qumman-hypotenuse-dhinac (RHS)

Labadan saddexagal waa isku mid (congruent). Kee ka mid ah shuruudaha ayaan u isticmaali karnaa si aan u caddeyno?

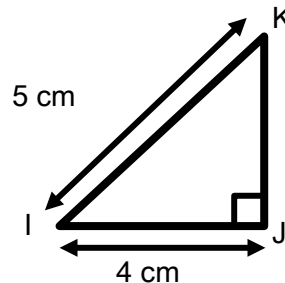


Ma og nahay dhammaan saddexda dherer ee dhinacyada? Maya

Ma og nahay laba dhinac oo isku mid ah iyo xagasha u dhexaysa? Maya

Ma naqaannaa laba xagal oo isku mid ah (corresponding angles) iyo hal dhinac oo isku mid ah (corresponding side)?

Maya

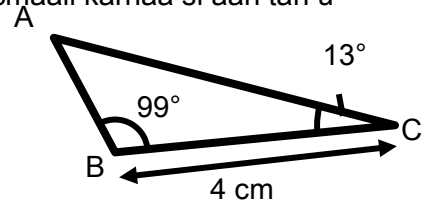


Haddii ay leedahay xagal qumman (right angle), ma naqaannaa hypotenuse-ka iyo dhinac kale oo isku mid ah (corresponding side)?

Haa

Kuwani waa isku mid (congruent) iyadoo la adeegsanayo RHS (xagal qumman-hypotenuse-dhinac).

Labadan saddex-xagal (triangles) waa isku mid (congruent). Shuruudaha (criteria) kee ayaan u isticmaali karnaa si aan tan u caddayno?



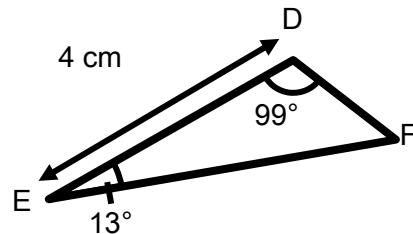
Ma naqaannaa dhammaan saddexda dherer ee geesaha (edge lengths)?

Ma naqaannaa laba gees oo isku mid ah (corresponding edges) iyo xagasha u dhaxaysa?

ASA

Ma naqaannaa laba xagal oo isku mid ah (corresponding angles) iyo hal dhinac oo isku mid ah (corresponding side)?

Haddii ay leedahay xagal qumman (right angle), ma naqaannaa hypotenuse-ka iyo dhinac kale oo isku mid ah (corresponding side)?



Kuwani waxay isku mid yihiin (congruent) iyadoo la adeegsanayo ASA (angle-side-angle).

Labadan saddex-xagal (triangles) waa isku mid (congruent). Shuruudaha (criteria) kee ayaan u isticmaali karnaa si aan tan u caddayno?

SAS

ASA

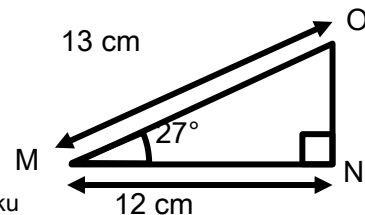
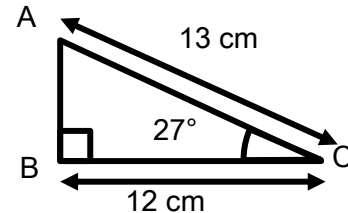
RHS

Ma og nahay dhammaan saddexda dherer ee geesaha?

Ma og nahay laba gees oo isku mid ah iyo xagasha u dhaxaysa?

Ma og nahay laba xagal oo isku mid ah iyo hal gees oo isku mid ah?

Haddii ay leedahay xagal qumman (right angle), ma og nahay hypotenuse-ka iyo gees kale oo isku mid ah?



Waxaa jira macluumaad ku filan oo muujinaya kuwaan inay isku mid yihiin (congruent) iyadoo la adeegsanayo SAS ama ASA ama RHS.

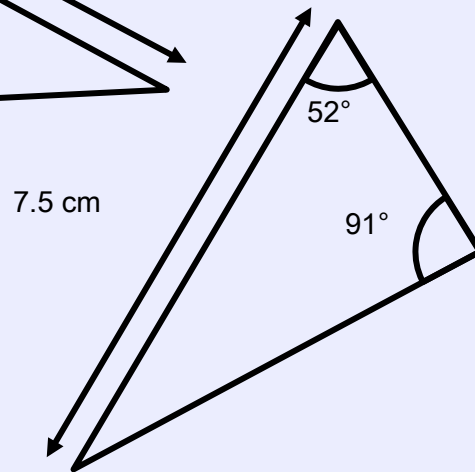
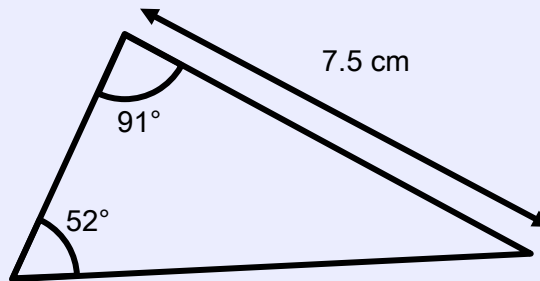
Labadan saddexagal waa isku mid (congruent) iyadoo la adeegsanayo AAS.



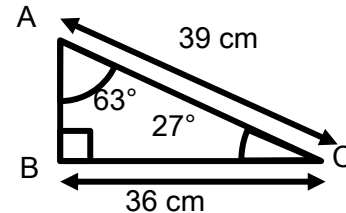
Isra

Ma Isra ayaa sax ah?

Maya, in kastoo laba xagal (angle) iyo hal dhinac (side) laga yaqaan labada saddex-xagal (triangle); dhinacyadu isku mid (corresponding) ma aha.



Labadan saddex-xagal (triangle) waa isku qaab (congruent), laakiin way adag tahay in la arko. Shuruudaha (criteria) kee ayaan u isticmaali karnaa si aan taa u caddayno, adigoo kaliya isticmaalaya macluumaadka la bixiyay?



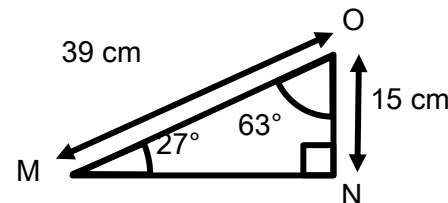
Miyaan garanaynaa dhammaan saddexda cidhif (edge) dhererkooda? Maya

Miyaan garanaynaa laba cidhif (edge) oo isku mid ah (corresponding) iyo xagasha (angle) u dhaxaysa?

Maya

Miyaan garanaynaa laba xagal (angle) oo isku mid ah (corresponding) iyo hal dhinac (side) oo isku mid ah?

Maya



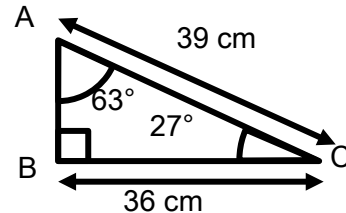
Haddii ay leedahay xagal qumman (right angle), miyaan garanaynaa hypotenuse-ka iyo dhinac (side) kale oo isku mid ah?

Maya

Macluumaadka la bixiyay, maxaa kale oo aan xisaabin karnaa?

Xagasha saddexaad ee labada saddexagal.

