GEOM EUC FACILE (ou PAS)

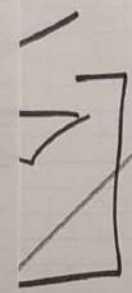
VOC BASE

Remarques de collège oubliées

Prop de Thalès

2nde

A refaire



construction au O

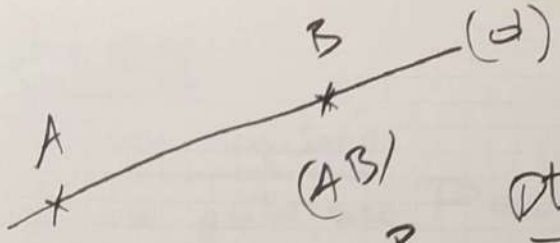
(d) :

. D ou P

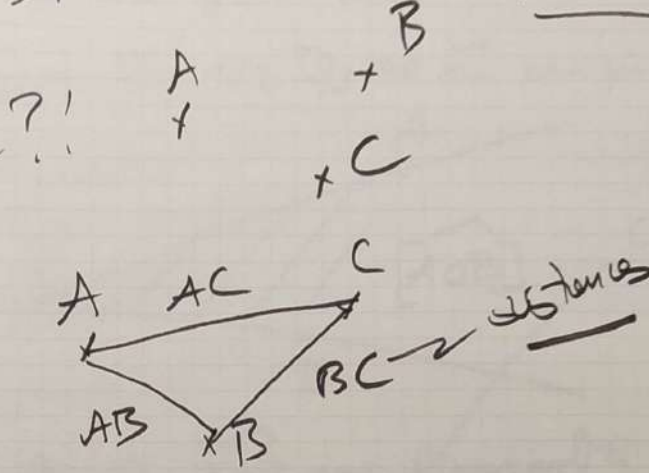
)

BAILLY MAÎTRE

GEOM À LA PAPA




Dts alignés ?




AC = 10
AB = 3
BC = 4

arc de cercle ?

trajet avec D le + court

inégalité triangulaire

$AC \leq AB + BC$

ABC alignés lorsque $AC = AB + BC$

GEOM EUC FACILE (ou PAS)

VOC BASE

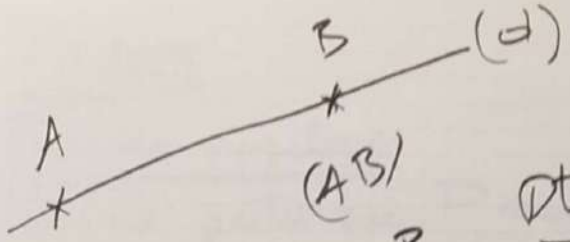
Remarques de collège oubliées

Prop des écoles

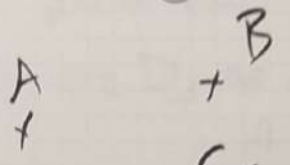
2nde

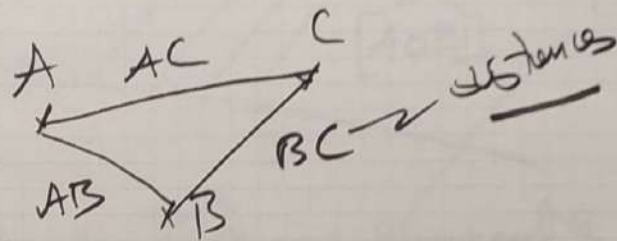
Raisonnements demandés à A adulte

?!




Dts disjoints ?




distances

AC = 10

AB = 3

BC = 4

avec ficelle ?

trajet le + court

inégalité triangulaire

$AC \leq AB + BC$

ABC alignés ssi $AC = AB + BC$

1 VOCABULAIRE

GEOM EUC FACILE (ou PAS)

VOC BASE

Rendez-vous de collège oubliés

2nde Prof de math

Raisonnements demandés à A Lutter

plus étapes

• Points • Droite • D

le • : objet dans un Plan

noté ex $A$ $B_1$ etc...

A B indicé

x y

ne sont pas coupé ≠ abstraction

sinO

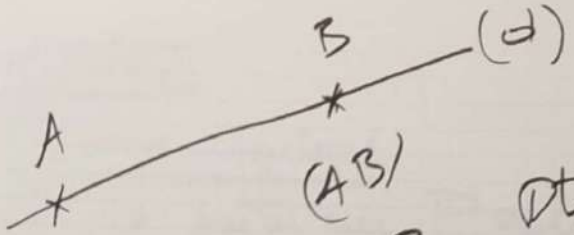
A noir

D : Ens alignés $(D_1)$ $(d)$ •

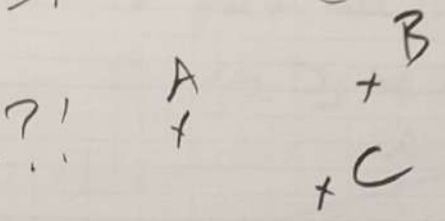
2 pts distincts A et B •

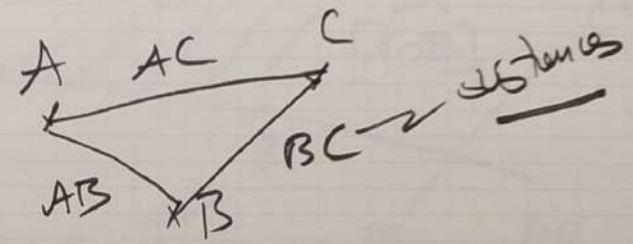
définissent une D ou D

(AB)




Pts alignés ?




$AC = 10$

$AB = 3$

$BC = 4$

ce possible ?

