

مادة الرياضيات (السنة الأولى من التعليم المتوسط)

المطلعات

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⋮
⋮
⋮

⋮

.1 :

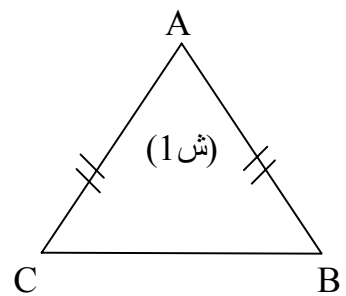
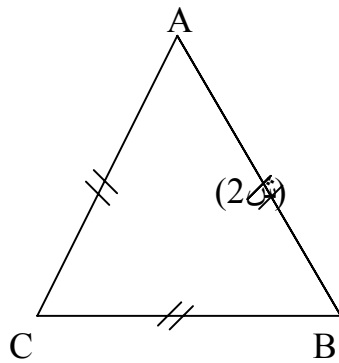
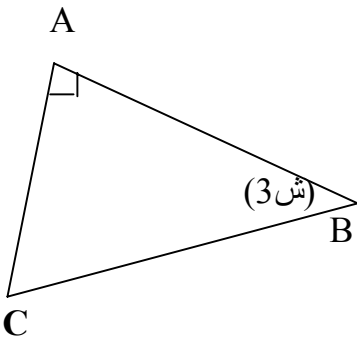
⋮

.2 :

⋮

.3 :

:



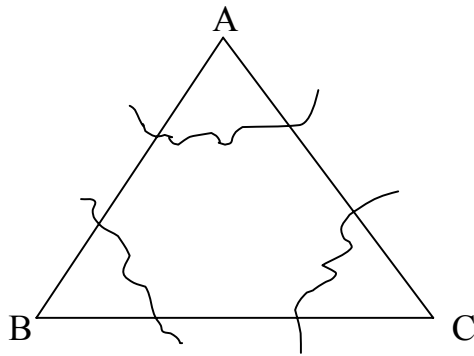


(4)

ABC

-1

(5)

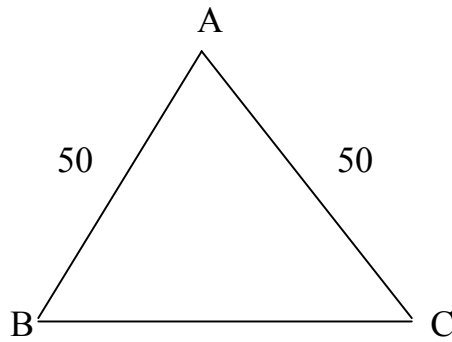


(5)

ABC:

-2

BC=40mm ; AB=50mm ; AC=50mm(6)

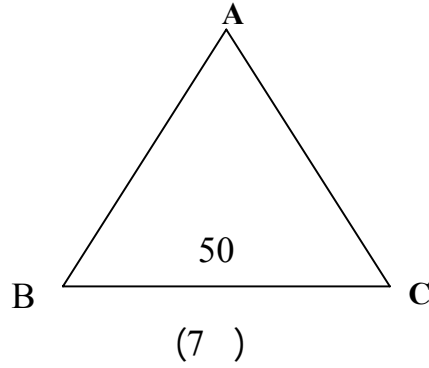


(6)

()

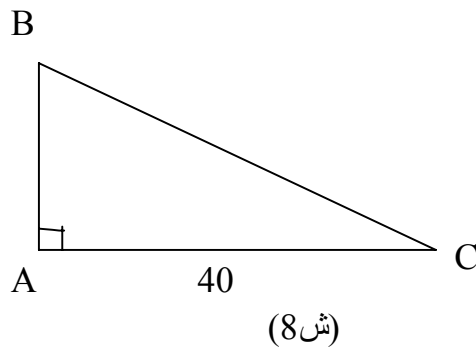
ABC : -3

BC=50mm (7)



-4

$\hat{A} = 90^\circ$; AB=40mm ; AC=60mm (8)



خواص المثلث المتساوي الساقين

BC=50mm ; AB = AC=60mm

ABC

-

[Ay

(.) [AC]

[AB]

\hat{BAC}

()

: \hat{C} ; \hat{B} و الذي يستلزم

[YC] ; [YB

(1)
تطابق

$$\hat{A}yC = \hat{A}yB \quad \hat{A}yB ; \hat{A}yC$$

[Ay

(2)

.ABC

[BC]

:

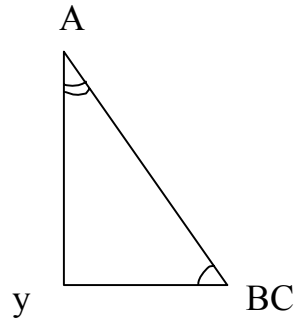
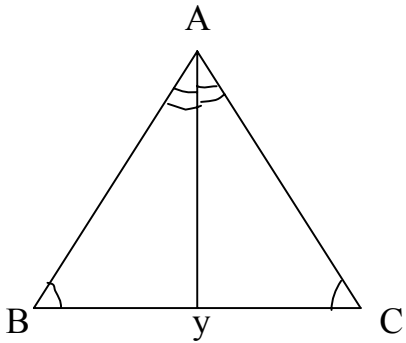
.AB=AC : ABC

-1

.[BC]

$\hat{B} AC$:

-2



(ش9)



-1

$\hat{} \quad \hat{} \quad .6\text{cm} \quad [\text{BC}] \quad -2$
 $\text{CBx}=60^\circ ; \text{BCy}=30^\circ$

$\hat{} \quad \text{A} \quad [\text{Bx} ; [\text{Cy}$
 .BAC

.ABC

AB=5cm $[\text{AB}] \quad -3$

.C $[\text{Bx} ; [\text{By}$ $\hat{} \quad \hat{} \quad \text{.ABx=BAy}=70^\circ$

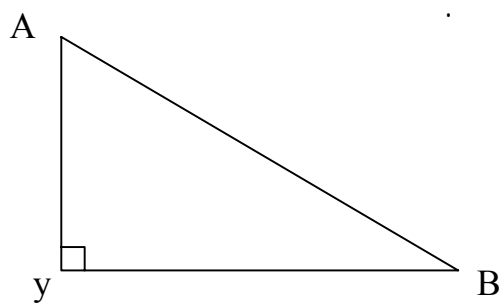
ABC $[\text{AB}]; [\text{AC}]$



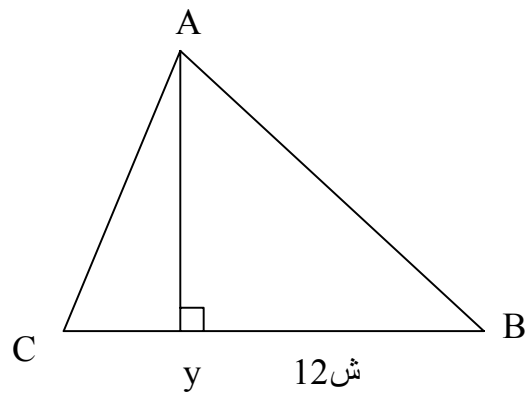
: -1

:

$[\text{Ay}] \quad [\text{BC}] \quad 12 \quad 11 :$

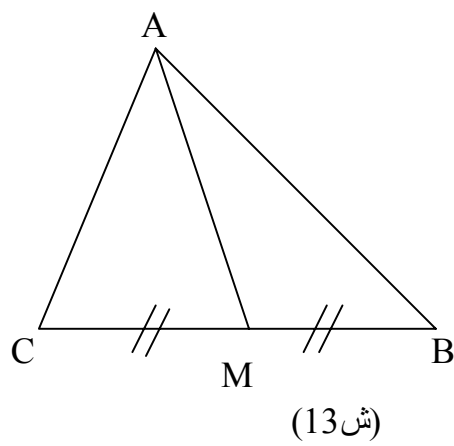


(ش 11)



-2

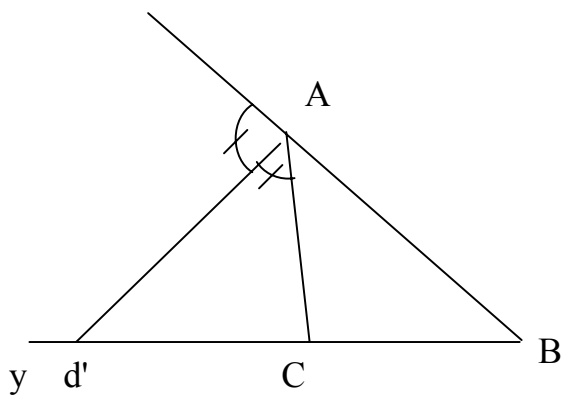
(13)



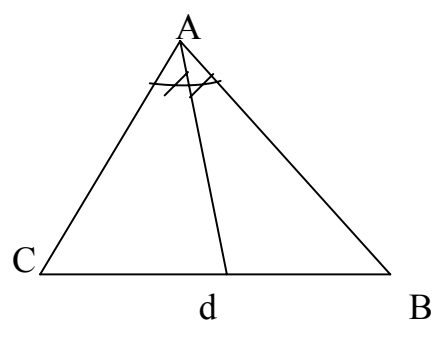
: -3

:

.(14,15) :



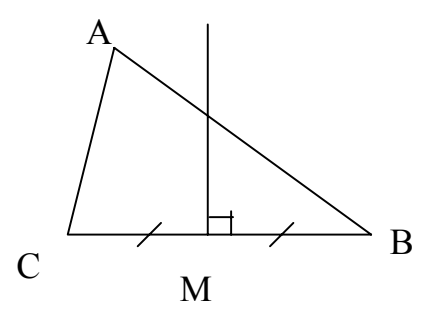
(ش15)



(ش14)

.(16)

:



(ش16)

()



(xy)

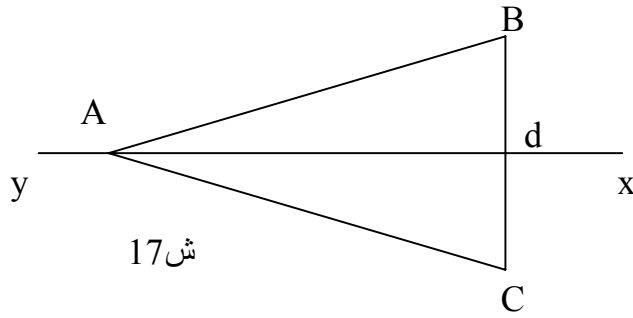
B,C

.A

(xy)

(

.(17)



-1

ABC

-2

-3

[Ad]

-4

A'B'C'

[AC]

[AB] :

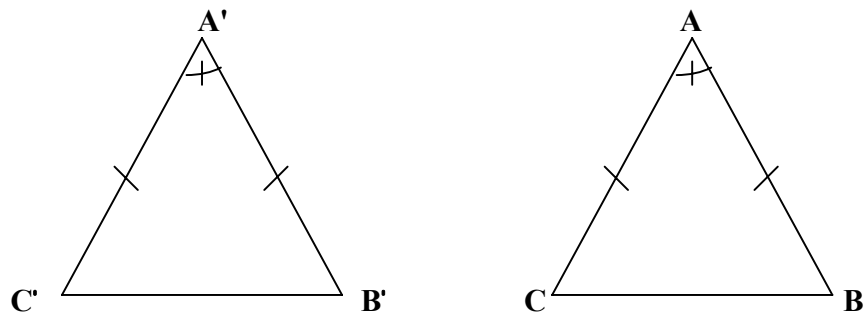
ABC

(

$$A'C' = AC \quad A'B' = AB$$

ABC

(18) : ABC



(ش 18)

(

)

$$AB \quad AB = AC$$

A

'A

$$.A'B' =$$

$$A'C' = AB$$

$$AC = AB \quad A'C' = AC$$

$$A'B' = AC$$

[AB]

[A'C']

A

A'

:

[AC]

[A'B']

$$\hat{C} = \hat{B}', \quad \hat{B}' = \hat{C}$$

$$\hat{B} = \hat{C} :$$

$$\hat{B} = \hat{C}', \quad \hat{C} = \hat{C}' :$$

.