Labadan saddexagal waa isku mid (congruent), laakiin ma aha mid cad. Kee ka mid ah shuruudaha ayaan u isticmaali karnaa si aan u caddeyno, adigoo isticmaalaya macluumaadka oo dhan?

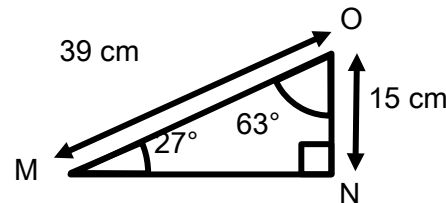


Ma og nahay dhammaan saddexda dherer ee geesaha?

Ma og nahay laba gees oo isku mid ah iyo xagasha u dhaxaysa?

ASA

Ma og nahay laba xagal oo isku mid ah iyo hal gees oo isku mid ah?



Haddii ay leedahay xagal qumman, ma og nahay hypotenuse-ka iyo gees kale oo isku mid ah?

Kuwani waxay isku mid yihiin (congruent) iyadoo la adeegsanayo ASA (xagal-gees-xagal).

Labadan saddexagal waa isku mid (congruent). Kee ka mid ah shuruudahan ayaan u isticmaali karnaa si aan u caddeyno?

a

SSS

b

SAS



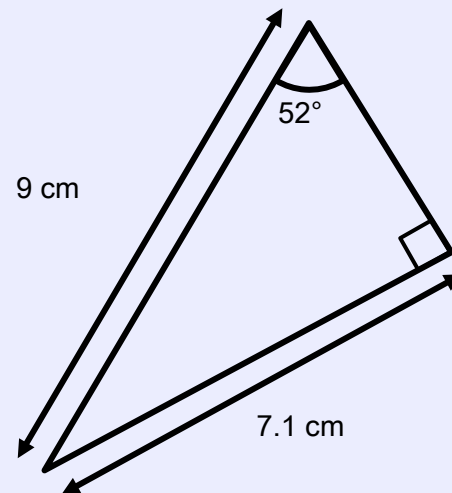
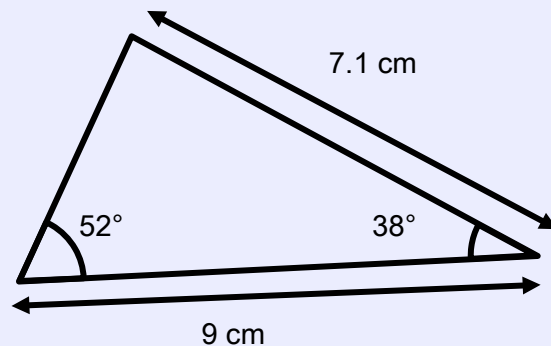
c

AAS



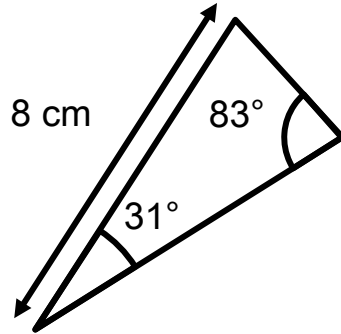
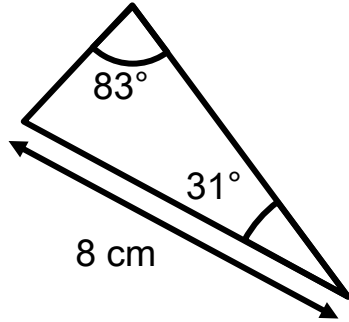
d

RHS

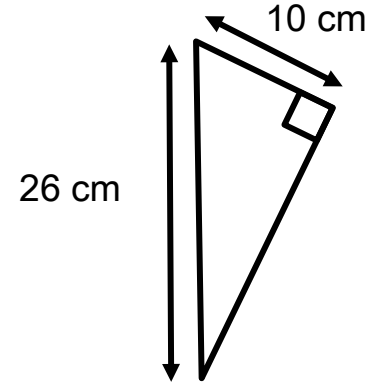
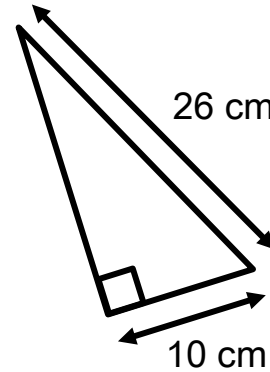


1) Waa maxay shuruudaha (criteria) caddaynaya in labada qaybood ay isku mid yihiin (congruent)?

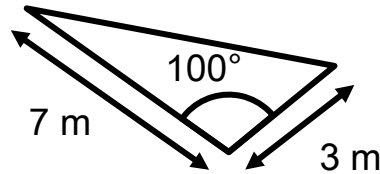
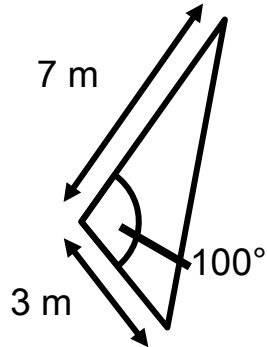
a)



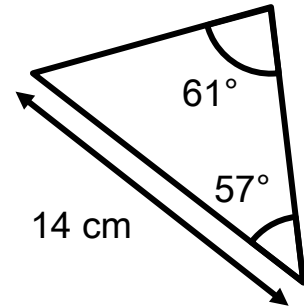
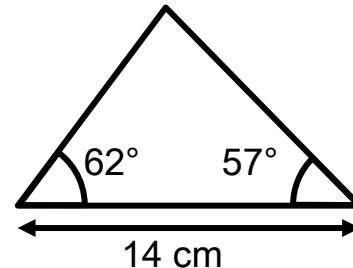
b)



c)

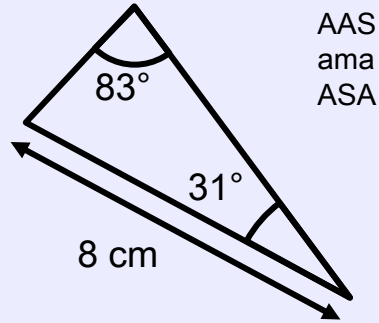


d)

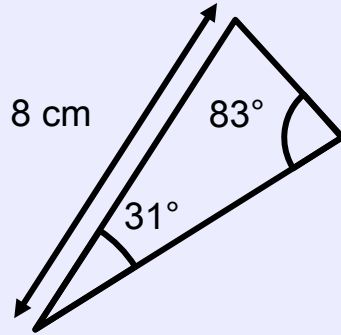


1) Waa maxay shuruudaha (criteria) caddaynaya in labada qaybood ay isku mid yihiin (congruent)?