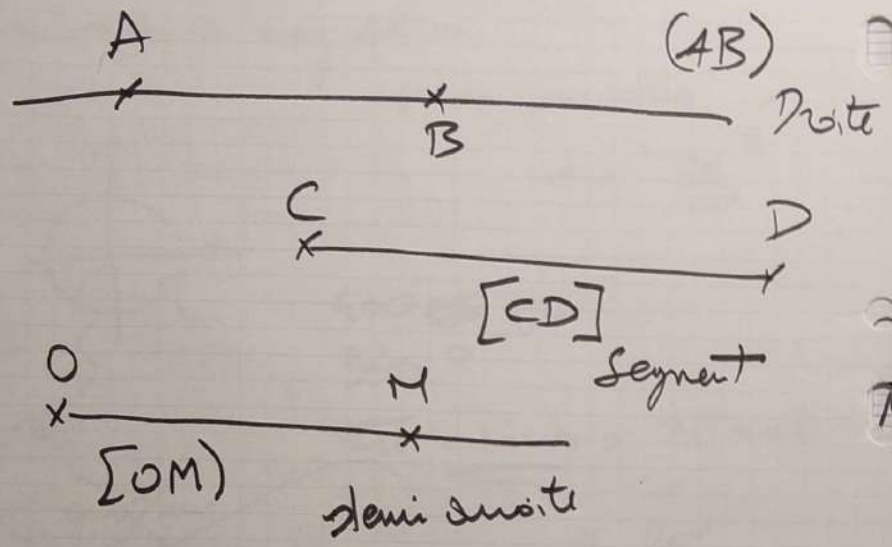
trajet avec D le + court

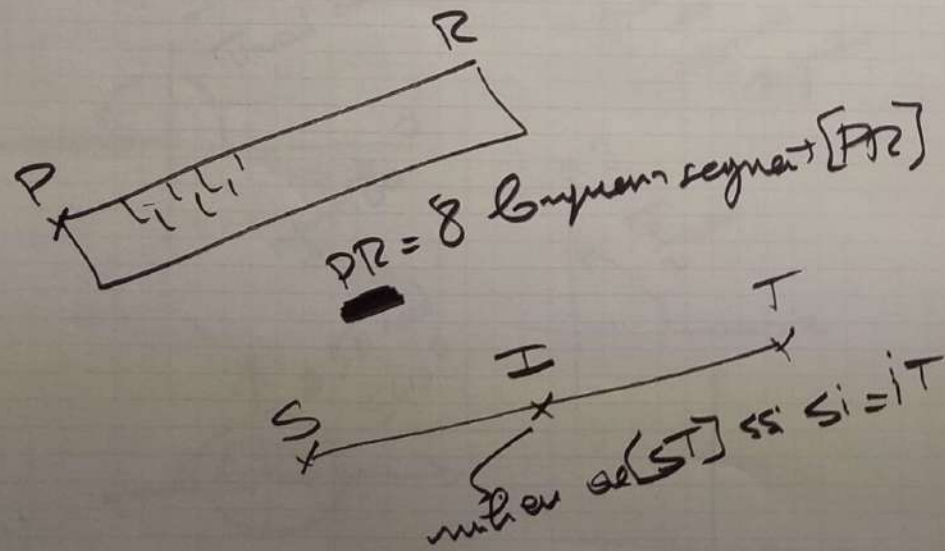
inégalité triangulaire

$AC \leq AB + BC$

ABC alignés ssi $AC = AB + BC$

# Segments, demi droite, longueur

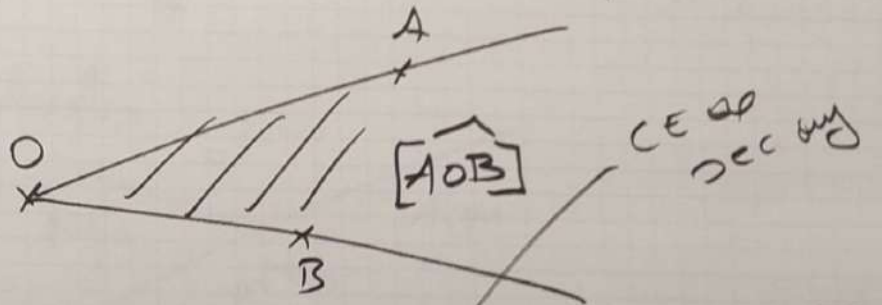



# Angles

## Secteur angulaire

C'est une partie du Plan limitée par 2 1/2 Ds de même origine




l'Angle $\widehat{AOB}$ est l'ensemble des secteurs angulaires associés à $[\widehat{AOB}]$

## Mesure d'un angle

est un nbre suivi d'une unité

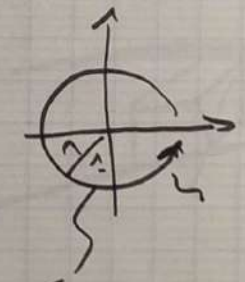
Chaque unité donne une valeur particulière de cet angle (ton cours)

on procède ensuite par proportionnalité

Mesure

Chaque unité donne une mesure arbitraire de la mesure d'un plein

et on prend la $\alpha^e$

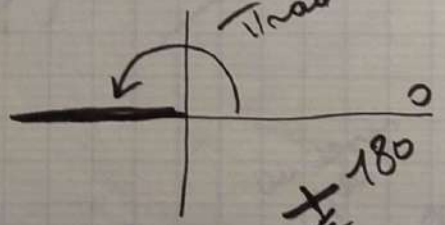


400 gr
360°

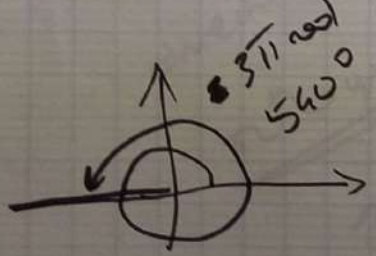
$2\pi$ radians = $2\pi$ rad

arbitraire

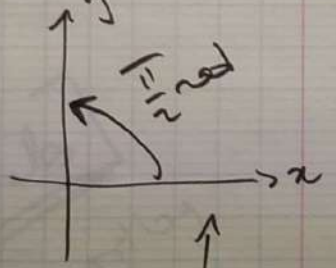
$\pi$ rad ou 180°



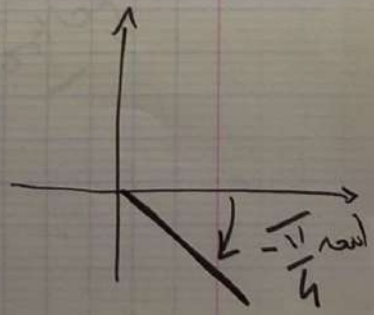
$\pm$ 180°



$\frac{3\pi}{2}$ rad
540°



$\frac{\pi}{2}$ rad

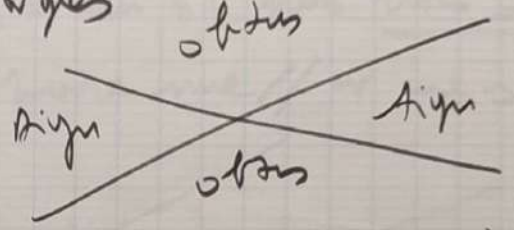


$-\frac{\pi}{4}$ rad

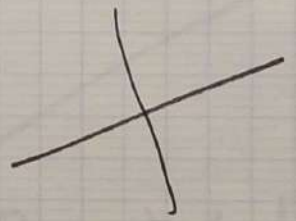
peut être donné un signe

| Rad | $\pi$ | $\frac{\pi}{3}$ | $\frac{\pi}{6}$ | $\frac{3\pi}{4}$ | $\frac{\pi}{180}$ | 1 | $\frac{37\pi}{180}$ |
|---|---|---|---|---|---|---|---|
| 0 | 180 | 60 | 30 | 135 | 1 | $\frac{180}{\pi}$ | 37 |

Angles

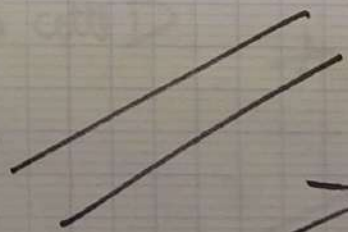



Droit

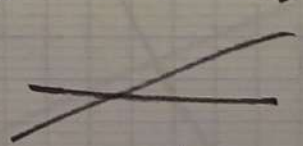


Position relative de 2 Droites

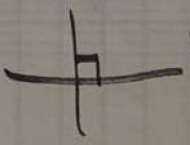
parallèles



sécantes

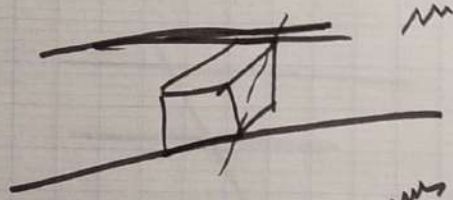


perpendiculaires



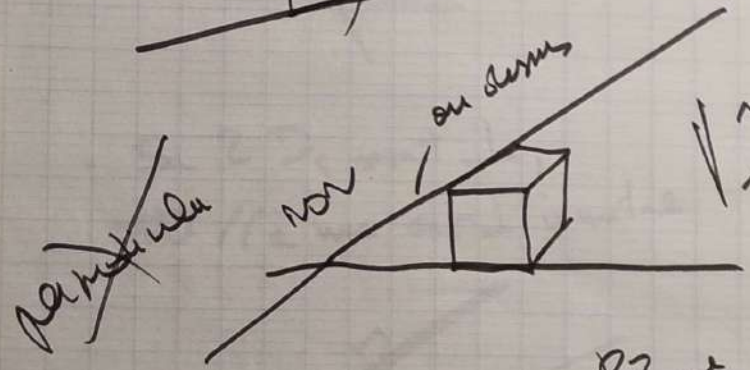
Espace

## Position Relative de 2 Ds

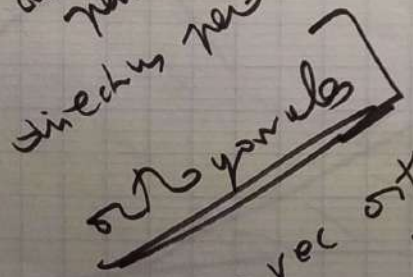


Un plan

Parallèles




// ne se coupent pas mais ne sont pas parallèles




GE

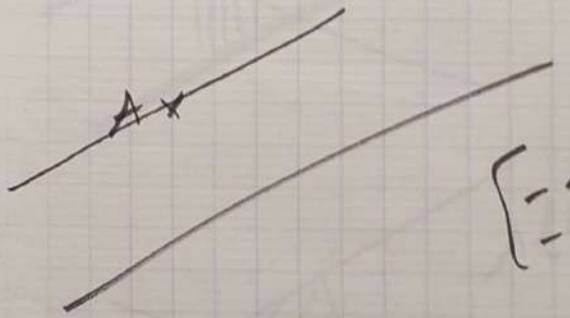
Euclide -300 BC

- Par 2 pts distincts passe 1 D et une seule

- Axiome ~~de~~ Euclide :