:

$$\hat{B} \Leftarrow \hat{C} \quad (AC=AB \quad ABC) :$$

:

$$A'B'C'$$

$$\hat{C} \quad \hat{B} : \quad ABC$$

$$\hat{C}' = \hat{C} \quad \hat{B}' = \hat{B}$$

$$\hat{C} \quad B \quad \hat{B}' \quad \hat{C}' \quad (19) \quad ABC$$

$$[BC] \quad [B'C']$$

$$\hat{B} = \hat{C} :$$

[B'C']

A A'

[BA

[C'A'

$$\hat{B} = \hat{C}' :$$

$$\hat{C}' = \hat{C}$$

$$\hat{B}' = \hat{C} :$$

$$\hat{B}' = \hat{B} \quad \hat{C} = \hat{B}$$

[CA

[A' B'

()

CA : A' [C'A' [B'A'

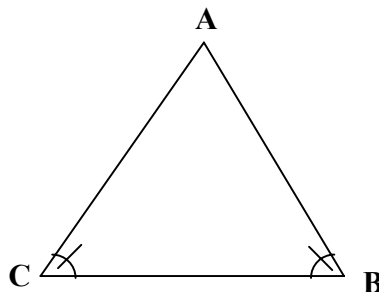
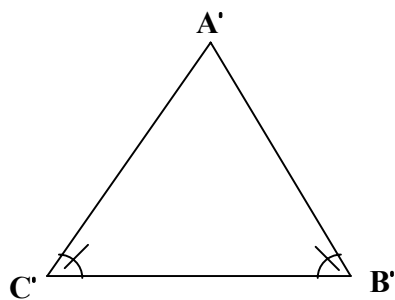
A'C' = AB :

A [BA [

AC = A'B'

AB=AC . AC=A'C'

ABC



(ش 19)

:

$$(AB = AC) < \hat{=} (\hat{B} = \hat{C} \text{ ABC})$$

:

ABC :

:

:

$$\hat{B} = \hat{C}$$

AB=AC

$$\hat{B} = \hat{C}$$

ABC

AB=AC :

⋮

() :
() :

⋮

⋮
$$\widehat{B} = \widehat{C} \iff (AB=AC)$$

⋮

$$(AC=AB) \iff \widehat{B} = \widehat{C}$$

⋮

() $\widehat{B} = \widehat{C} \iff AB=AC$

$$\widehat{B} = \widehat{C} \iff (AB=AC)$$

⋮

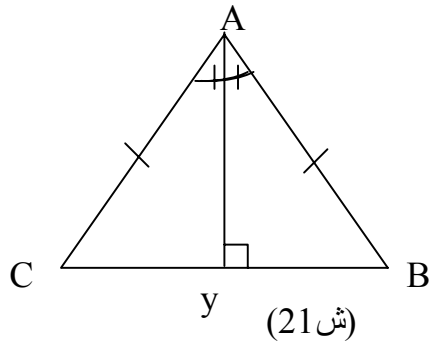
()

.ABC [Ay] [BC] [Ay] $\hat{}$.AyC :
 .[BC] (Ay)

[BC] [Ay] -1
] A (Ay) C B
 (Ay) .(Ay) [AC] [AB

(Ay) AyC AyB -2

$$\left. \begin{array}{l} [Ay \perp [BC] \\ By = Cy \end{array} \right\} \Rightarrow AB=AC$$



(21) ACy ABy

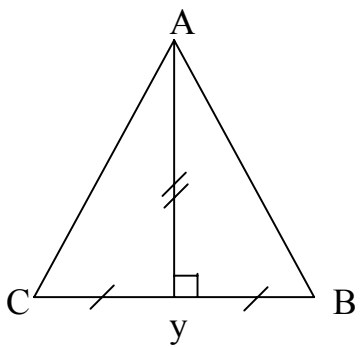
$$\widehat{A_y C} = \widehat{A_y B} \quad [A_y]$$

$$[BC] \quad y \quad C_y = B_y$$

() :

ABC AB = AC :

:



(ش 22)

$$\left. \begin{array}{l} \widehat{B A_y} = \widehat{C A_y} \\ [A_y \perp [BC] \end{array} \right\} AB = AC$$

(22) ACy ABy
[Ay] :

()

$$\hat{A} \quad [Ay \quad \hat{BAy} = \hat{CAy}$$

$$\hat{AyC} = \hat{AyB}$$

ABC . AB = AC :

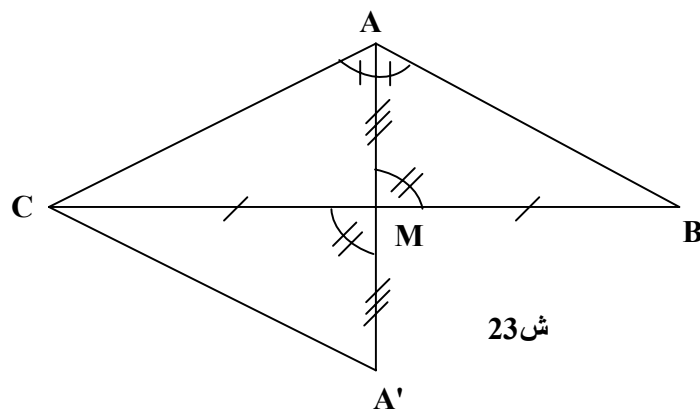
() :

:

$$\left. \begin{array}{l} \hat{MAB} = \hat{MAC} \\ MB = MC \end{array} \right\} \implies AB = AC$$

.M C [MA] [MA'] [AM

(23) .ABM A'CM :



ش 23

()

$$MA = \dots \quad BMA = CMA' \quad [BC] \quad M \quad MB = MC : \dots MA'$$

$$: \quad (\dots) : \text{ [Yellow Box]}$$

$$AB = A'C \quad \widehat{MAB} = \widehat{MA'C}$$

$$\widehat{MA'C} = \widehat{MAC} \quad \widehat{MAB} = \widehat{MA'C} \quad \widehat{A} \quad [A M : \quad \widehat{MAC} = \widehat{MAB} :$$

$$AC = A'C :$$

$$ACA'$$

$$AB = A'C :$$

$$ABC$$

$$AB = AC :$$

:

$$: \quad : \text{ [Yellow Box]} \quad ($$

:

.-

-

(



5cm [BC]

-1

A'BC ABC :

$$\hat{A'BC} = \hat{ABC} = 50^\circ :$$

$$\hat{BCA'} = \hat{BCA} = 60^\circ$$

ABC A'BC :

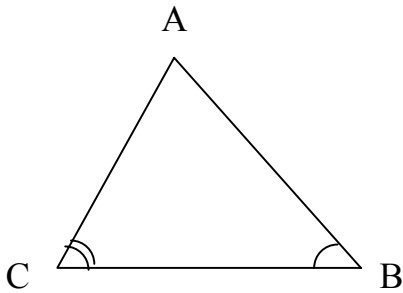
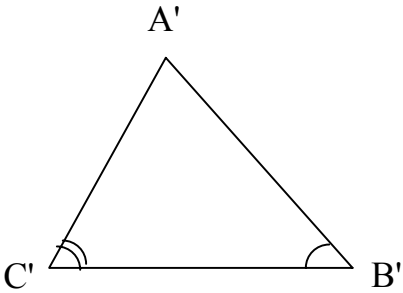
-2



:

A'B'C' ABC :

(24)



(24)

$$BC = B'C'$$

$$\hat{C} = \hat{C'}$$

$$\hat{B} = \hat{B'}$$

$$\left. \begin{array}{l} BC = B'C' \\ \hat{C} = \hat{C'} \\ \hat{B} = \hat{B'} \end{array} \right\} \Rightarrow ABC = C'A'B'$$

: [Redacted]

: [Redacted]

5cm [AB] -1

: A'B'C' ABC :

$$\begin{aligned} \angle ABC &= \angle A'B'C' = 60^\circ \\ BC &= B'C' = 4\text{cm} \end{aligned}$$

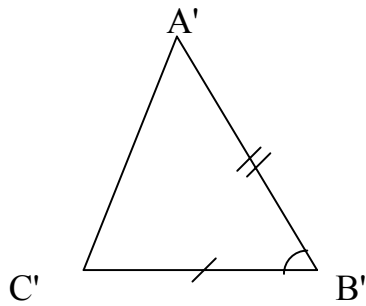
A'B'C' ABC :

.

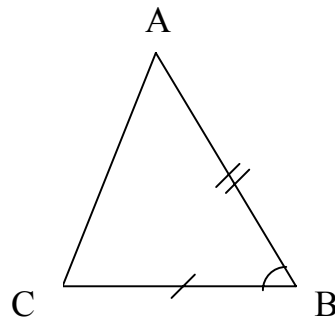
: [Redacted]

(25)

A'B'C' ABC : 25



شكل 25



$$\left. \begin{aligned} BC &= B'C' \\ \angle B &= \angle B' \\ BA &= A'B' \end{aligned} \right\} = \triangleright (A'B'C' = ABC)$$

()

: [redacted]

: ABC A'B'C'

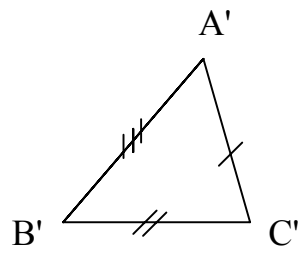
:

: [redacted]

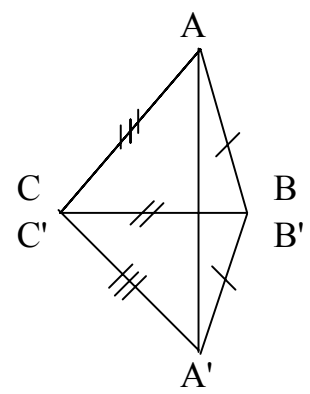
: [redacted]

[AB] [CA] [BC] : -1
 . 4cm 5 cm 6cm
 . [BC] :
 . [BC] A' A

. A'BC ABC : -2



شکل 26



: 

:

A'B'C' ABC

$$\left. \begin{array}{l} AB = A'B' \\ AC = A'C' \\ BC = B'C' \end{array} \right\} \Rightarrow (A'B'C' = ABC)$$

:(1) 

A'B'C' ABC

:(2) 

: A'M'B' AMB

$$AB = A'B' \quad MB = M'B' \quad AM = A'M' :$$

∧
M



: []

[AD] [DH]

ABC

[AD]

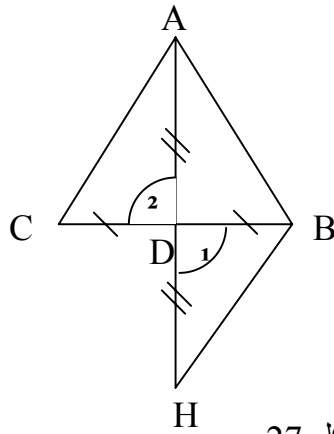
. [HB]

[BH] [AC] :
BHD

. [BH] [AC]
ACD

:

27



شكل 27

DC

[CB]

D

[AD]

. () DH = AD

.DB =

. $\hat{D1} = \hat{D2}$.