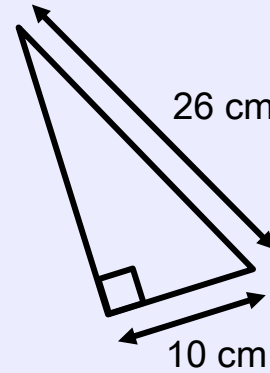
a)



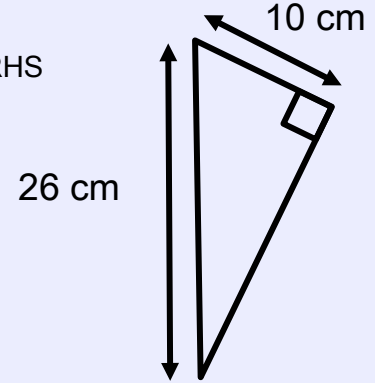
AAS
ama
ASA



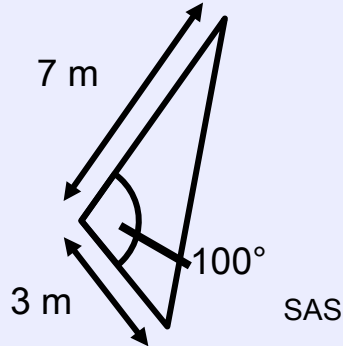
b)



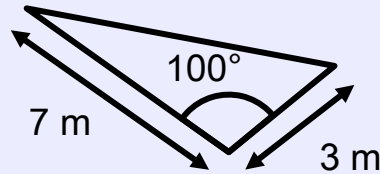
RHS



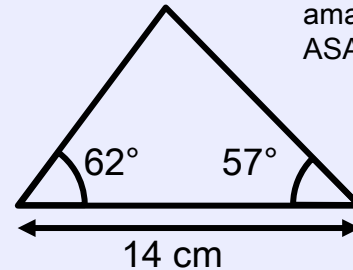
c)



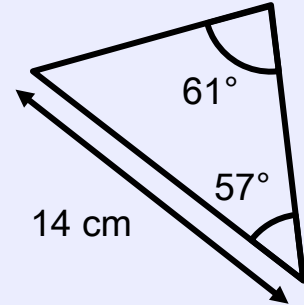
SAS



d)



AAS
ama
ASA



Ku dabaqista shuruudaha isku midnimada (congruence)



Doorashada shuruudaha saxda ah



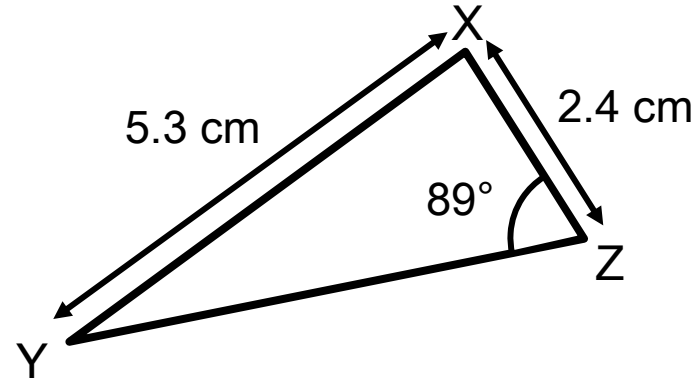
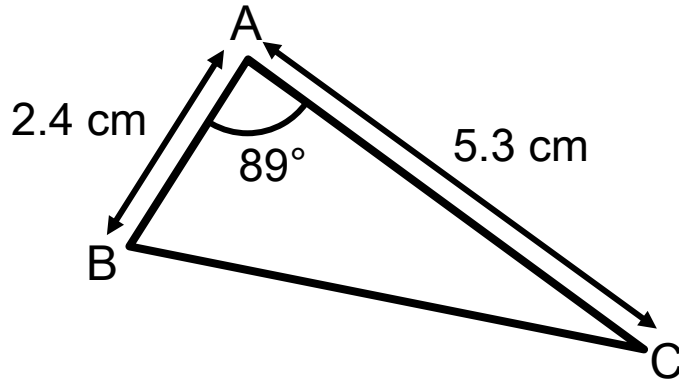
Isku mid (Congruent) mise maya?



Isku mid qarsoon (Hidden congruence)

Isku mid (Congruent) mise maya?

Saddexagalladan labadan ma isku mid (congruent) yihiin?

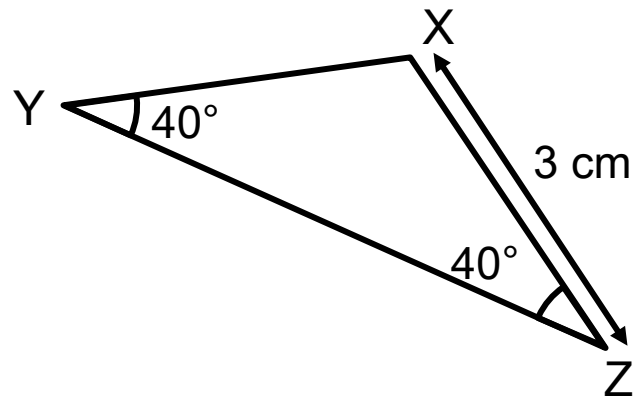
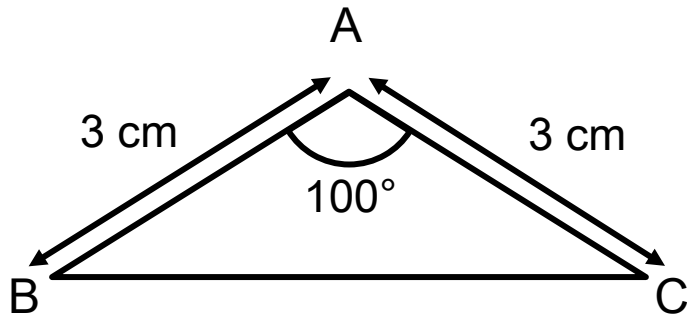


Ma hubin karno inay isku mid (congruent) yihiin.

Inkastoo aan haysanno laba gees oo u dhigma, ma ognin in xagasha u dhaxaysa ay siman yihiin.

Isku mid (congruent) mise maya?

Miyay labadan saddex-xagal isku mid (congruent) yihiin?



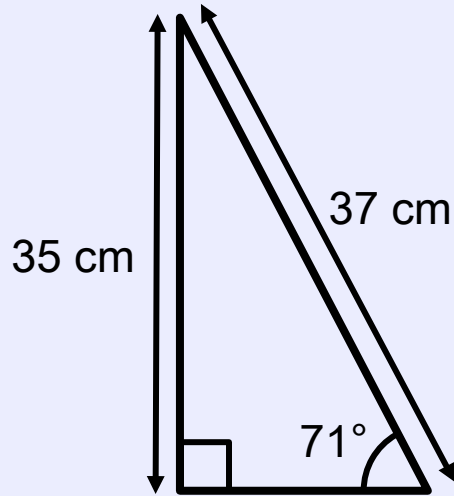
Haa.

Waan ognahay in saddex-xagalka ABC uu yahay isosceles (isosceles) macluumaadka la bixiyay, marka labada xagal ee kale waa siman yihiin oo waa 40° .

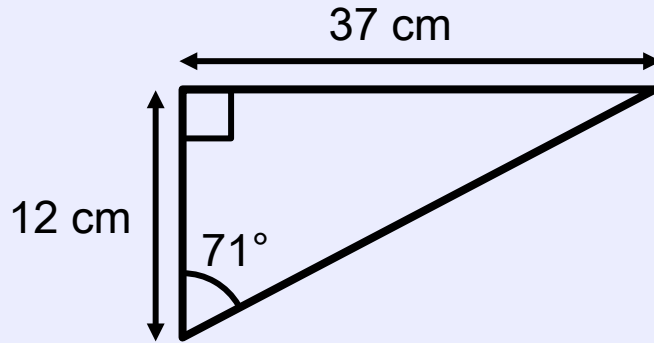
Sidaas darteed, saddex-xagalladu waa isku mid (congruent) iyadoo la adeegsanayo AAS.

Isku mid (congruent) mise maya?