Par un pt pas sur une D

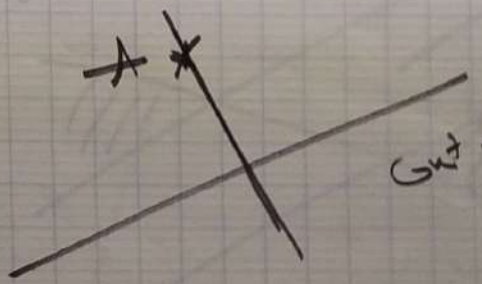
passe une // et une seule à cette D



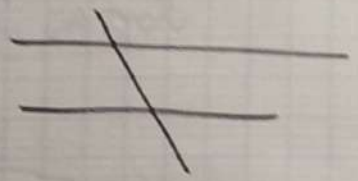

[- pas de sécantes
-

- Par un pt pas sur cette D

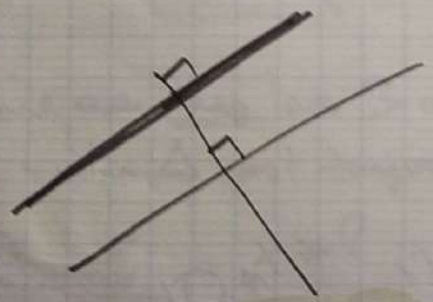
on ne peut mener qu'une perpendiculaire à cette D



- Si 2 Ds sont //,
tte sécante à l'une est sécante à autre



- Si 2 Ds sont ⊥,
tte // à une est ⊥ à autre



qui a un sup à tout angle

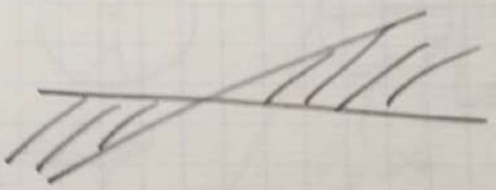
C=

Adjacents

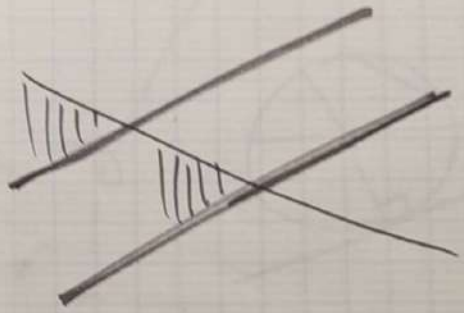
ANGLES

Origine en Gmm

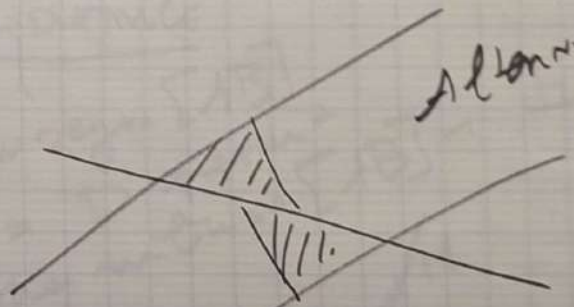
→ 1 1/2 D en Gmm



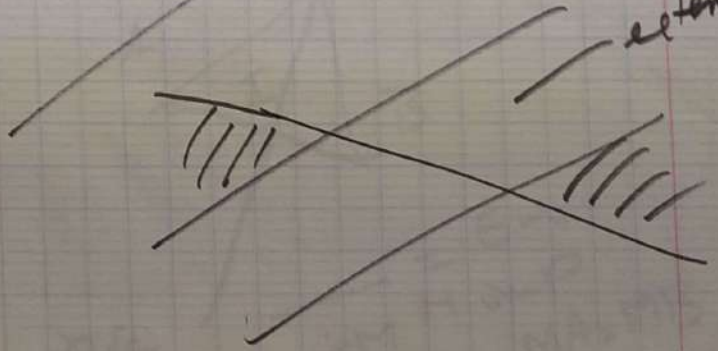
opposés par sommet



correspondants



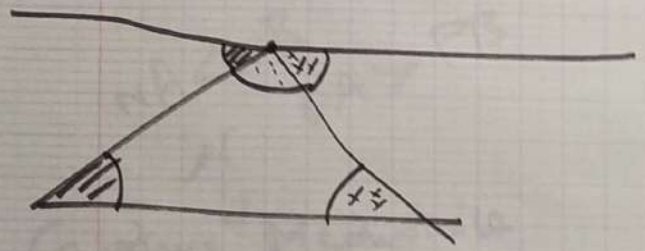
alternes-internes



alternes

les ang cor ou alt-i
ou —
sont = ssi Dr sont //

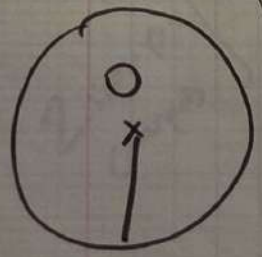
APPLICATION



SP

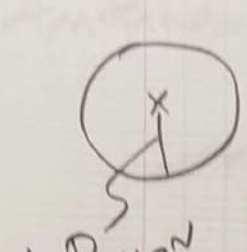
Somme des mes des 3 ang
d'un Δ est toujours = 180°

CERCLE

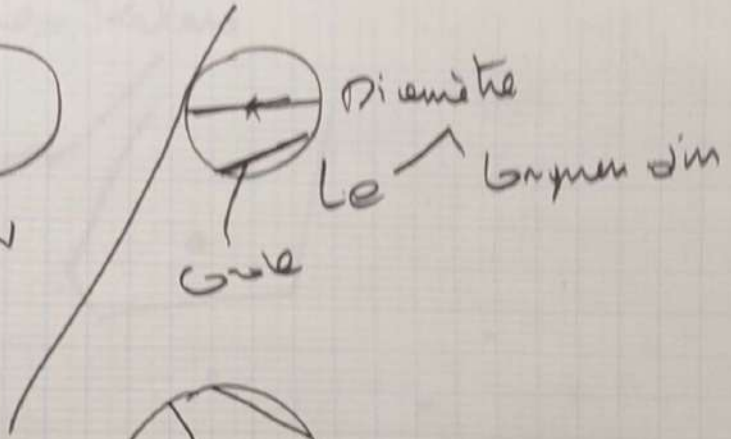


O
x

O ∈ P
r = dist O à M ∈ ℝ+
Centre O
r ∈ ℝ+
Ensemble des M
de P tq OM = r
distance



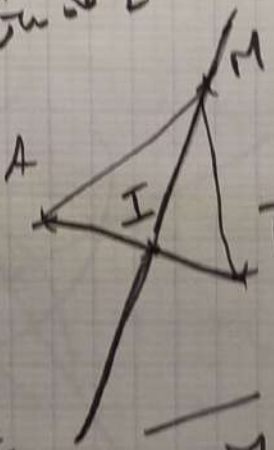
1 Rayon



Diamètre
le ^ bagnon dim
Corde
tg

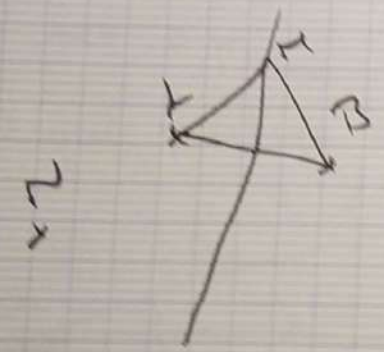
MÉDIATRICE

du segm [AB]
= D passant
par milieu de [AB] ⊥ à (AB)