$\hat{D1}$ $\hat{D2}$

ACB BHD :

. [BH] [AC]

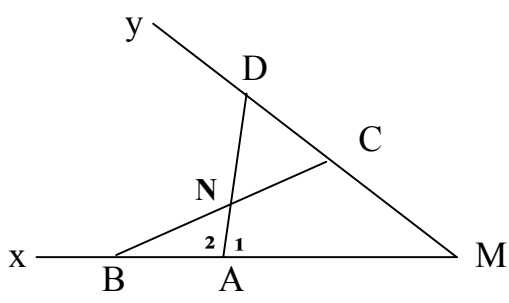
()



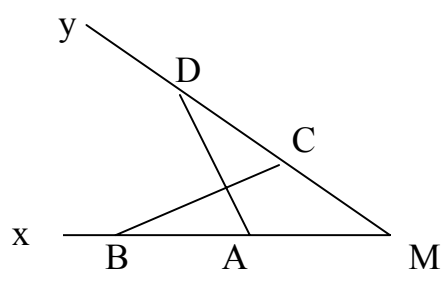
$\widehat{M B} = \widehat{M D}$ $\widehat{M A} = \widehat{M C}$: $\widehat{C D}$
 $\widehat{M C B} = \widehat{M A D}$ (1)
] [NC] (BC) // (AD) N (2)
 . [NA

$\widehat{x M y}$ [MN] : (3)

\widehat{M} () $\widehat{M A} = \widehat{M C}$ 27 $\widehat{M C D} = \widehat{M A D}$ (1)
 . () $\widehat{M D} = \widehat{M B}$



ش 28



ش 27

$\widehat{B1} = \widehat{D1}$ ، $\widehat{C1} = \widehat{A1}$ ، $CB = AD$

$\angle NCD = \angle NAB$ 28 $\angle [NC] = \angle [NA]$ (2)

∴ $\angle CDN = \angle MBN$:
 : $() MD = MB \quad MC = MA$:
 $CD = AB \quad MC - MD = MA - MB$
 $\angle NCD = \angle NAB$:

∴ $NC = NA$:

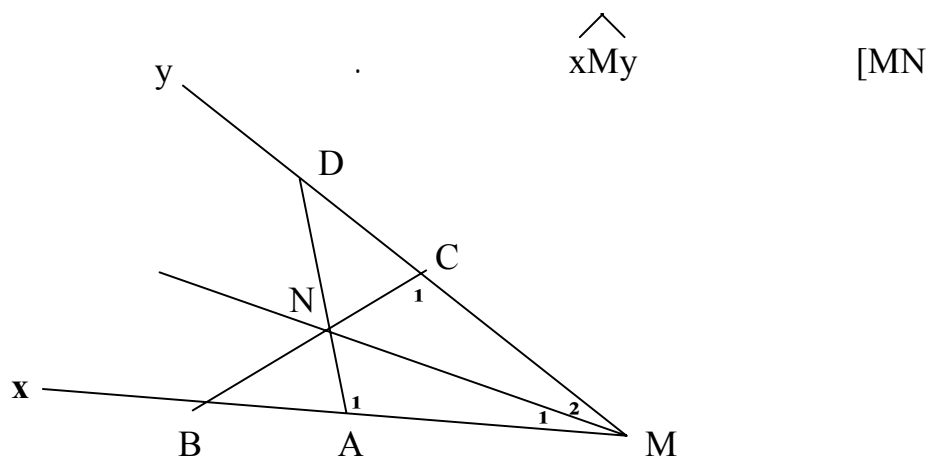
$\angle NMx$ $\angle xMy$ $\angle [MN]$ (3)

: 29 $\angle NMC = \angle NMA$ $\angle NMy$
 $() MC = MA$

$() \angle C = \angle A$

$() NC = NA$

∴ $\angle NMC = \angle NMA$:



شکل 29

()

مادة الرياضيات (السنة الأولى من التعليم المتوسط)

تابع للإنشاءات الهندسية

-
-
-
-
-



-
-
-
-
-
-

B A

B A :

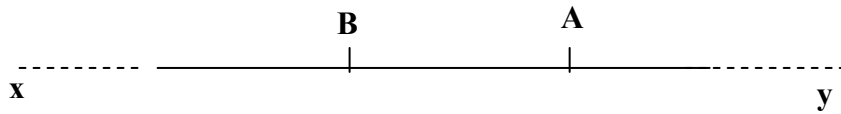
[BA] [AB]

⋮

⋮

:

B A : (xy)



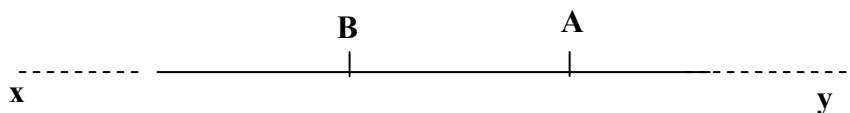
⋮

⋮

:

(xy)

B A



B A

(xy)

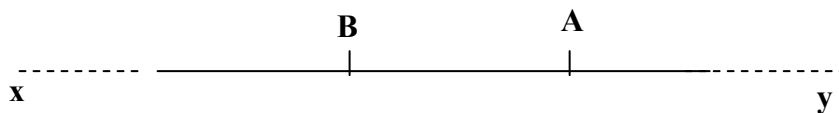
[Ax ∩ [By :

[AB]

[By ∩ [Ax = [AB] :

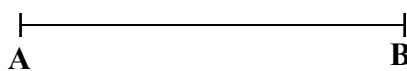


(xy) A B



[AB]

B A : B A : [AB]



=



[AB] B [AB] A -1

.A ∉ [AB]]AB] :

[AB] [AB[[AB] A [AB] B -2

.B ∉

[AB]]AB[[AB] B [AB] A -3

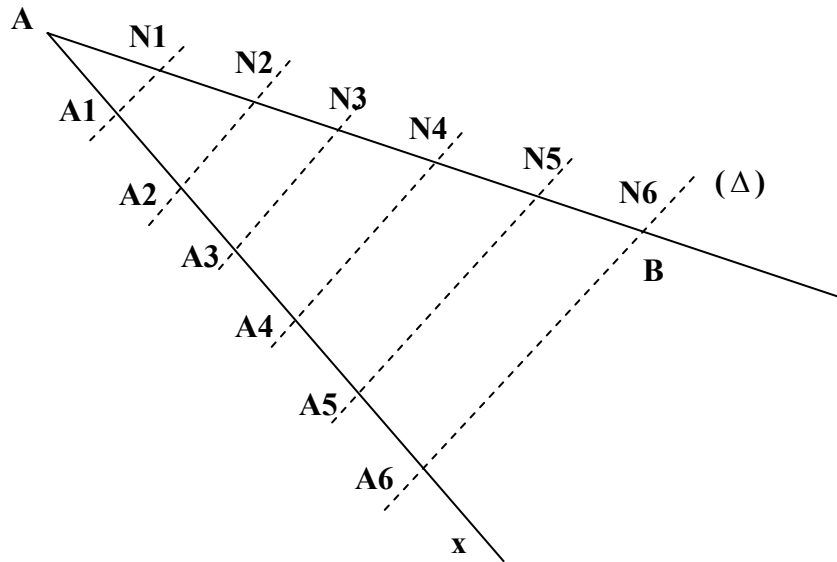
.A ∉ [AB] B ∉

. A ∈ [AB] B ∈ [AB] [AB] : [AB] -4



6

[AB]

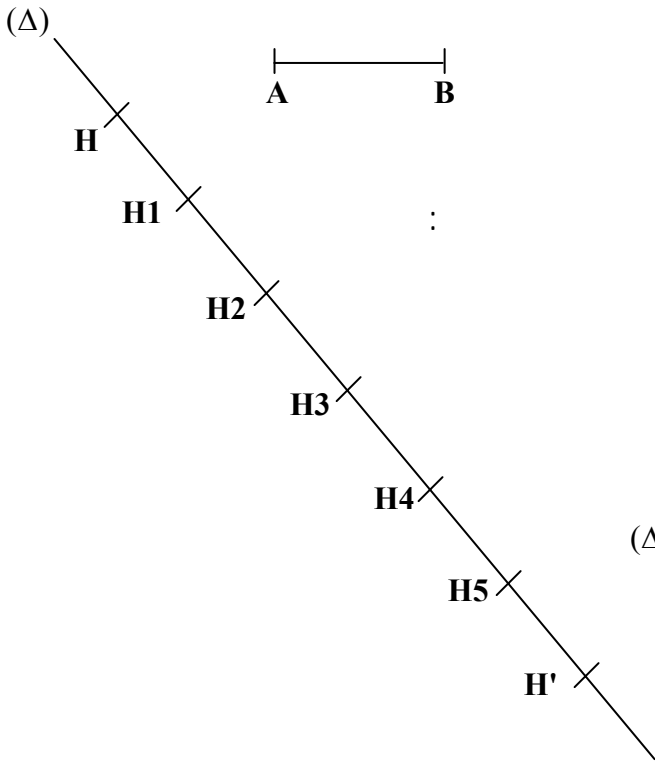


\cdot [Ax] B [Ax] -
 \cdot H [Ax] -
 \cdot A6 B -
 A6 A5 A4 A3 A2 A1 (Δ) -

N6 N5 N4 N3 N2 N1 (AB)

: [AB]

A N1 = N1 N2 = N2 N3 = N3 N4 = N4 N5 = N5 N6



a

[AB]

.a ≠ 1

$$.H H' = a .AB$$

-



(Δ)

H

[AB] ∉ (Δ)

(Δ)

.[AB]