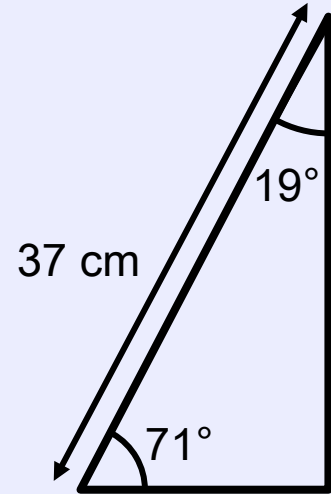
Kee ka mid ah kuwani ma aha isku mid (congruent) labada kale?



a

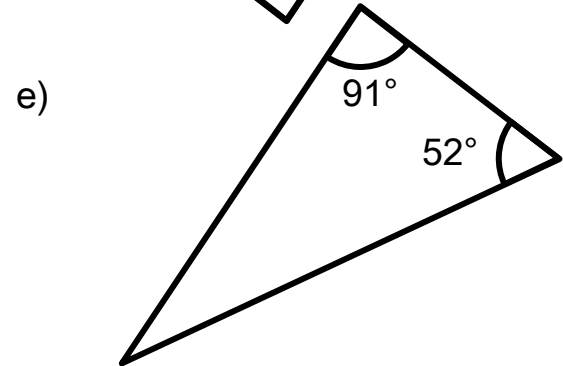
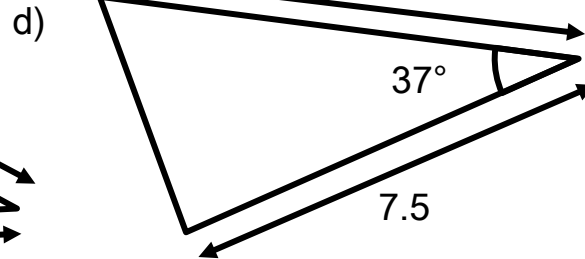
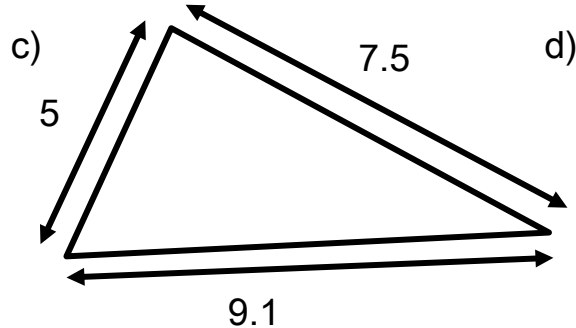
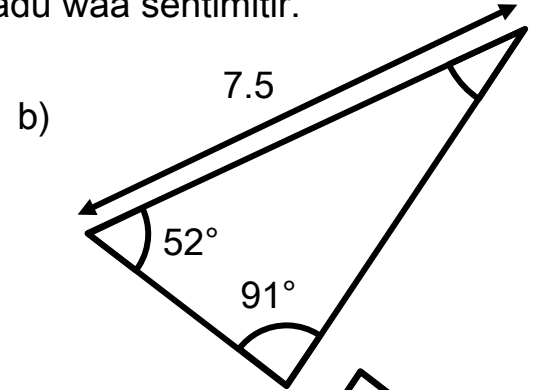
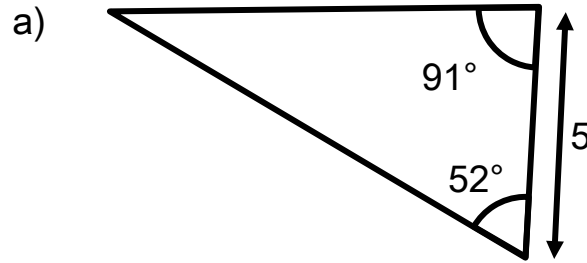
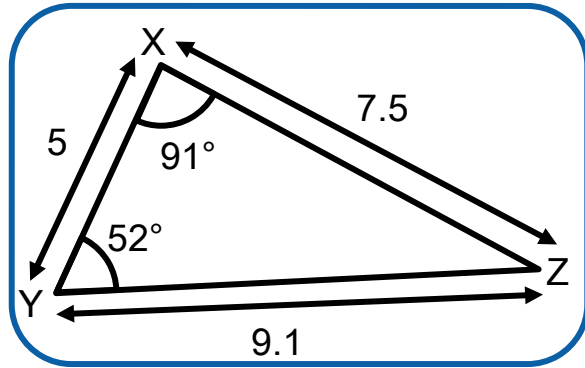


b

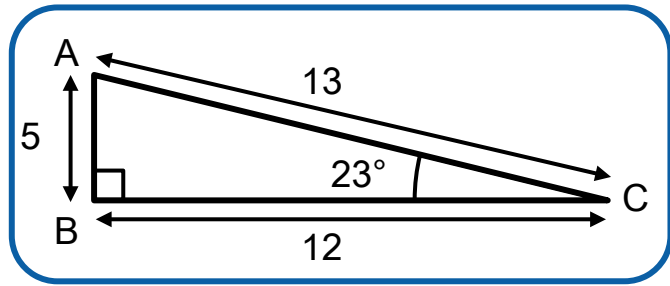


c

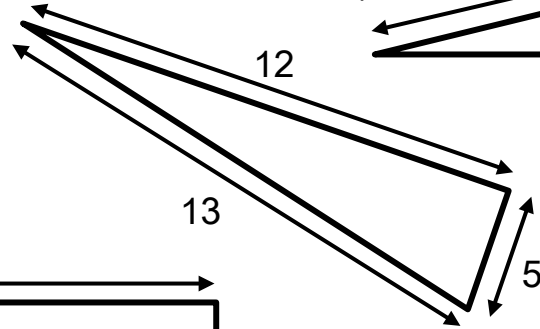
1) Go'aami kee ka mid ah saddex-xagallada uu isku mid (congruent) yahay saddex-xagalka XYZ, adigoo sheegaya shuruudaha (criteria) caddaynaya. Dhammaan cidhifyadu waa sentimitir.



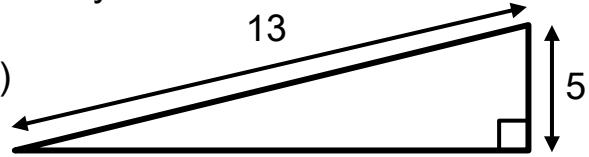
2) Go'aami kee ka mid ah saddex-xagallada uu isku mid (congruent) yahay saddex-xagalka ABC, adigoo sheegaya shuruudaha (criteria) caddaynaya. Dhammaan cidhifyadu waa sentimitir.