M
A
I
B

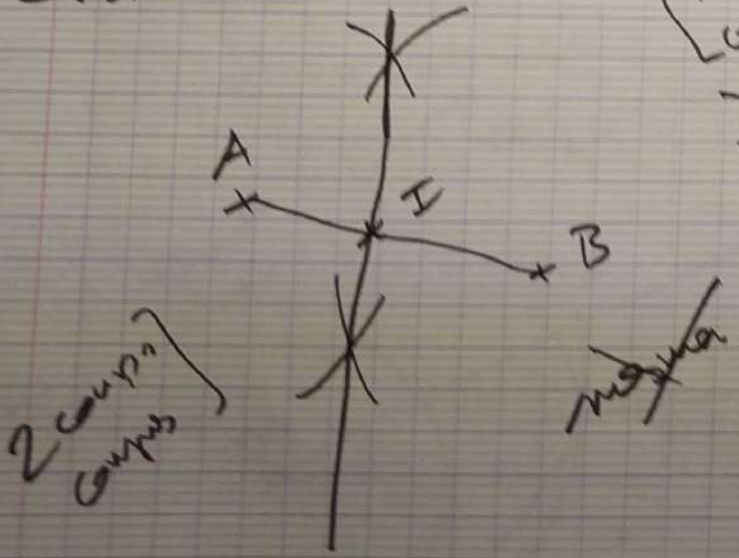
Déf = Ens
des M de P
tq MA = MB
ssi MA = MB




2 parties

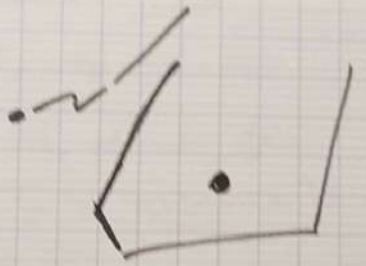
$NA < NB$ ⇒ $PA > PB$

⇒ Système Méditrice




2 cercles

Antennes Relais

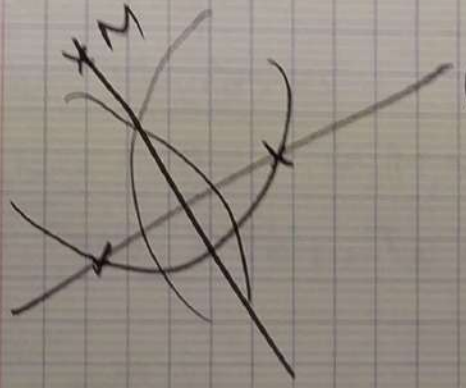


Réseau

Deux voitures

Exercice

Comment construire le ⊥ à une D(d) passant par un pt M donné ?

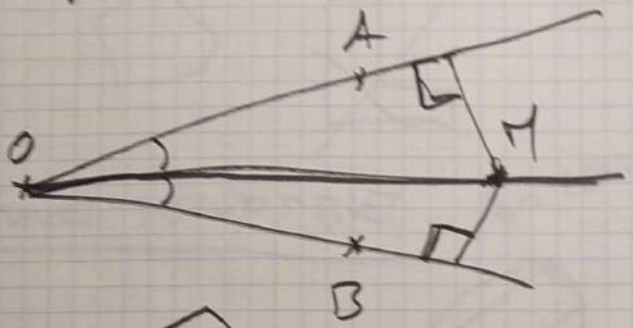



Action

## Bissectrice

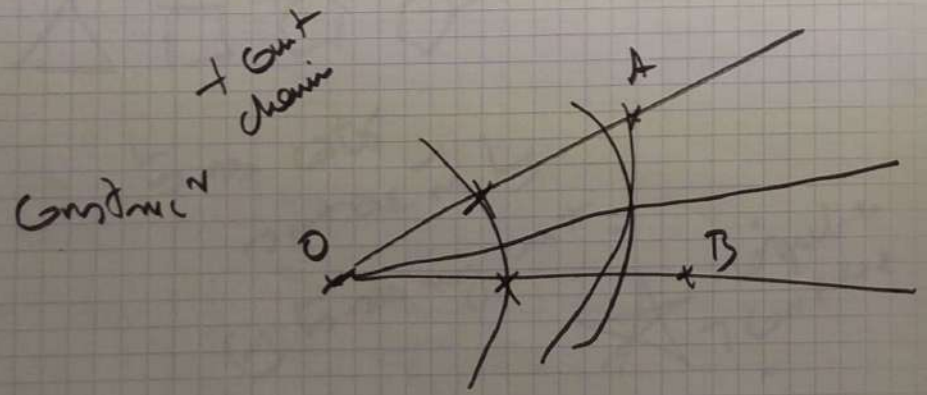
d'un sec ang

= D qui partage ce ang en 2 ang égaux




Bis de ang $\widehat{AOB}$

= E pts M du plan situés à égale distance de [OA) et [OB)



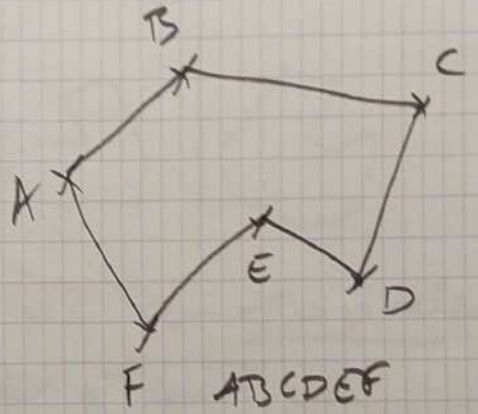

## Polygones ang

fig planes fermées

Constitués 1 nb fini

pts = sommets

reliés par segments nommés côté




ABCDEF

6 côté hexagone

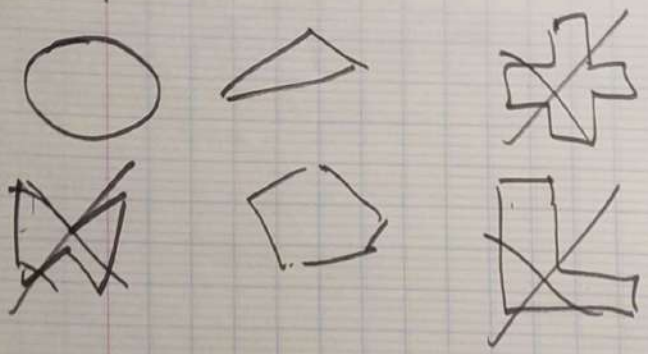
## Figures convexes

fig plane / ∀ (M,N) pts ds intérieur

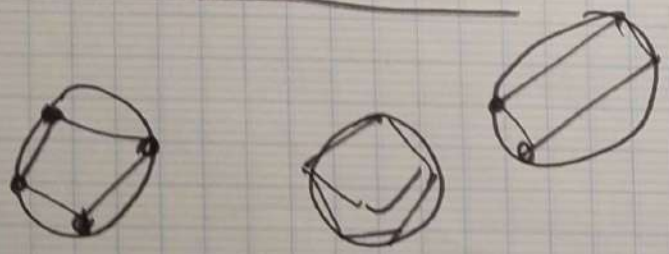
[MN] entièrement ds intérieur figure

Le dernier polygone

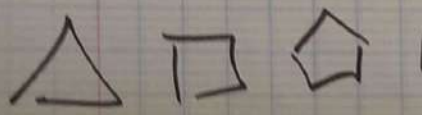
partie de ~~l'~~ espace



POLYGONES INSCRIPTIBLES de cercle



régulier



convexe si

tous ses côtés sont de même Ls

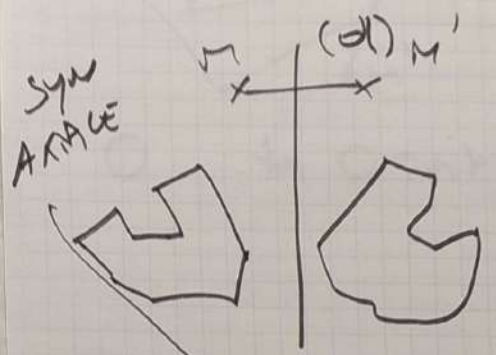
et tous ses ang sont =

régulier + convexe croisés

polyg régulier ss:

- tous ses côtés sont de même Ls
- il est inscriptible

TRANSF° DU PLAN:




conserve Ls angs

?