. H1

H

-

H2

H1

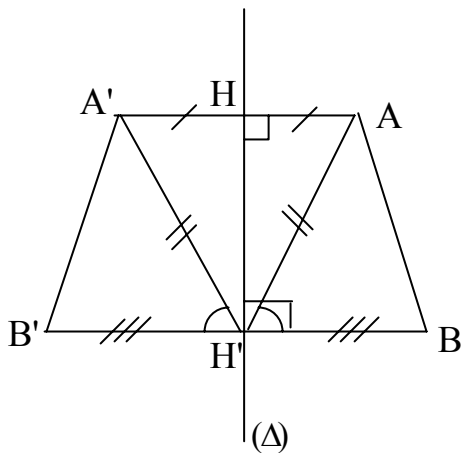
H'.... H4 H3

a

.AB

[H'H]

$$.H H' = a .[AB]$$



.[AB]

[A'B']

[AB]

(Δ)

[AB] ∉ (Δ)



.(Δ)

A

A'

.(Δ)

B

B'

B' A'

[A'B']

[AB]

:

$$.AB = A'B'$$

:

:

(

)

$$[BB'] \cap (\Delta) = H' \quad (\Delta) \cap [AA'] = H : \\ AA' H' \quad H' \in (\Delta) \quad [BB'] \quad (\Delta) \quad [AA'] \quad (\Delta)$$

$$(1) \dots \widehat{A'H'H} = \widehat{H'H'A} : \quad \widehat{A'H'A} \quad [H'H] :$$

$$(2) \dots 90^\circ = \widehat{HH'A'} + \widehat{A'H'B'} = \widehat{H'H'A} + \widehat{A'H'B} :$$

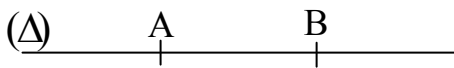
$$\widehat{A'H'B'} = \widehat{A'H'B} : \quad (2) \quad (1)$$

. $A'H'B' \quad A'H'B$

$$\widehat{A'H'B'} = \widehat{A'H'B} \quad \widehat{H'B'} = \widehat{H'B} \quad H'A' = H'A :$$

$$A'B' = AB$$

$$[AB] \subset (\Delta) :$$



. B (Δ) B

A (Δ)

A

$[AB] \subset (\Delta)$

. $[AB]$

.N $\notin [AB] :$

. $[AB]$

$[A'B']$

$[AB]$

N

$[AB]$

:

.N

A

A'

.N

B

B'

. $[A'B']$

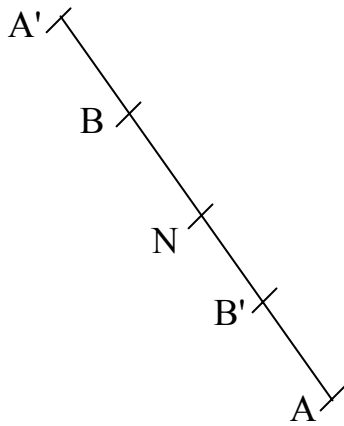
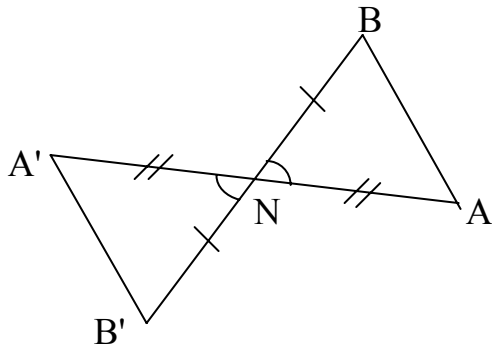
$[AB]$

. $AB = A'B' :$

A' B'

$$\widehat{A'NB'} = \widehat{ANB} \quad NA = NA' \quad NB = NB' : \quad A'NB' \quad ANB$$

$$A'B' = AB$$



.[AB] [A'B']

N ∈ [AB] :

.[AB] N [AB]

.[AB] [A'B']

.N A A'

.N B B'

.[A'B'] [AB] A' B'

:

(1).....(N A A') NA' = NA

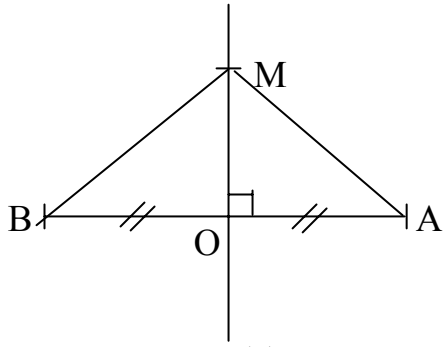
(2).....(N B B') NB' = NB

NA' + NB' = NA + NB : (2) (1)

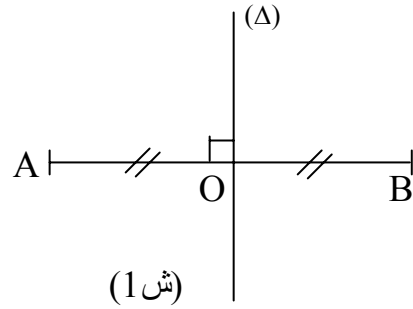
.[A'B'] [AB] AB = A'B'



.[AB] O (AB) (Δ) [AB] (Δ)



(ش 2)



(ش 1)

:1

:

$M \in (\Delta)$

$MA = MB$

:2

:

.[AB]

M

:1

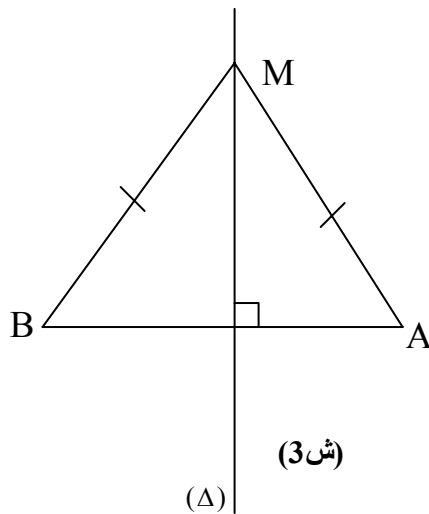
.(Δ)

A B

2 1

(2) .[AB]

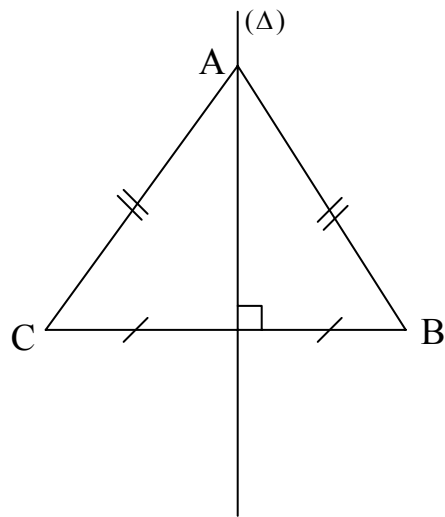
(Δ)



(ش 3)

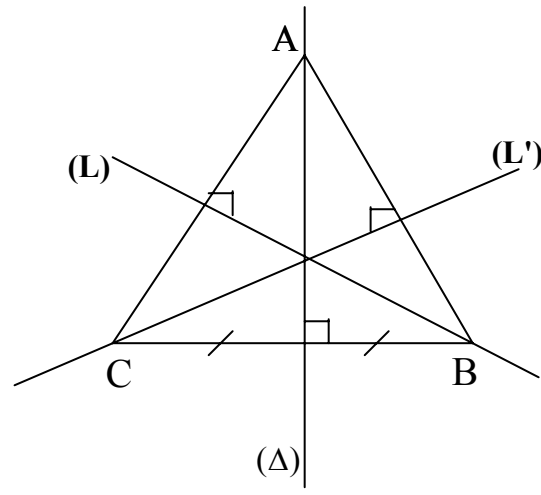
(Δ)

$[AB]$ (Δ) $[AB]$ (Δ) **:2**
 $.[AB]$ (Δ) (Δ) $A B$
 $.(\Delta)$ (Δ)
: [redacted] -1
 $A .(\Delta) C B : [BC] (\Delta)$
 $.(\Delta)$
 $.ABC [BC] (\Delta)$

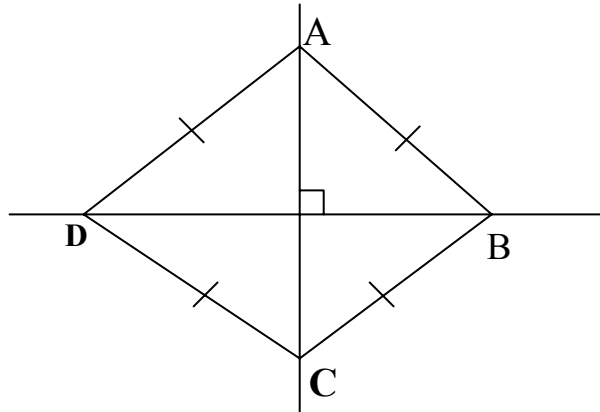


$.(\Delta)$ **: [redacted] -2**

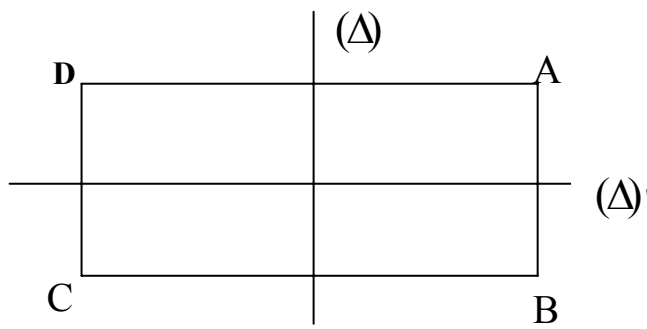
ABC



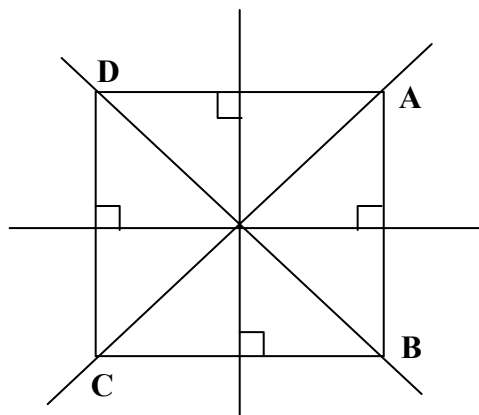
: -3



: -4



: -5



⋮

:

:

-1

:

-2

:

-3

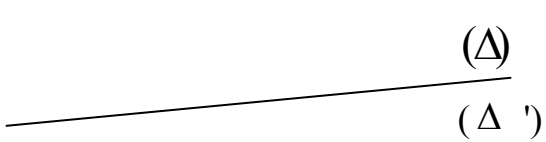
:

⋮

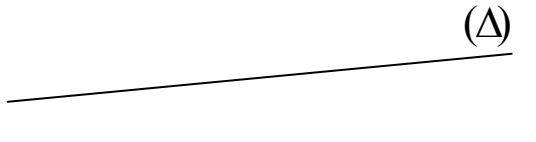
:

(1)

:



(ش 2)



(Δ')

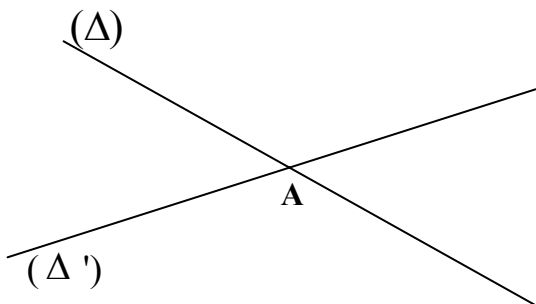
(ش 1)

(Δ') (Δ) :1

(Δ) (Δ') : :2

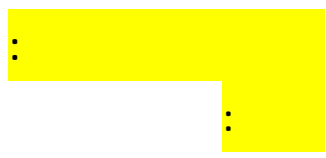
⋮ (2)

:



ش 3

:

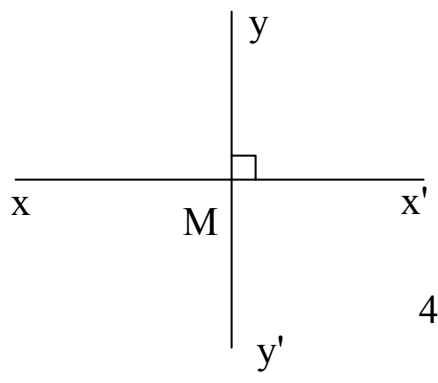


(4) (4)

M

(yy') (xx')

(y y') ⊥ (xx') :



ش 4

$$[90^\circ = \widehat{xMy} \{M\} = [(xx') \cap (yy')] \Leftrightarrow [(xx') \perp (yy')]$$

:

N (Δ)

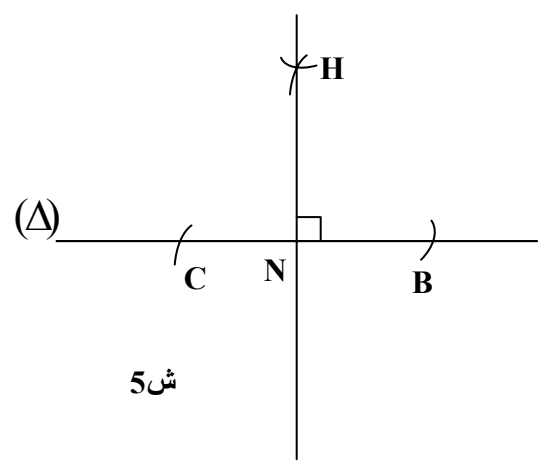
.N ∈ (Δ) :

.C B (Δ) N -

C B -

.H

(Δ) ⊥ (HN) :



.N ∉ (Δ) :

N R C B (Δ) N -

. (Δ)

[Nx \widehat{BNC} -

. (Δ) ⊥ [Nx :

(6) (Δ) ⊥ (Nx)

.(x y) N (x y) :

.N B (x y) -

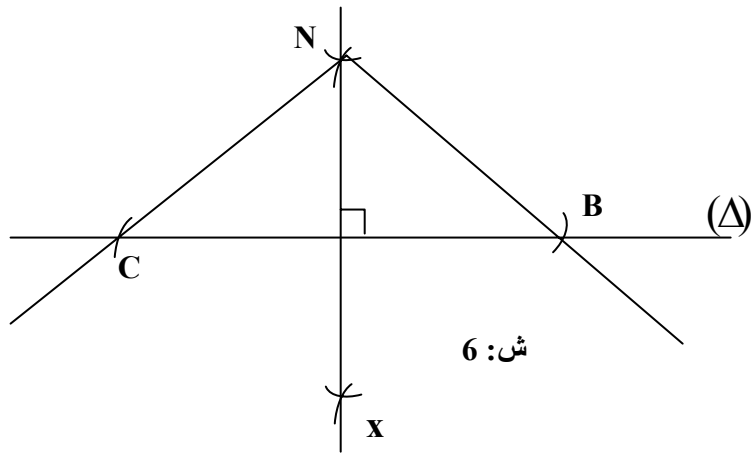
.NB y $\widehat{}$ -

.N (x y)

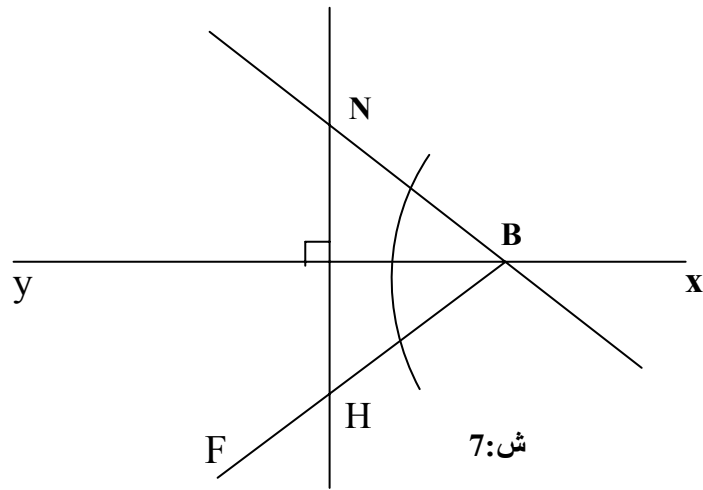
.BN = BH : H -

H ∈ BF

(7) (HN) ⊥ (x y) :



ش: 6



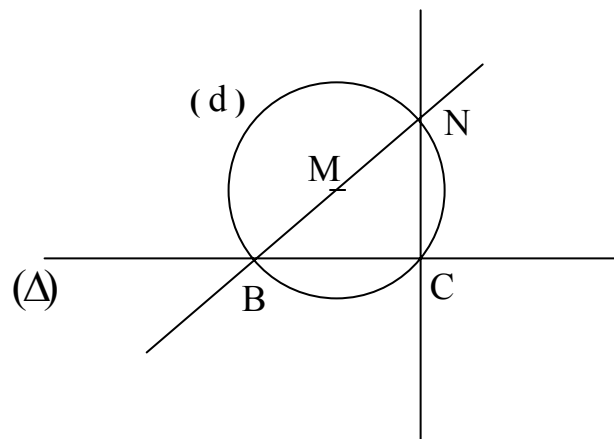
ش: 7

(Δ) N (Δ) :

. N B (Δ) -

. [BN] (d) -

. (Δ) ⊥ (NC) : (d) ∩ (Δ) = {B C} : -



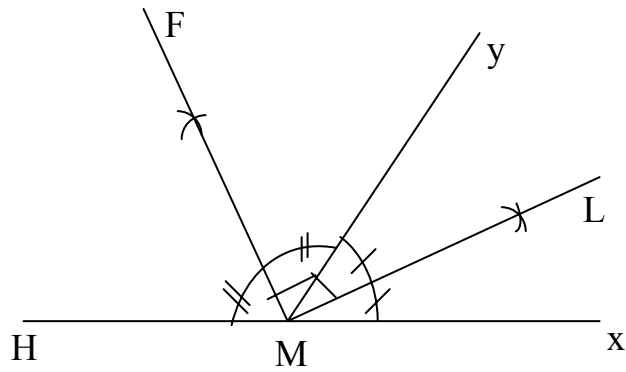


(2)

:

\widehat{yMH} \widehat{xMy}

$(ML) \perp (MF)$ \widehat{yMH} \widehat{xMy} $[MF]$ $[ML]$



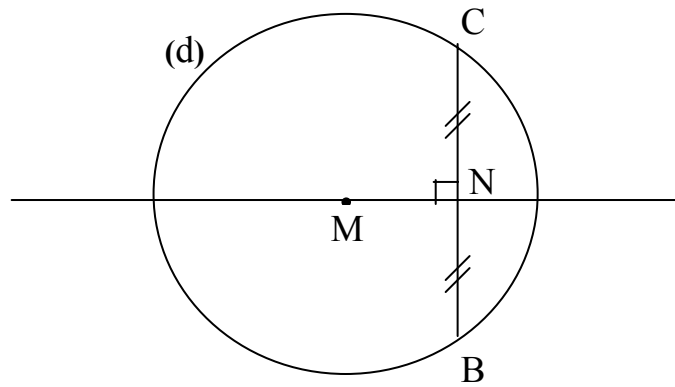
\widehat{M}

:

$d(MR)$

$[BC]$

$(BC) \perp (MN)$: $[BC]$ N



.M' M

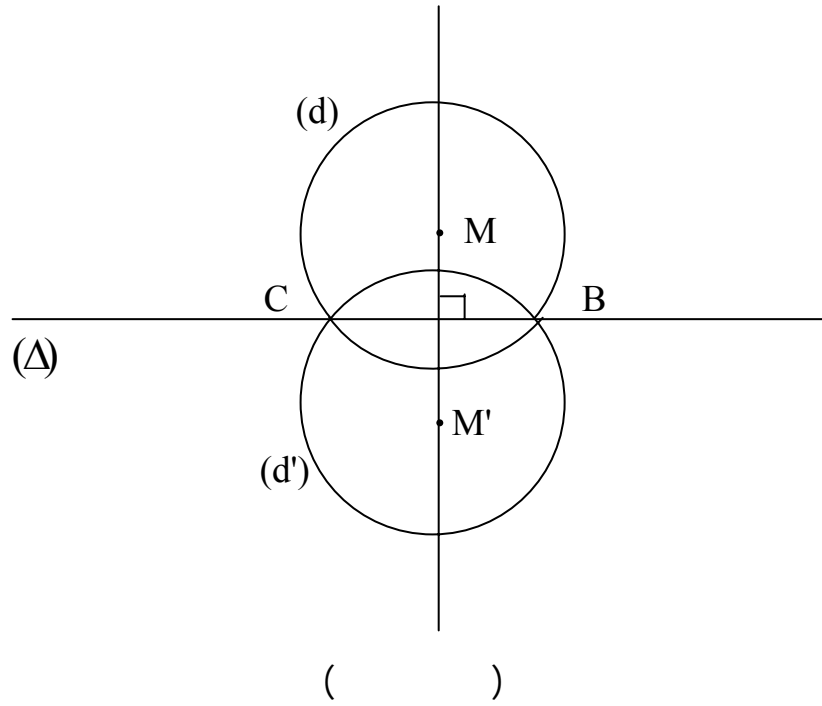
C B

(d') (d)

.[BC]

.M' M

(M M') \perp [BC] :



()

:

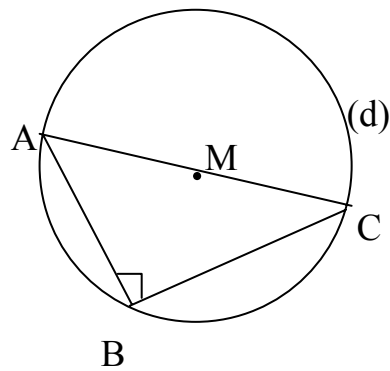
d(M R)