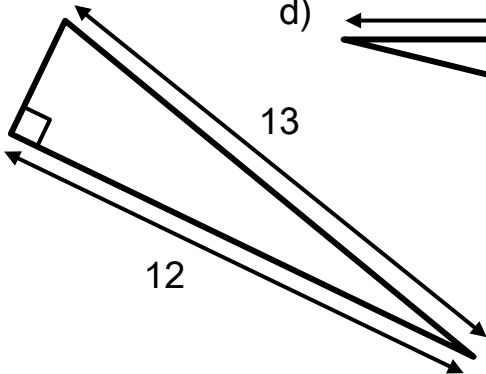
a)



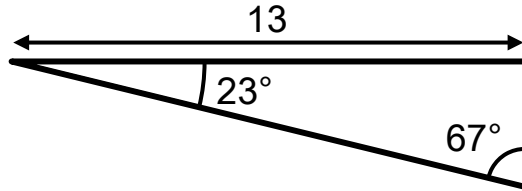
b)



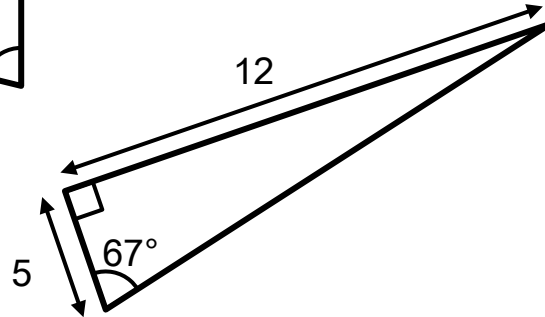
c)



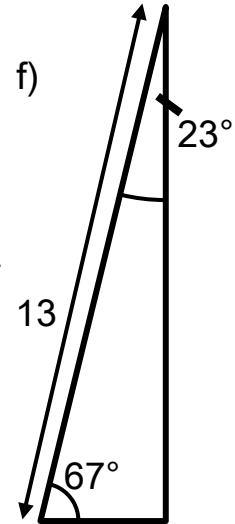
d)



e)

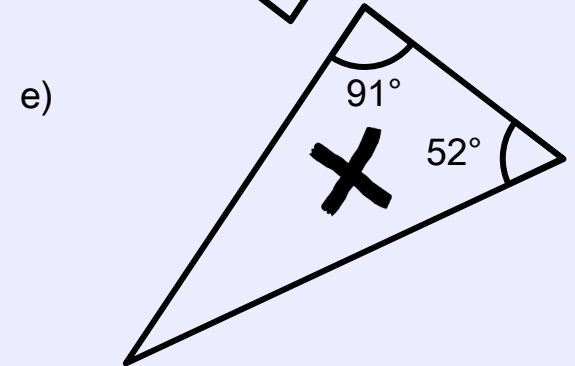
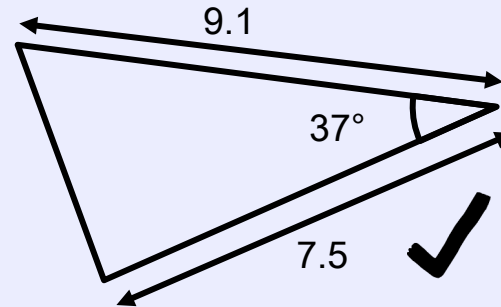
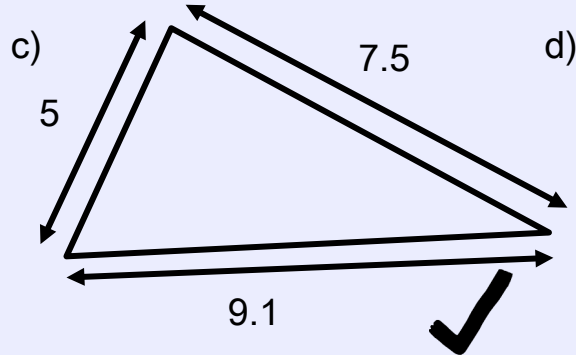
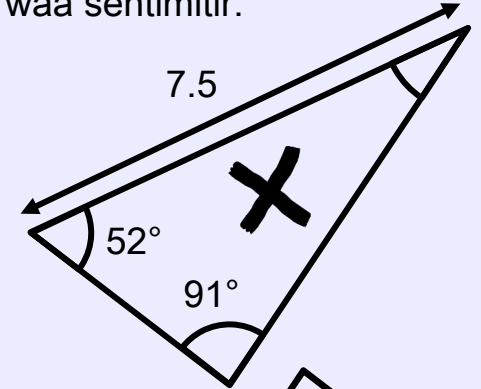
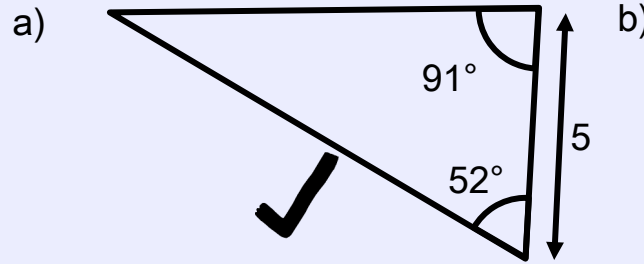
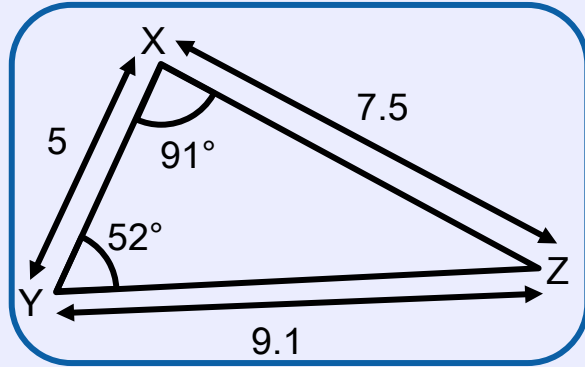


f)

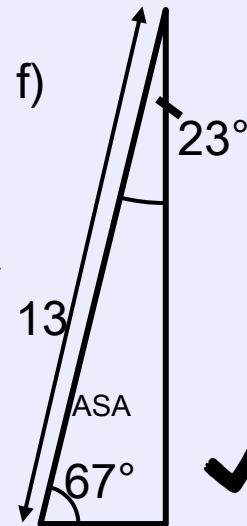
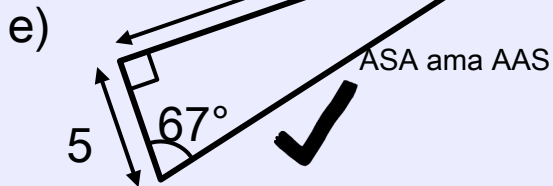
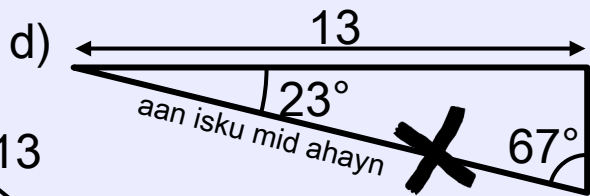
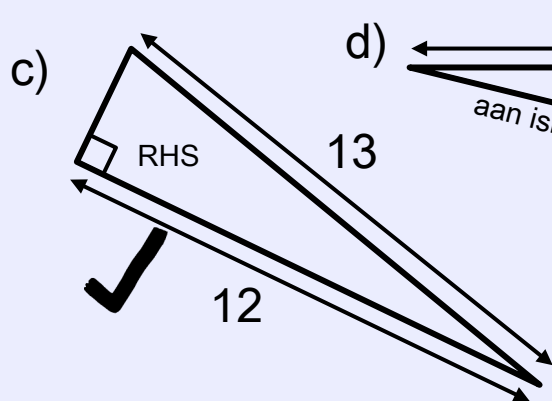
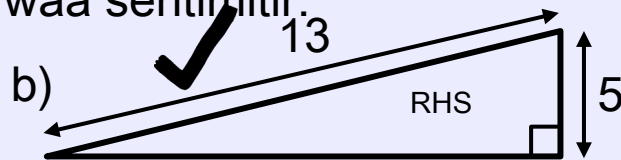
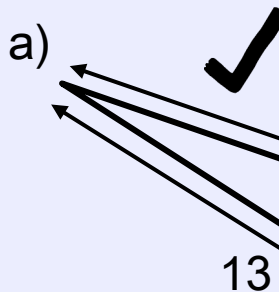
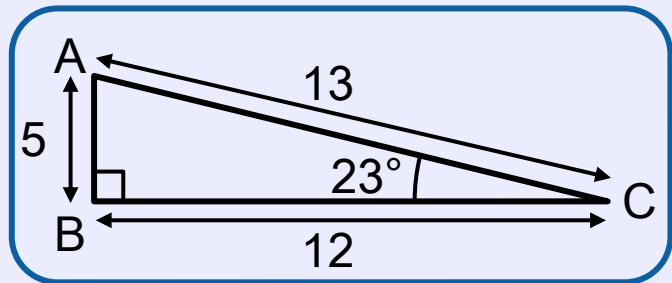


Hawsha B Isku mid (congruent) mise maya?