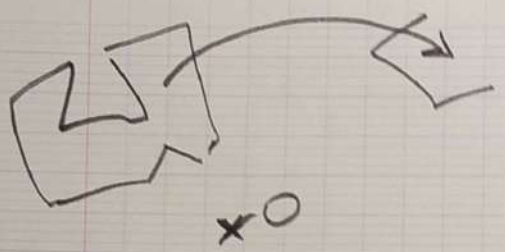
(d) ⊥ droite d'axe (d)

et ∃! M' qui

M ⟼ M' ~~ssi~~

ssi (d) est médiatrice [MM']

RotN



Gnnnn
ang

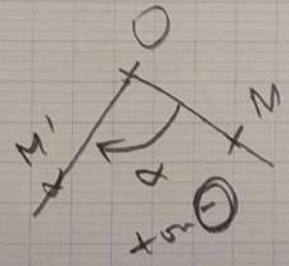
O pt
α ang

Rot centre O ∠ ang α

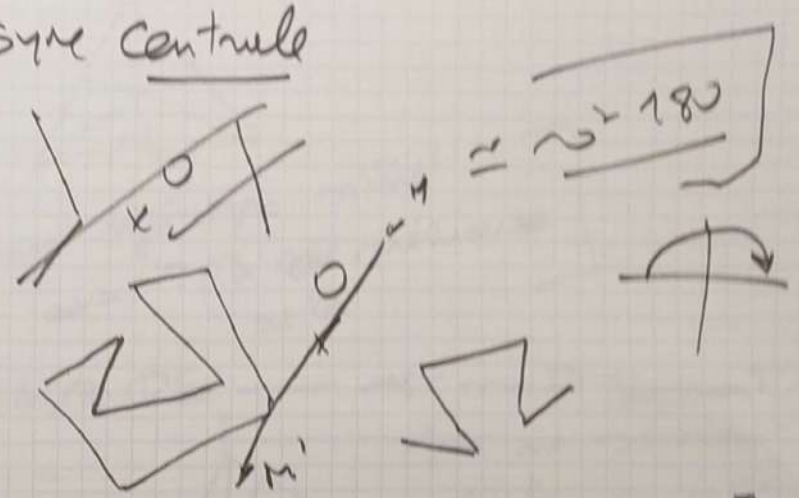
$\varphi : M \longmapsto M'$

tq $OM = OM'$

et $\widehat{MOM'} = \alpha$



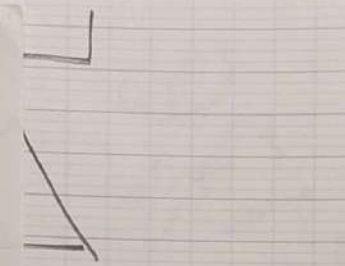

Sym centrale

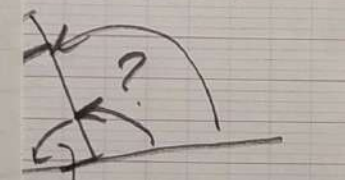



O tq O milieu de $[MM']$

TRIANGLES ← GE2

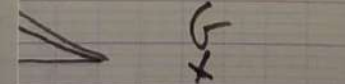
fig plane obtenue reliant
3 ou 5 par segments
" sommets "



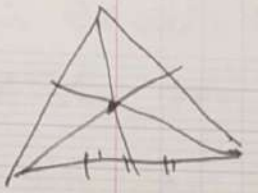



somme angles

G centre gravité

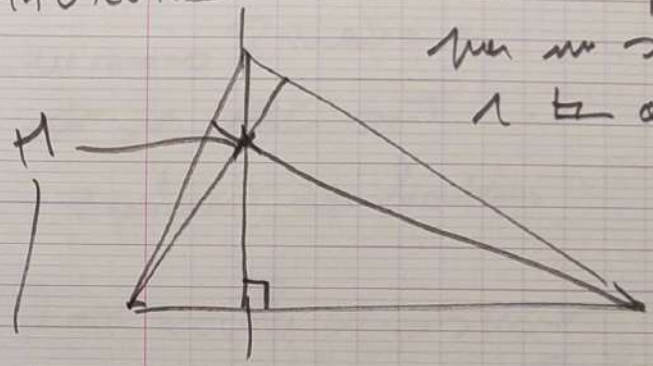


2 TRIANGLES



Bonus : tjs situé
entre 2/3 médiane
de la

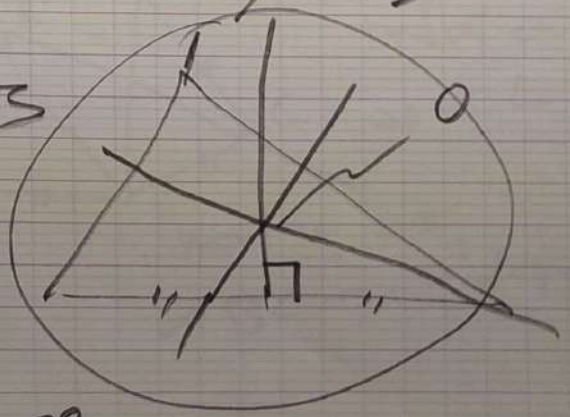
HAUTEURS — droite passant par un sommet ⊥ au côté opposé



orthocentre
↑ mieux à retenir

MEDIATRICES

tgt cercle circonscrit

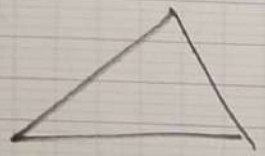



BONUS
G, H, O
Alignés
D'EULER

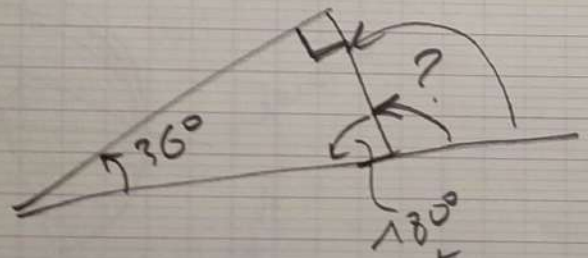
# TRIANGLES ← GE2

fig plane obtenue reliant 3 ni 5 "sommets" par segments "côtés"

Somme des mesures des 3 ang d'un △ = 180°

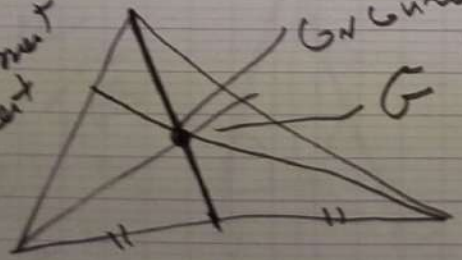


Tracé EXO




MÉDIANES

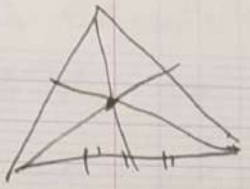
D qui passe par un sommet et le milieu du côté opposé