(d) A C

. A C

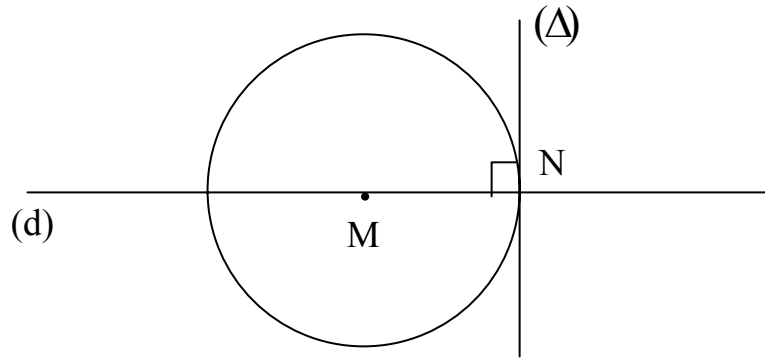
(d) B

.(BC) \perp (AB) :



()

:
 . (M R) -
 (d) N -
 .N (d) (Δ) -
 (Δ) ⊥ (MN) :

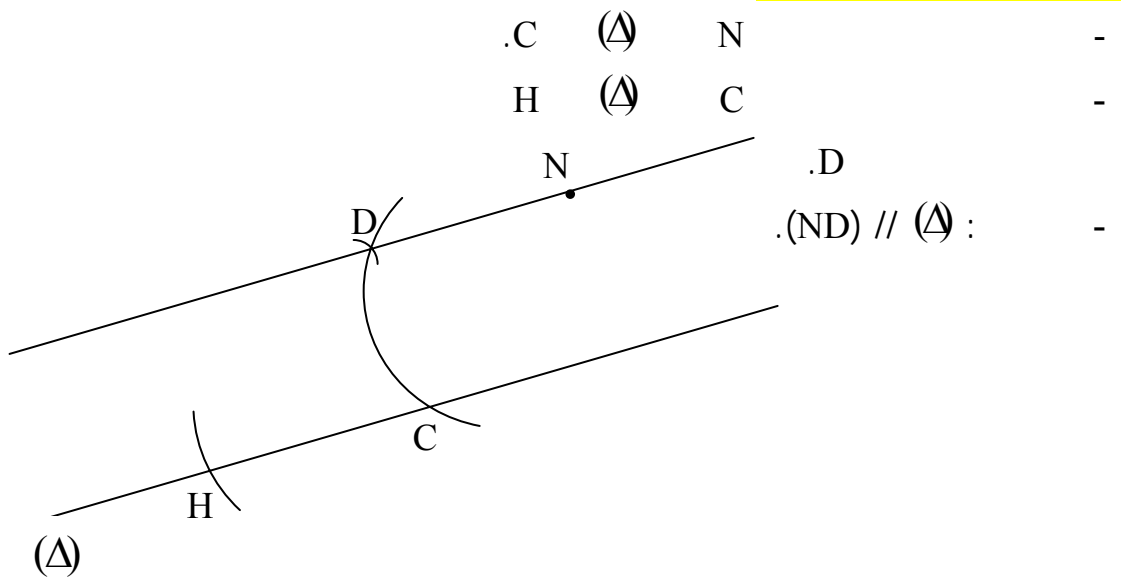


:
 .[(Δ') ⊄ (Δ)] = (Δ') ∩ (Δ) ⇔ [(Δ') // (Δ)]

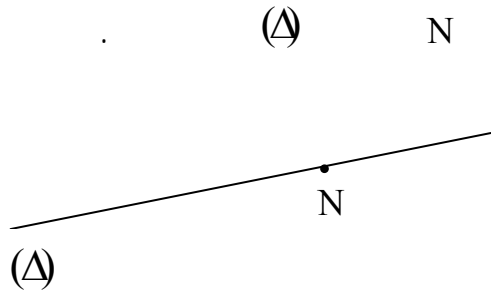
-1

.N ∉ (Δ) :

H

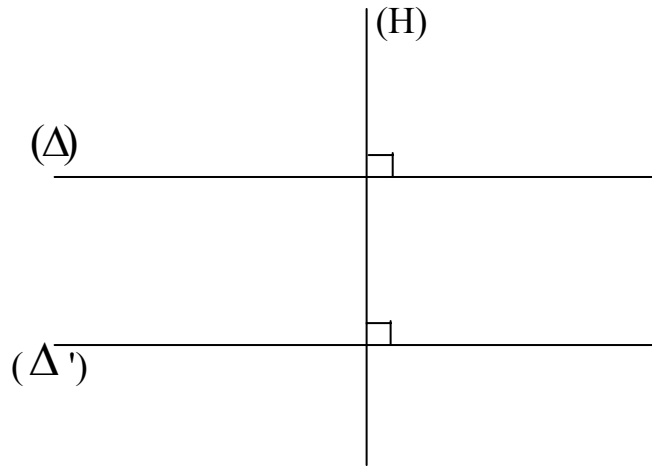


$N \in (\Delta) :$

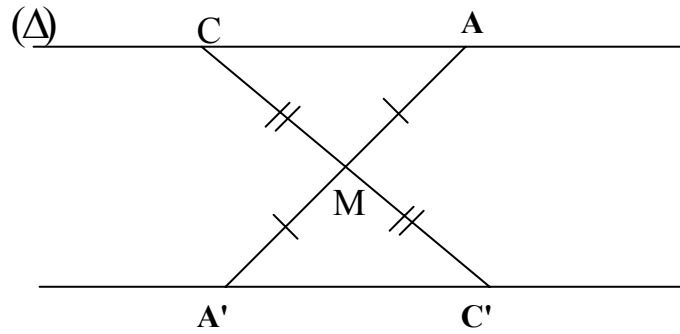


2

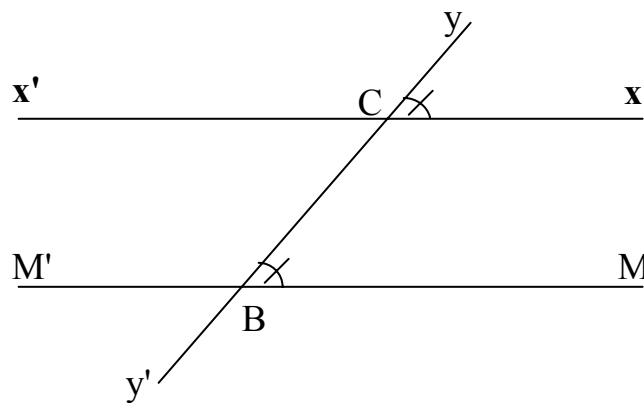
- $(H) \perp (\Delta) \quad (\Delta) \perp (H) :$
- $(\Delta') \parallel (\Delta) :$



\therefore
 (Δ) -
 $C A$ -
 (Δ) M -
 $C A$ $C' A'$ -
 $(A'C') \parallel (\Delta)$:



\therefore
 (yy') (xx') -
 (yy') B -
 (yy') \widehat{xCy} \widehat{MBy} -
 $(xx') \parallel (BM)$:

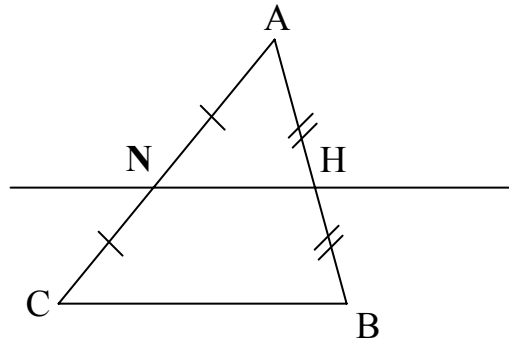


∴

.ABC

[AC] [BA] N H

.(BC) // (HN) :



∴

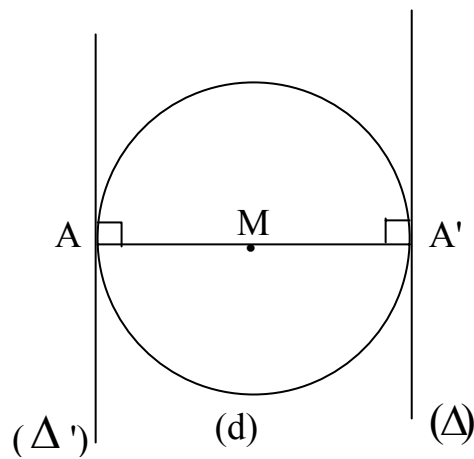
.M (d)

A' A

. A' (d) (Δ)

.A (d) (Δ')

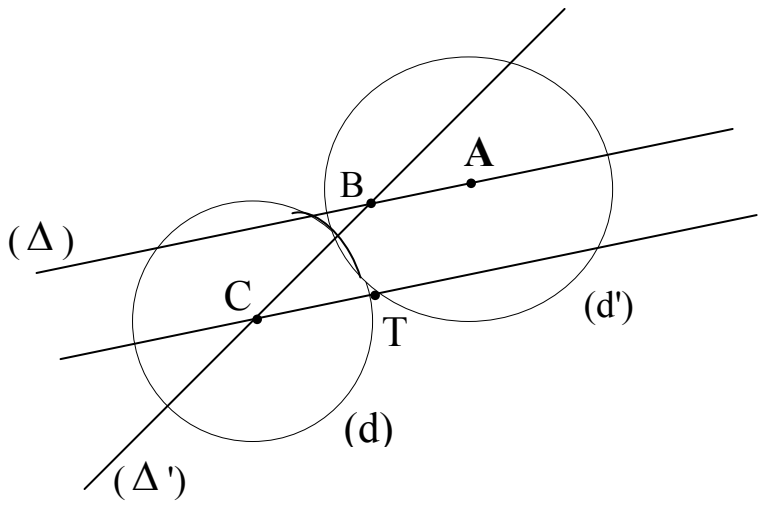
.(Δ') // (Δ) :



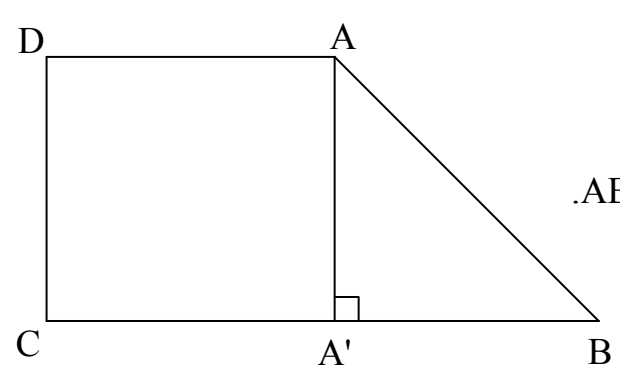
\vdots
 (Δ) B, A
 (B) (Δ) (Δ')
 A,C (d') (d)
 (Δ')
 $[BC], [AB]$