1) Go'aami kee ka mid ah saddex-xagallada uu isku mid (congruent) yahay saddex-xagalka XYZ, adigoo sheegaya shuruudaha (criteria) caddaynaya. Dhammaan cidhifyadu waa sentimitir.



2) Go'aami saddexagalka kuwa isku mid ah saddexagalka ABC. Sheeg shuruudaha caddaynaya. Dhammaan cidhifyadu waa sentimitir.



Codsashada shuruudaha isku midnimada



Doorashada shuruudaha saxda ah



Isku mid ma aha?



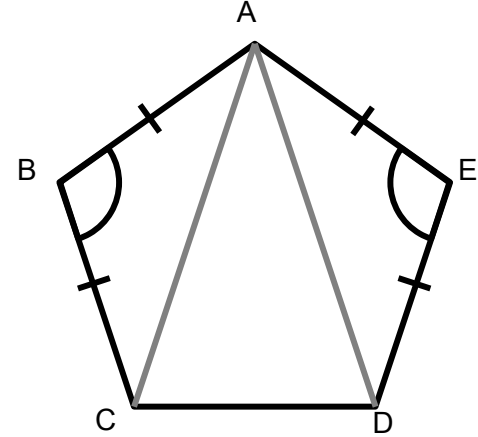
Isku midnimo qarsoon

Inta badan jaantusyada ama qaababku uma muuqdaan inay ka kooban yihiin saddexagallo.

Tusaale ahaan shan-geesoodkan joogtada ah.

Marka aan sawirno xaglo qarsoon waxaan samayn karnaa saddexagallo.

Waxaan muujin karnaa in saddexagalka ABC uu isku mid yahay saddexagalka ADE.



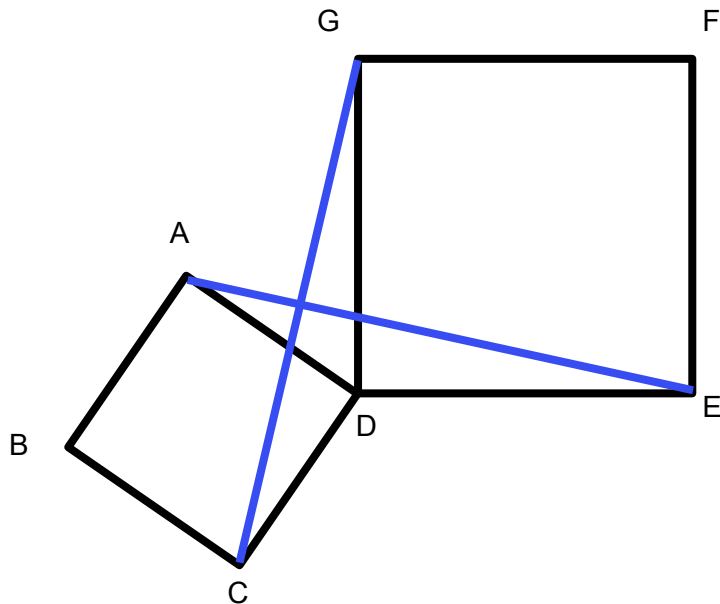
$AB = BC = AE = ED$ sababtoo ah waa geesaha shan-geesle (regular pentagon)

$\angle ABC = \angle AED$ sababtoo ah waa xagaha gudaha ee shan-geesle (regular pentagon)

Sidaa darteed, saddex-xagalka ABC iyo saddex-xagalka ADE waa isku mid (congruent) iyadoo la adeegsanayo SAS.

ABCD iyo DEFG waa labo jibbaaran (squares). Caddee in saddex-xagalka CDG iyo ADE ay isku mid yihiin (congruent).

Ma jiraan saddex-xagal (triangles) jaantuskan.



Ku dar xariiqyada (line segments) si aad u samaysato.

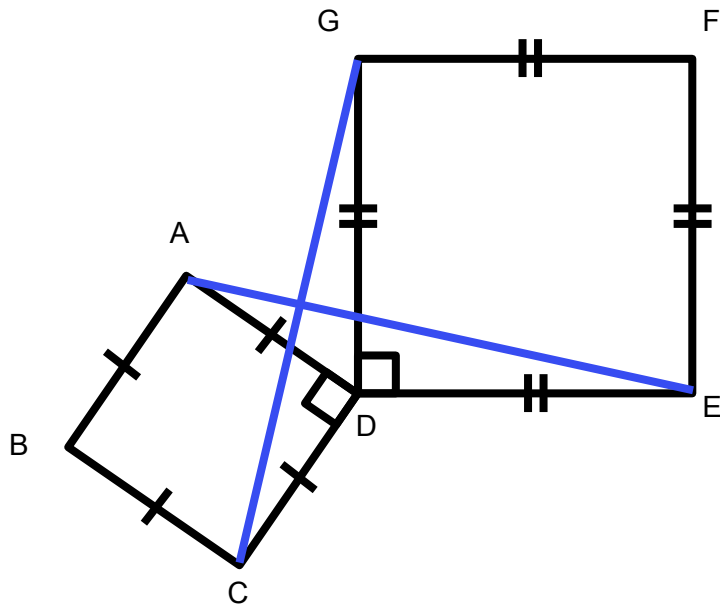


ABCD iyo DEFG waa labo jibbaaran (squares). Caddee in saddex-xagalka CDG iyo ADE ay isku mid yihiin (congruent)

Haa, weli ma hubo halka laga billaabo.



Nuur



Aynu ku darno sifooyin (properties) kasta oo aan ognahay.



Suad

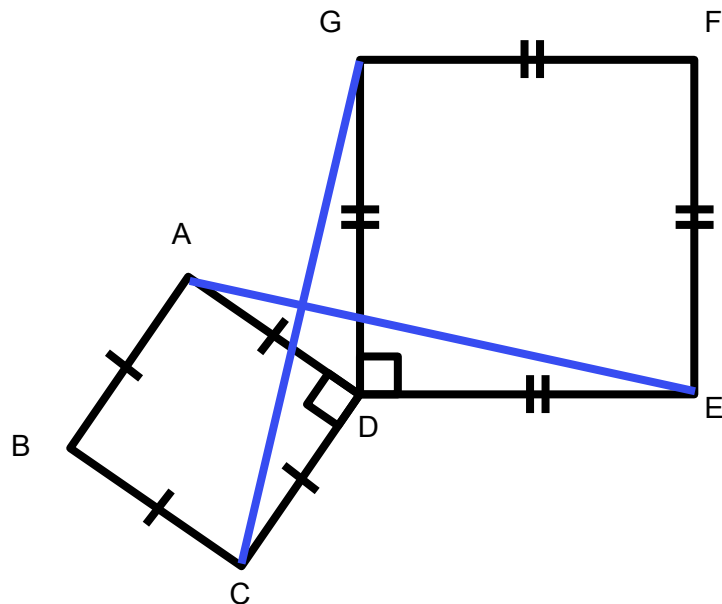
Isku-midnimo qarsoon (Hidden congruence)



Sharaxaad

ABCD iyo DEFG waa labo jibbaaran (squares). Caddee in saddex-xagalka CDG iyo ADE ay isku mid yihiin (congruent).