Gravitation G

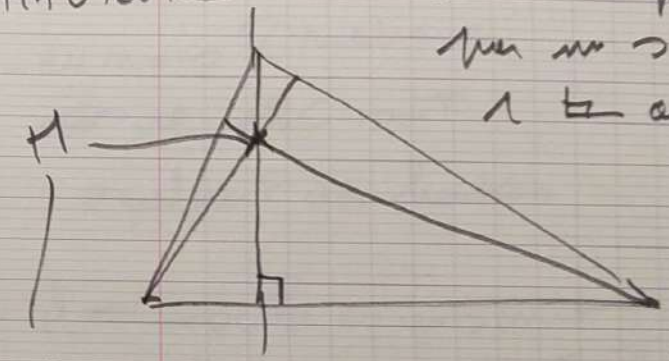
G centre de gravité

+ rencontre médianes



Bons : tjs situé aux 2/3 de la médiane

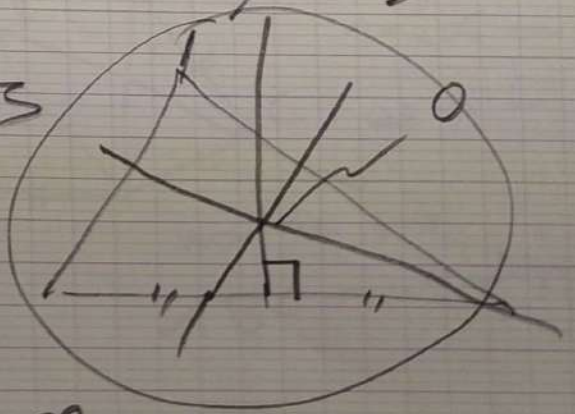
HAUTEURS — droite qui passe par un sommet et est ⊥ au côté opposé




orthocentre = milieu d'extrémités

MÉDIATRICES

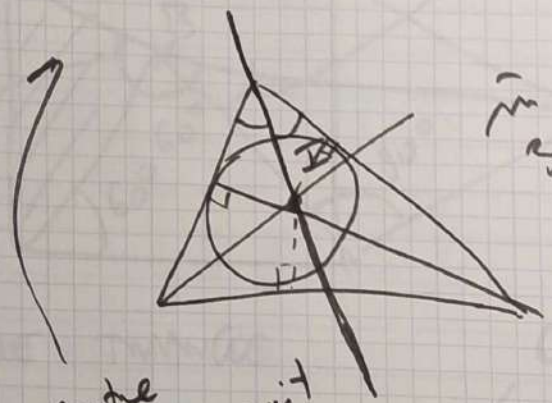
+ pt centre circonscrit




BONUS

G, H, O alignés D'EULER

# Bissectrices



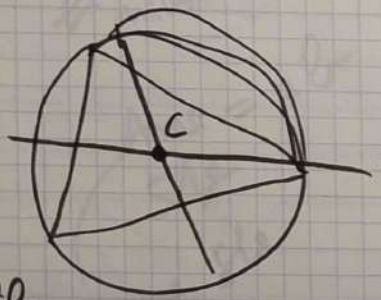
même sens
3 bissectrices

Pt rencontre
de 3 cercle inscrit

4 pts
~~distincts~~ 3
même

EXO Comment construire ⊙ 1 cercle donné ?

règle pointeur
compas



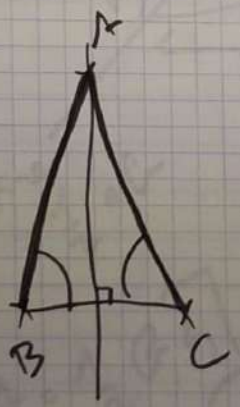
médiatrice

△ tracé
en A

ssi $AB = AC$

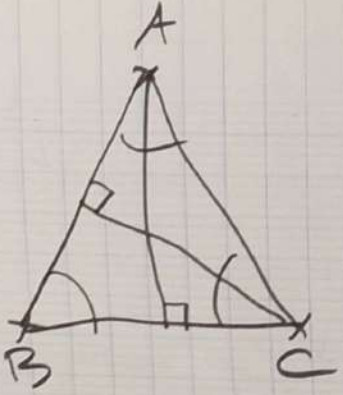
- $\widehat{ABC} = \widehat{ACB}$

- médiane
issue de A
or $\frac{1}{2}[BC]$



△ équilatéral
ABC ssi

- $AB = AC = BC$

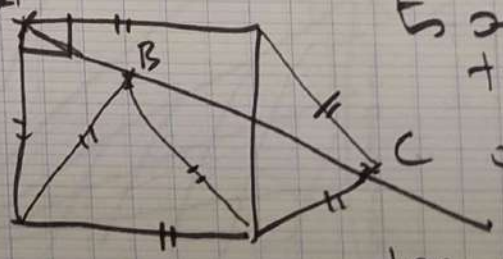


- $\widehat{ABC} = \widehat{ACB} = \widehat{BAC}$

- au moins 2 médianes
de ABC sont
également des hauteurs

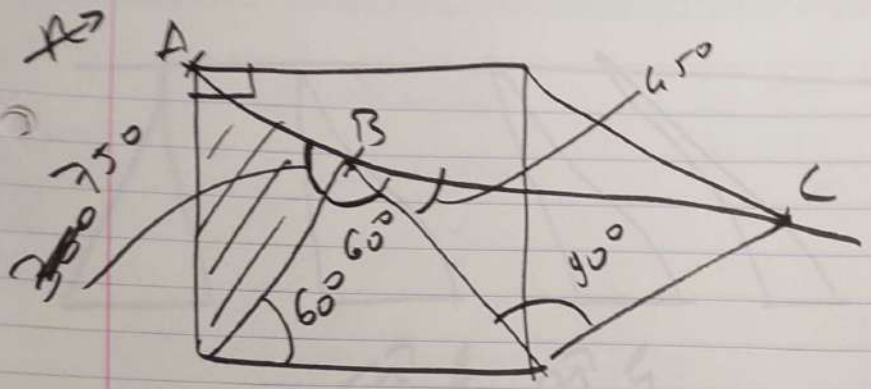
- il est isocèle en ses sont
sont aux même 60°