(Δ) T T

.C
 $(\Delta) // (TC) :$



$.ABCD$ $[CB] [DA] :$



$[DC] [DA]$
 AA'



(1)

ABCD

ABC

D

B

ABC

.B

:



.B ABC

d : (Δ) d

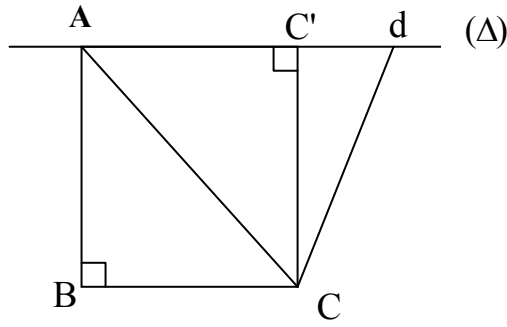
(BC)

A

(Δ)

.(Δ) C

.ABCd B



(2)

4cm

3cm

. 6cm

:



: : ABC -

.6cm = BC=4cm AB=3cm

.B

[AC]

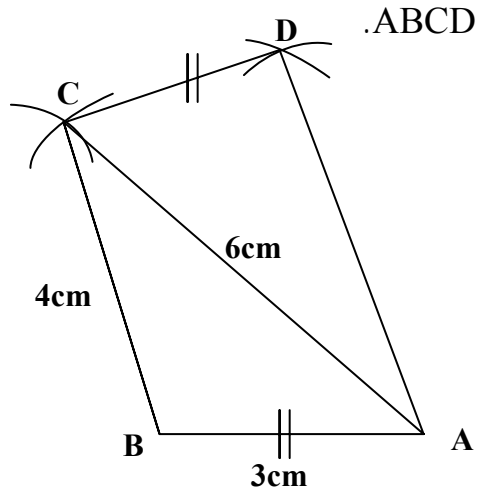
-

.D

C

[AB]

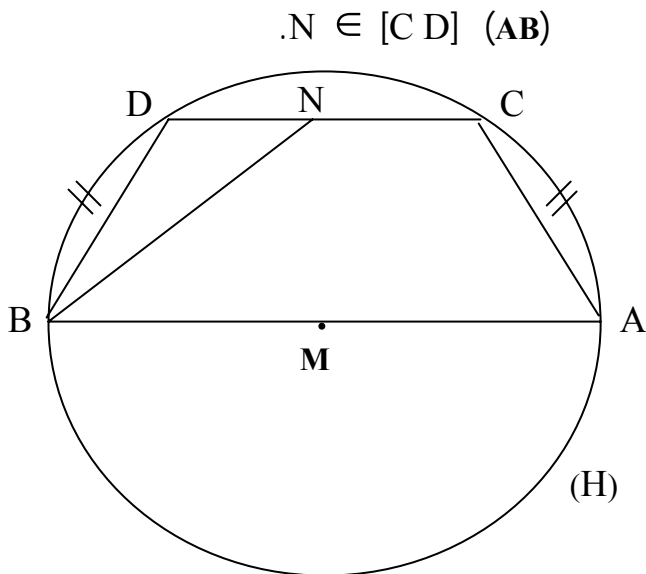
-



()



$D \in C$ \widehat{BD} \widehat{AC} : $C \in (H)$ $D \in (H)$ $H(M, \frac{AB}{2})$ (3)

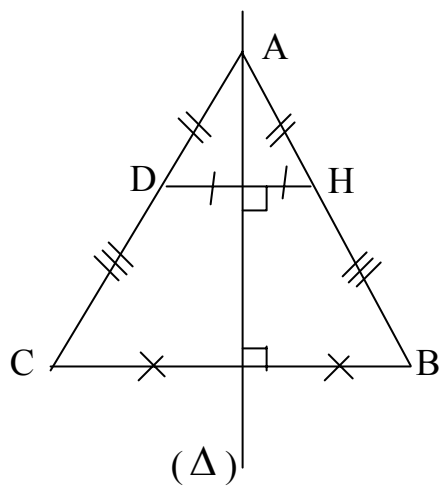


$N \in [CD] \quad (AB)$

C
 $ABNC$



$[CB]$ ABC
 (Δ)
 $D \in]AB[$ (Δ) H $D, H \in]AB[$
 $HDCB$

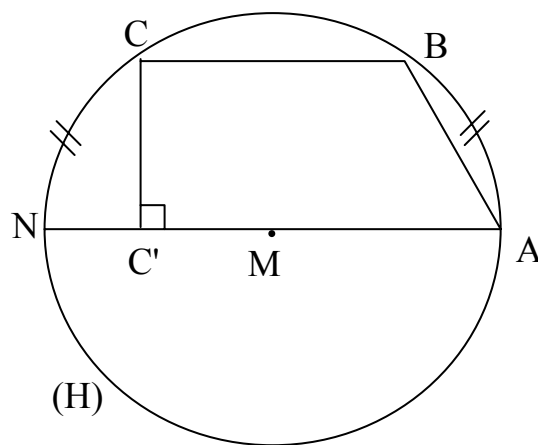




(5)

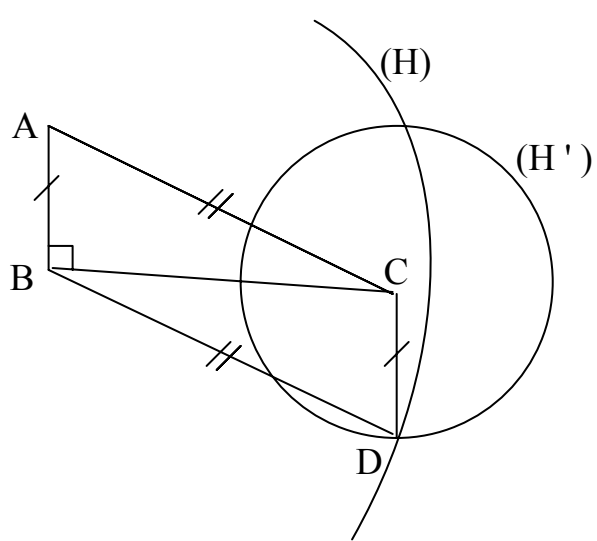
$C \in (H) \quad B \in (H) \quad H \left(\frac{AN}{2}, M \right)$
 $\widehat{NC} = \widehat{AB}$

$C' \in (AN)$
 $ABCC'$

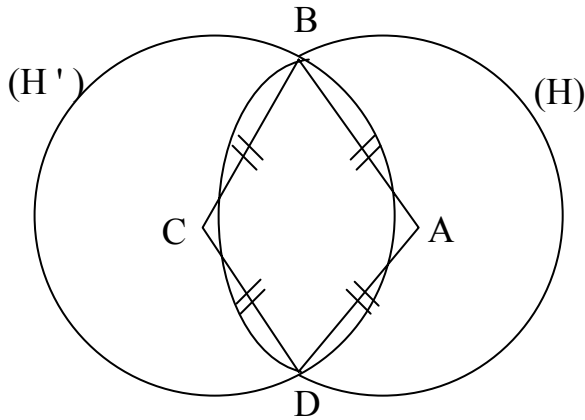


(2)

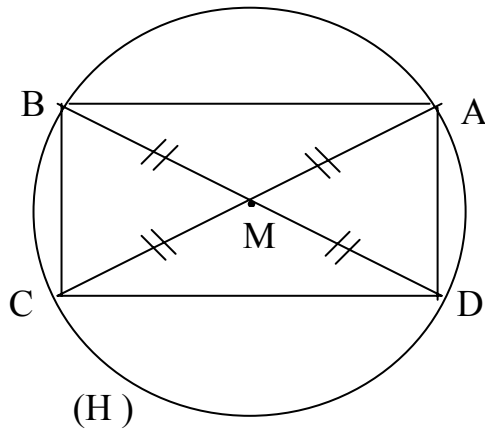
$(H) \cap (H') = \{D\}$
 $H'(C \perp AB) \quad H(B \perp AC)$



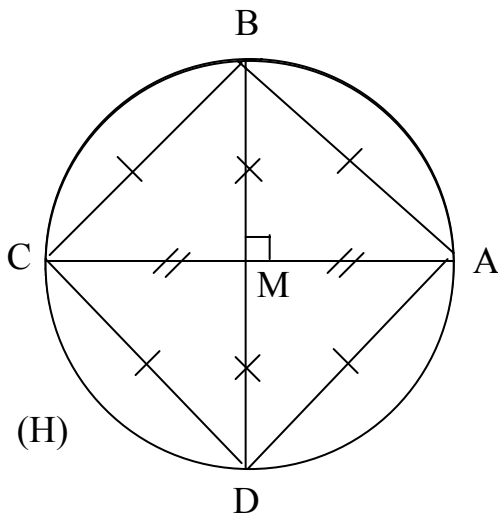
ABDC



$(AC) \perp (BD) : (H)$



$(AC) \perp (BD) : (H)$



(3)
-1

$H'(C R) \quad H(A R) \quad A C$
 $(H) \cap (H') = \{B D\}$
 $ABCD$

-2

$[BD] \quad [AC] \quad H(M R)$
 $ABCD$

-3

$[BD] \quad [AC] \quad H(M R)$
 $ABCD$

مادة الرياضيات (السنة الأولى من التعليم المتوسط)

الإنشاءات الهندسية:



⊙ :

.....

⊙

" : - -

"

⊙ 536 535

⊙

" 1406-1332

808-732

....."

...