Waan arki karnaa in labada saddex-xagal (triangles) ay leeyihiin laba geesood oo isku dherer ah.



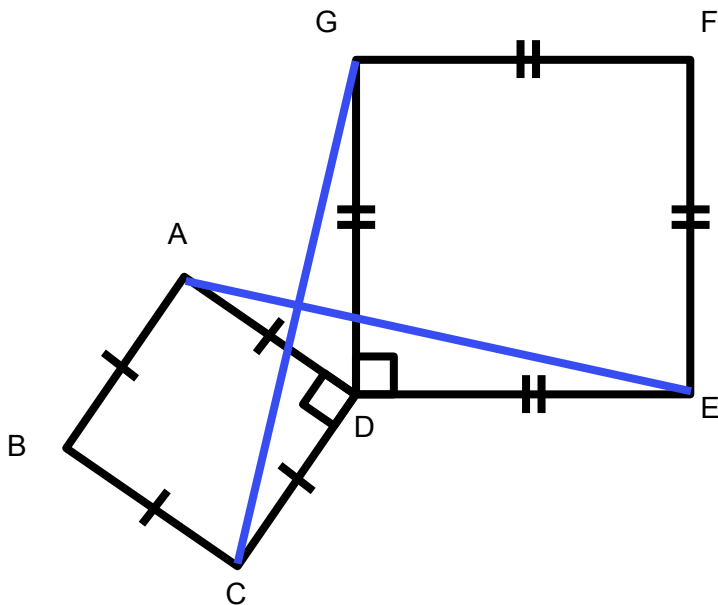
Nuur

Waxaa intaa dheer, xagasha u dhaxaysa waa isku mid.



Suad

ABCD iyo DEFG waa labo jibbaaran (squares). Caddee in saddex-xagalka CDG iyo ADE ay isku mid yihiin (congruent)



Waa maxay $\angle CDG$ iyo $\angle ADE$?



Nuur

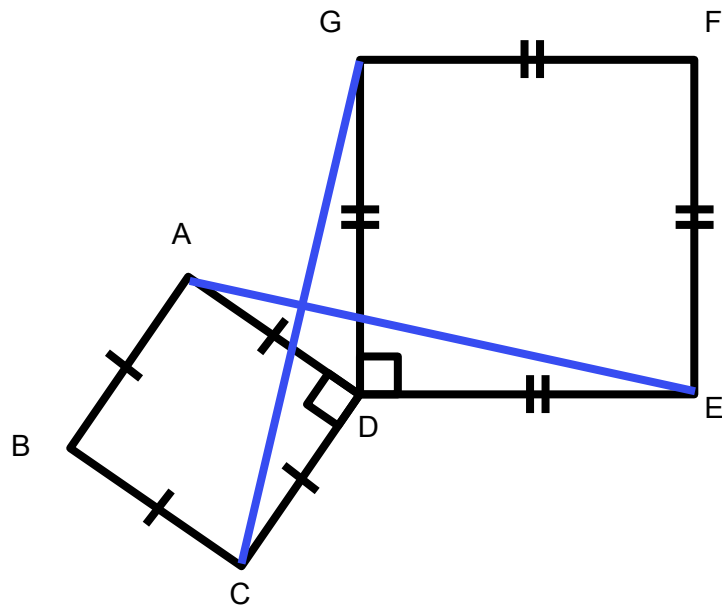
Haa, labaduba waa 90° oo lagu daray $\angle ADG$.



Suad

ABCD iyo DEFG waa labajibbaarro. Caddee in saddexagalka CDG iyo ADE ay isku mid yihiin (congruent).

Marka waxay isku mid yihiin (congruent) iyadoo la adeegsanayo SAS!



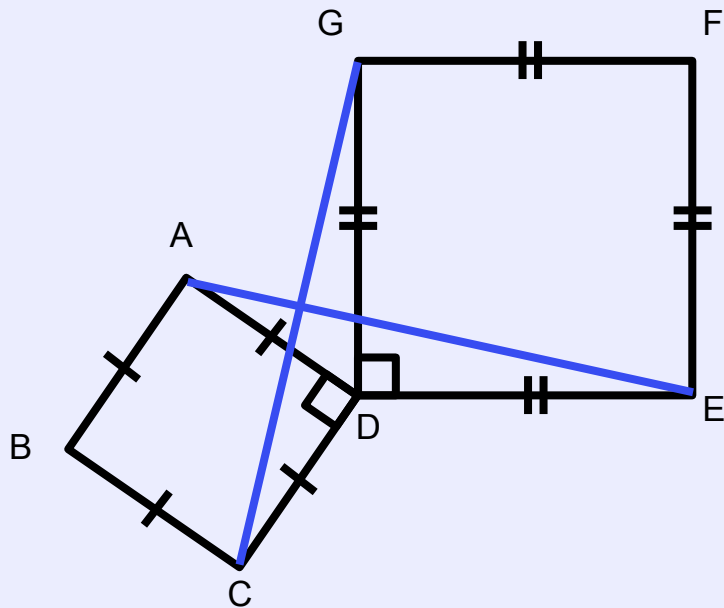
Nuur

raa!



Suad

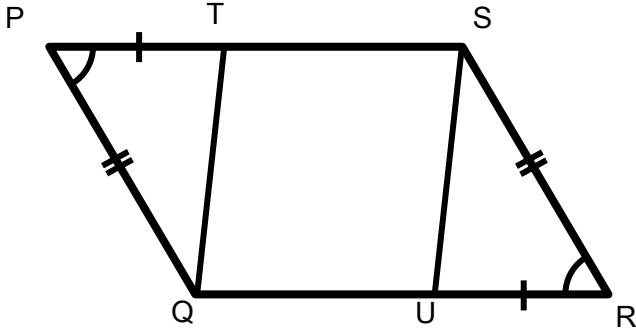
Saddexagalka CDG wuxuu la mid yahay saddexagalka ADE iyadoo la adeegsanayo SAS.



Xaggee u dhigma $\angle DAE$?

$\angle GCD$
($\angle DCG$)

Haddii la siiyo in PQRS uu yahay barbaroodle (parallelogram) iyo $PT = RU$. Caddee in $TQ = SU$.



Haddii aan tusi karno in saddexagalka PTQ iyo saddexagalka SUR ay isku mid yihiin (congruent), markaas waxay tusinaysaa in geesaha u dhigma ay isku dherer yihiin, sidaas darteed $TQ = SU$.