EXO

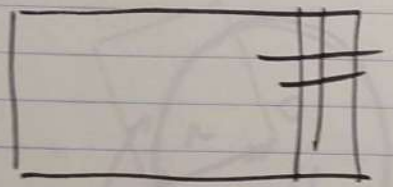


5 segments
tracés sont
de même L

montrer que
ABC sont alignés




AIRE TRIANGLE




C

$a \times b$

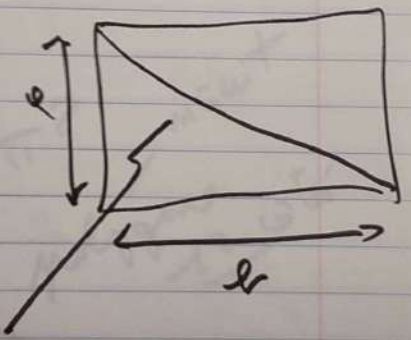
$5 \times 3 = 3 \times 5$

numération

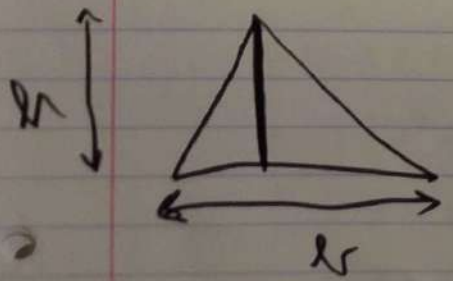
Aire = $ab$

Si $b$

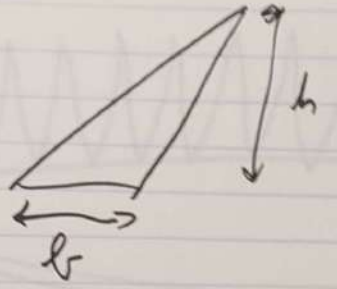
même $ab$

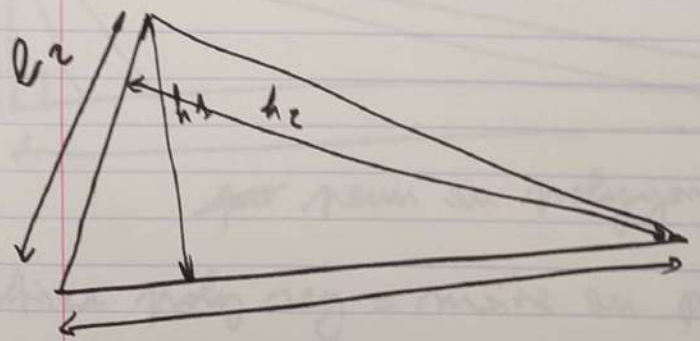



Aire = $\frac{1}{2} ab$

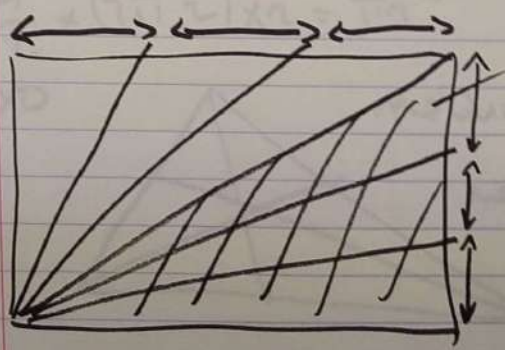



$A = \frac{1}{2} bh$

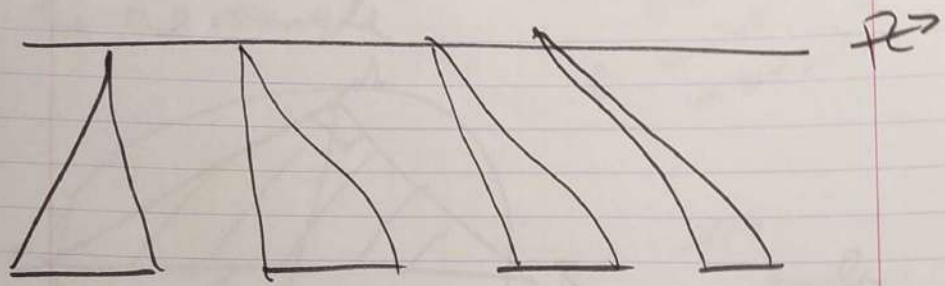



$b_1 h_1 = b_2 h_2$



$= \frac{1/2}{1/2}$



$\vec{m}$ & $\vec{m}$

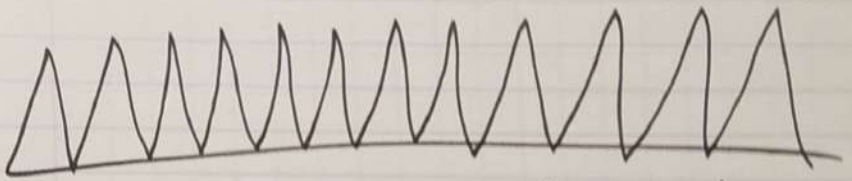
Retour au cercle


Périm $= 2\pi r$

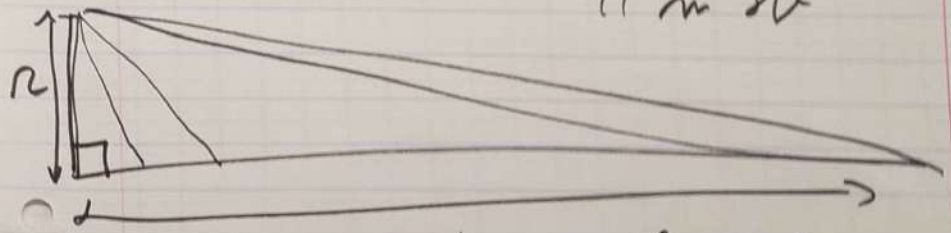
Aire $= \pi r^2$

Pourquoi l'on le $\vec{m}$ $\pi$ ?

suit / polygone 12 côté



11 $\vec{m}$ $\vec{s}$



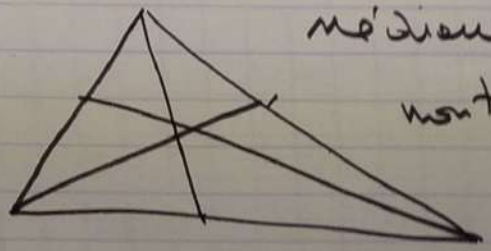

périm en polygone

Aire polygone = moitié du produit de son périmètre par sa

~~hauteur~~ apothème

$\frac{1}{2} \times (2\pi r) \times r = \pi r^2$

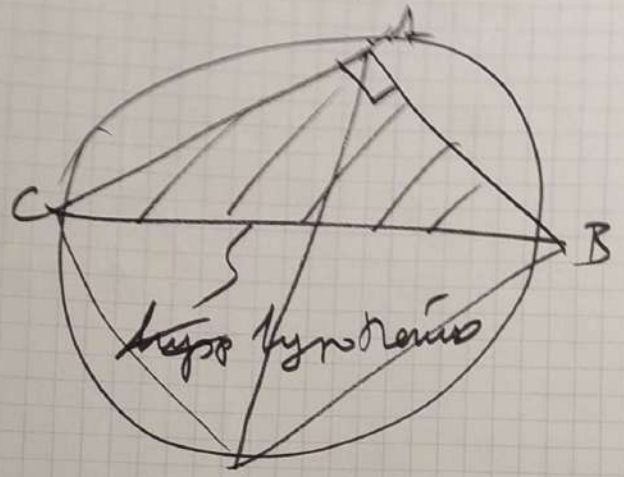
EXO



médiane

montrer que G $\vec{m}$ A

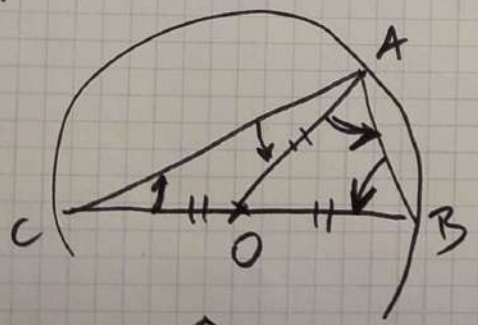
Δ rectangle




où
C sur
ou sur ?