347-427
305 (6:) ,



255-315



-1

-2

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•

-1

-2

-

✘



•



.1

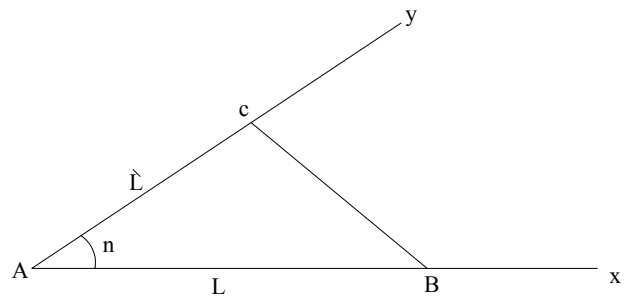
n : BÂC AC=L', AB=L : ABC

[AB] [Ax n : [Ax , Ay]

AC=L' : [AC] [Ay AB=L :

ABC

ABC

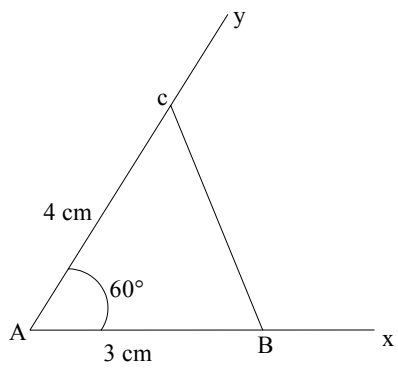


$\pi > n$



ABC xAy=60°, AB=3 cm , AC=4 cm

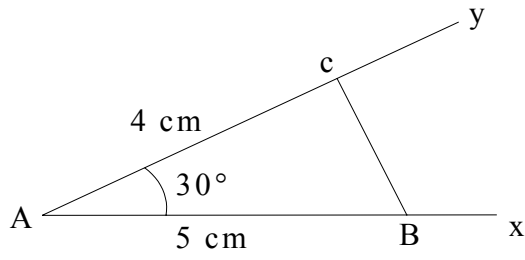
:ⓐ -



()

ABC $\angle A = 30^\circ$, $AB = 5 \text{ cm}$, $AC = 4 \text{ cm}$

: ②



:

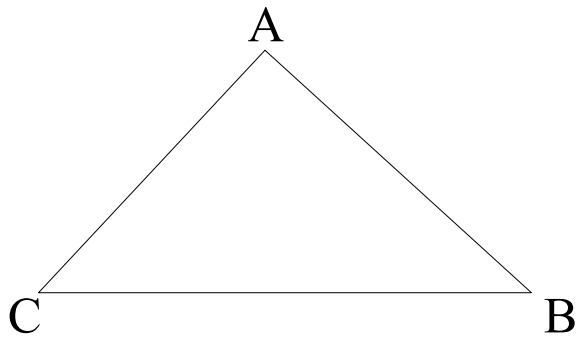
.2

$L = AB$, $AC = L'$, $BC = L$

ABC

L, L, L

$L > L > L$



⋮

$BC = L$

[BC]

-

L

B

-

L

C

-

A

ABC

ABC

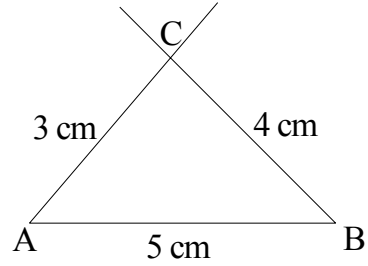


-

$L < L + L$:

AC=3 cm , BC=4 cm, AB=5 cm ABC

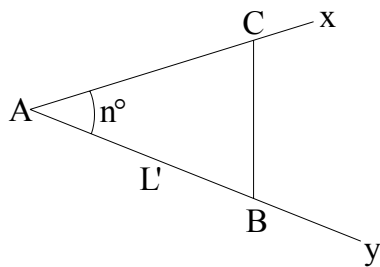
⋮ ○
⋮ -



⋮ **.3**

(L,L') AB=L', BC = L :

BAC= n° : -

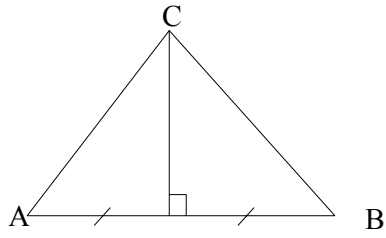


⋮ ○

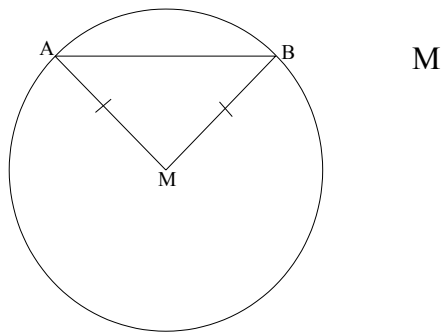
n BAC : -

AB=L' [AB]: [Ay -

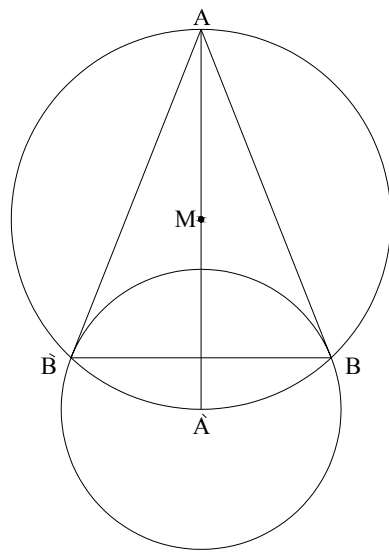
L B [Ax : c



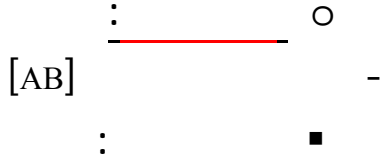
$\frac{\text{[BC]}}{\text{[BC]}}$ \circ
 [BC]
 A
 A,B,C



$\frac{\text{[BC]}}{\text{[BC]}}$ \circ
 (d)
 A,B :
 A M



R M (d)
 A ,A :
 R A
 B,B (d) R > R :
 B ,B, A
 ABB



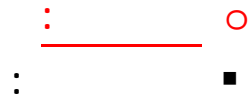
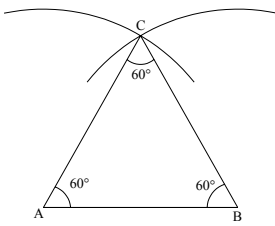
AB

B A

C

BC=AC=AB :

ABC



[AB]

.1

60° B

.2

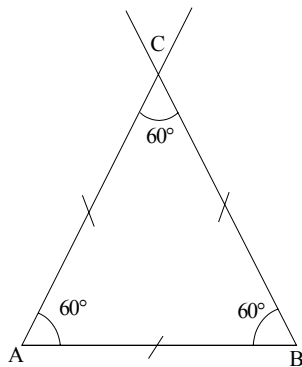
60° A

.3

ABC

C

BC=AC= AB:

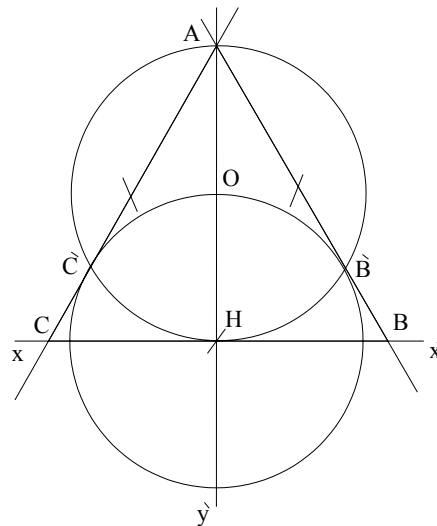


∴  ○

∴ 

- . $A \in (yy')$ H $(yy'), (xx')$.1
- . AH
- OH (AH) (d) .2
- C', B' (d) , H .3
- B (xx') (AB')
- C (xx') (AC')

. ABC



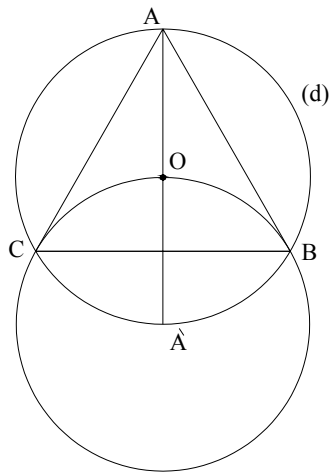
∴

∴

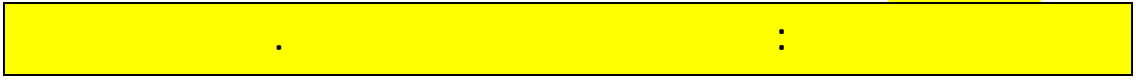
[AA'] [Ao] (d) -1

'A
C, B (d) -2

ABC C, B, A -3

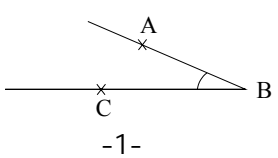


∴



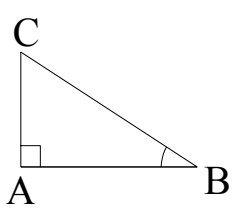
∴ .1

∴



ABC, [AB]

∴



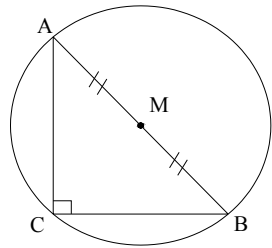
C ABC -

A (AB) -

ABC

()

.2



-1-

M [AB]

M

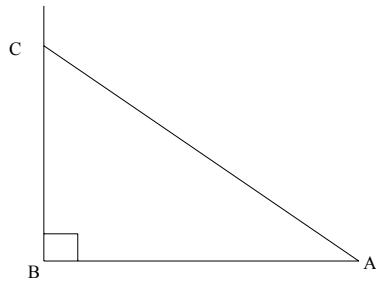
A, B

ABC

B

.C

.3



AC, [AB]

ABC

B

[AB]

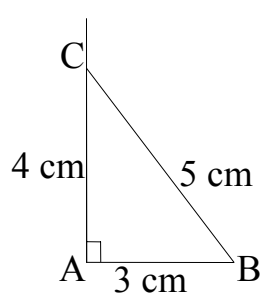
A

.C

ABC

A,C

: .4



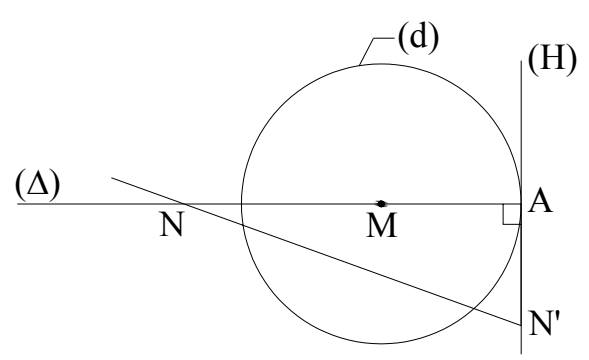
: C,B,A
 . BC= 5 cm, AC= 4 cm ,AB= 3 cm

. A ABC C,B,A : -

: .5

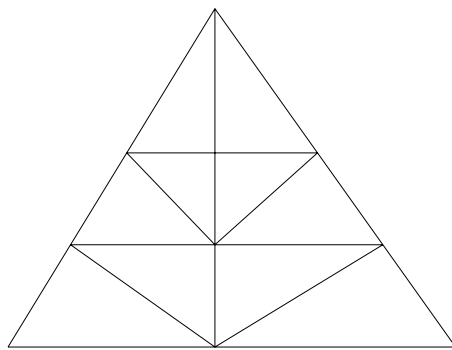
(d) -
 (H) A -
 - A (d) (Δ) -
 . (Δ),(H)

.A A N N' (H) N' (Δ) N
 (A N') , (A N) :





- (H) . (H) , B,A .1
- (H) A [BC] . ABC .2
- C',B',A' ABC .3
- . .4
- 60° A 3 cm,4 cm .5
- B=130° ,C=70° CB= 5 cm . ABC .6
- B=30° ,C=45° CB= 5 cm . ABC .7
- . A .8
- :
- A -
- A -
- .9
- .10
- .11



! . 20 : _____ ✨