$PQ = SR$ maxaa yeelay waa dhinacyada iska soo horjeeda ee barbaroodle (parallelogram)

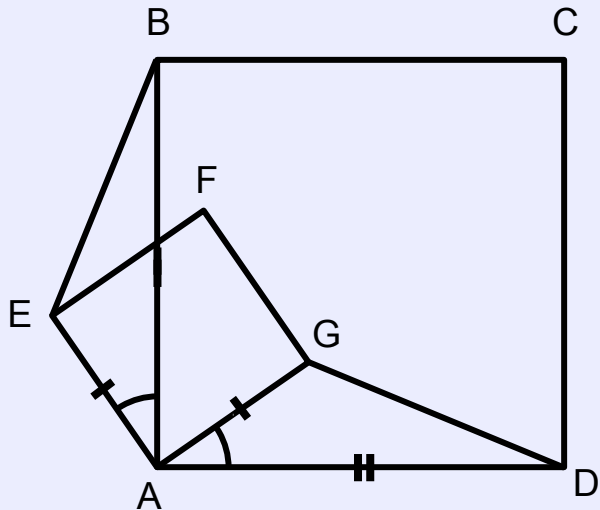
$\angle TPQ = \angle SRU$ maxaa yeelay waa xaglaha iska soo horjeeda ee barbaroodle (parallelogram)

Saddex-xagalka PTQ wuxuu la siman yahay (congruent) saddex-xagalka SUR iyadoo la adeegsanayo SAS, sidaas darteed $TQ = SU$

Isku-dhafan qarsoon (Hidden congruence)



Dhammeysti weedhaha.



Jaantuskan, saddex-xagalka AEB iyo saddex-xagalka AGD waxaa la caddayn karaa inay isku mid yihiin (congruent) iyadoo la adeegsanayo .

Sidaas darteed, iyo SAS

$$BE = \frac{GD}{\dots}$$
$$\angle AEB = \angle \underline{\hspace{1cm}} AGD$$

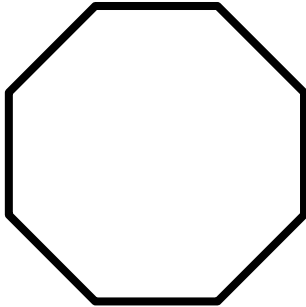
Hawsha C Isku-dhafan qarsoon (Hidden congruence)



1) ABCDEFGH waa sideed-geesood joogto ah (regular octagon).

a) Caddee in saddex-xagalka ABC iyo saddex-xagalka HGF ay isku mid yihiin (congruent).

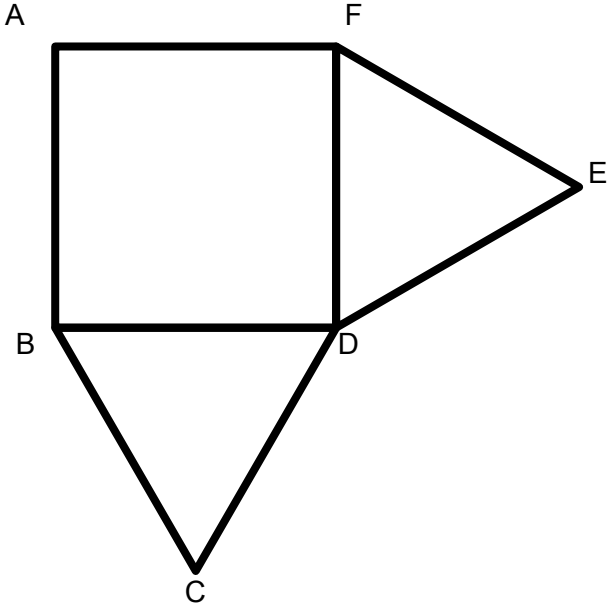
b) Waa kuwee saddex-xagallo kale oo la siman (congruent) ABC?



Jawaabaha:

A H B G C F D E

2) ABDF waa laba-geesood (square). BCD iyo DEF waa saddex-xagallo siman (equilateral triangles). Caddee in saddex-xagalka CDE iyo saddex-xagalka FDC ay isku mid yihiin (congruent).

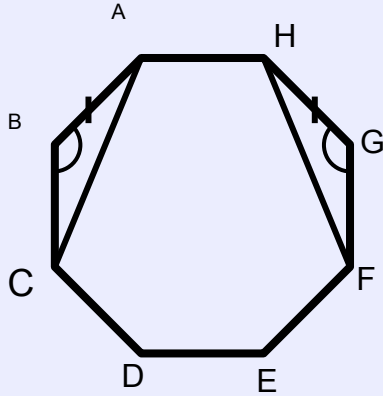


Hawsha C Isku-dhafan qarsoon (Hidden congruence)

1) ABCDEFGH waa sideed-geesood joogto ah (regular octagon).

a) Caddee in saddex-xagalka ABC iyo saddex-xagalka HGF ay isku mid yihiin (congruent).

b) Waa kuwee saddex-xagallo kale oo la siman (congruent) ABC?



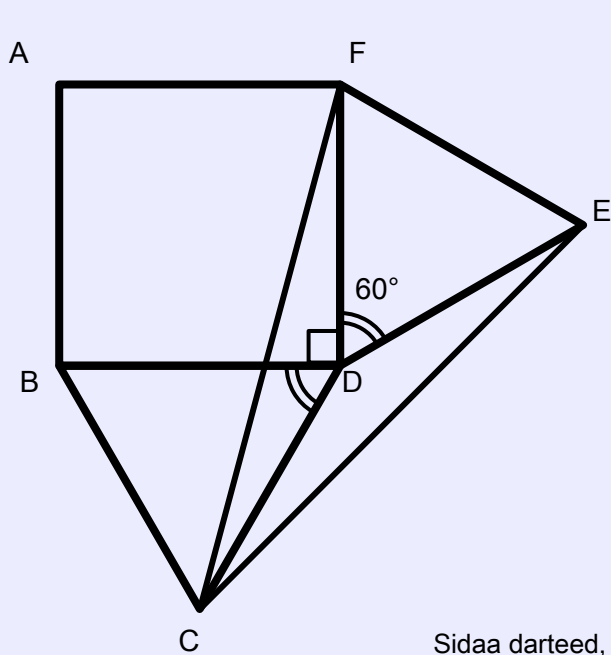
$AB = BC = HG = GF$ sababtoo ah sideed-geesoodku waa joogto (regular)

$\angle ABC = \angle HGF$ sababtoo ah waa xaglo gudaha (interior angles) oo sideed-geesoodka joogtada ah

Saddexagalka ABC wuxuu la siman yahay saddexagalka HGF iyadoo la adeegsanayo SAS.

Saddexagallada BCD, CDE, DEF, EFG, GHA iyo HAB waxay la siman yihiin ABC

2) ABDF waa labajibbaaran. BCD iyo DEF waa saddexagallo siman (equilateral). Caddee in saddexagallada CDE iyo FDC ay isku siman yihiin.



CD waa gees guud labada saddexagal

DF = DE maxaa yeelay waa geesaha isla saddexagalka siman (equilateral)

$$\angle CDF = 90^\circ + 60^\circ = 150^\circ$$

$$\angle CDE = 360^\circ - (60^\circ + 90^\circ + 60^\circ) = 150^\circ$$

Sidaa darteed, $\angle CDF = \angle CDE$

Sidaa darteed, saddexagalka CDE wuxuu la siman yahay saddexagalka FDC iyadoo la adeegsanayo SAS.

Haddii mid ka mid ah shuruudaha (SSS, SAS, ASA, RHS) ay quseeyaan, markaas labada saddexagal waa isku siman yihiin.

Xaaladaha qaarkood, waxaa la isticmaali karaa in ka badan hal shuruud si loo caddeeyo simanta.

Haddii laba saddexagal la caddeeyo inay isku siman yihiin, waxaad kaloo caddeyn kartaa dhererka isku midka ah.