1/2
rectangle

Montrons que Δ ABC est rectangle




$\widehat{CAB} = \widehat{CAO} + \widehat{OAB}$

$= \widehat{OCA} + \widehat{ABO}$

$= 180° - \widehat{CAB}$

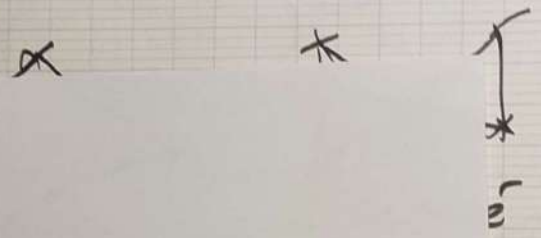
$2\widehat{CAB} = 180°$

$\widehat{CAB} = 90°$

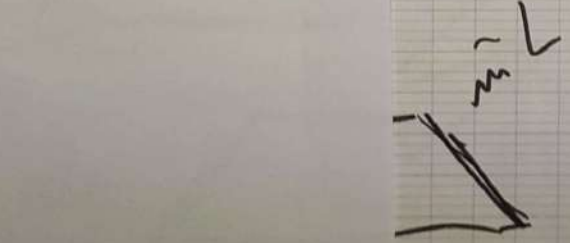
T Thalès
plusieurs
ouvrir

QUADRILATÈRE

= polygone à 4 côtés

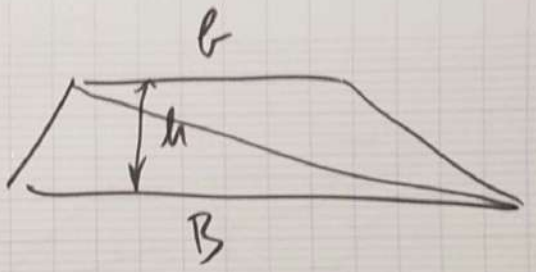


côtés opposés



3 QUADRILATÈRES

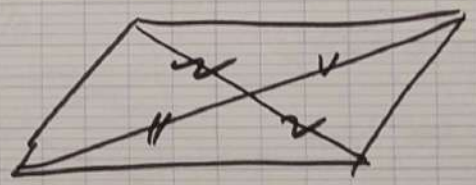
droit



$\frac{1}{2} B \times h$ $\frac{1}{2} b \times h$

$A = \frac{1}{2} (B + b) \times h$

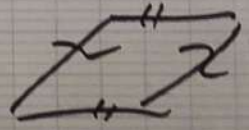
Parallélogramme



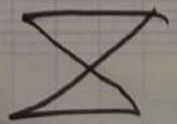
côtés opposés //

ssi ils ont même milieu

quadrilatère croisé

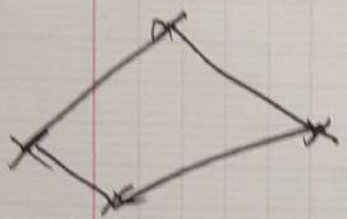


ssi côtés opposés ont même longueur



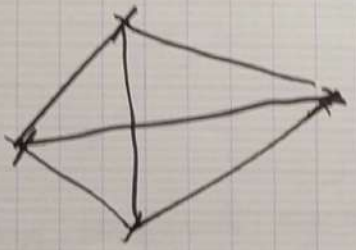
QUADRILATÈRE

= polygone à 4 côtés



convexe

croisé

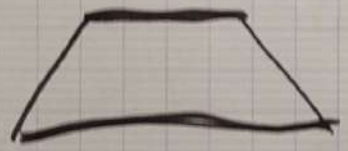


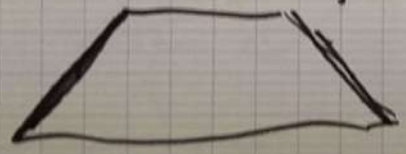
diagonales

sommets opposés

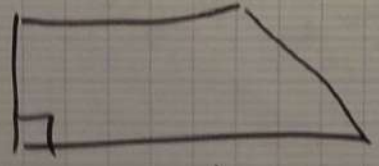
Trapèze

2 côtés //

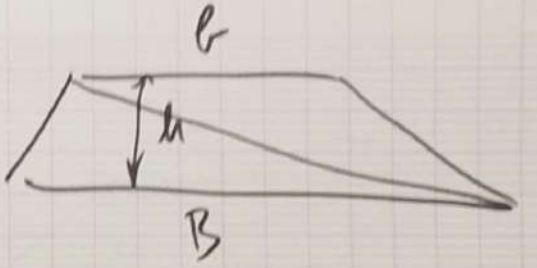




isocèle



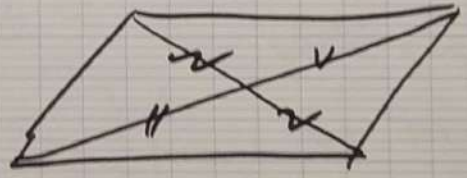
Droit



$\frac{1}{2} B \times h$ $\frac{1}{2} b \times h$

$A = \frac{1}{2}(B+b) \times h$

Parallélogramme

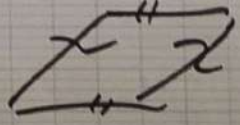


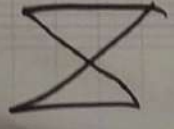
côtés opposés //

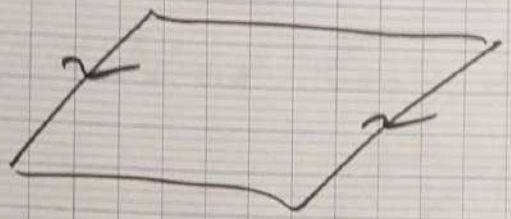
ssi diagonales ont même milieu

quadrilatère avec un pt

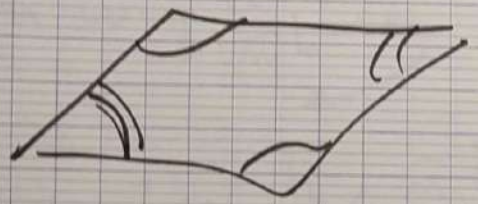
ssi côtés opposés sont 2 à 2 de même Lg





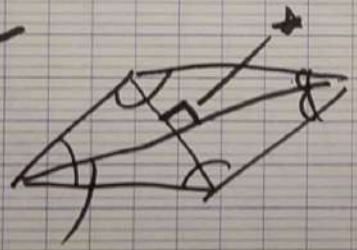


opposés //
même L

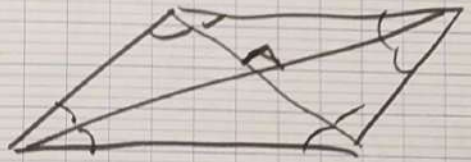


ang opposés égaux
4 côtés

Losange
parallélogramme
mêmes 4 côtés même L



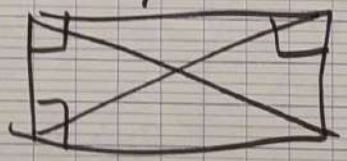
sont bissectrices des angles



un parallélog sont diag sont ⊥ entre eux losange

mêmes 2 côtés consec même L = losange

Rectangle



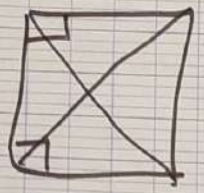
quadrilatère dont ang - 3 ang sont droits

mêmes diag même L

un des ▱ donc rectangle avec 2 côtés ⊥ entre eux

Carré

quadrilatère $\cos(+)$ roc



par diag $\perp$ $\overline{m}$ L rec +

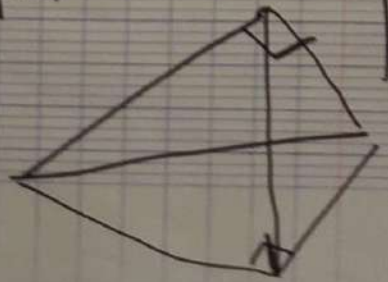
par 2 cot $\perp$ $\wedge$ $\overline{m}$ L carré

Inscription

Dessiner quadrilatère ~~#~~ ayant 3 fois

- 2 paire cot $\perp$
- $\overline{m}$ L
- diag $\perp$

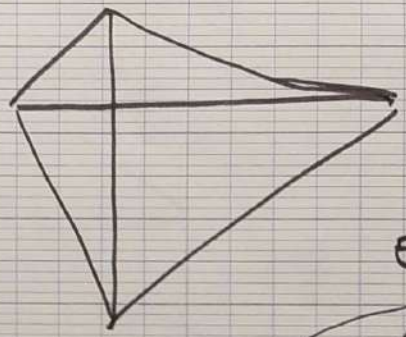
pas ne sont pas un carré !!!



complet

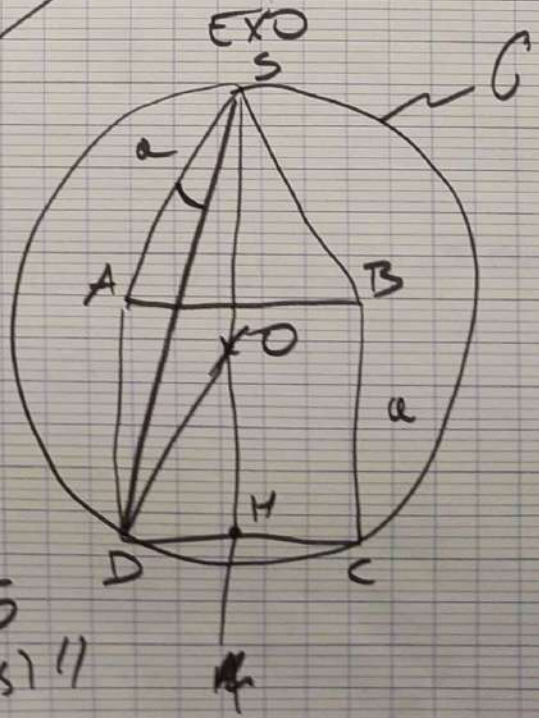
Dessiner quad ~~carré~~ à la fois

- 2 cot //
- diag $\overline{m}$ L
- $\perp$



triangle 2 cot $\overline{m}$ L

EXO




$\perp$ (DC)

calculer $\widehat{ASD}$ même

déduire que (SD) bissectrice de $\widehat{ASO}$

(OO) (AS) //

SOAH les mêmes 2 cachés

Ts clas

T Pythagore

Calcul d'une 2ème longueur

$(a+b)^2 = 2ab + c^2$

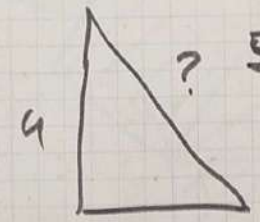
$^2 = c^2$

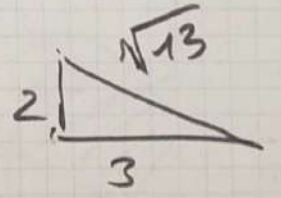
, son carré
= carré hypo

car de 2

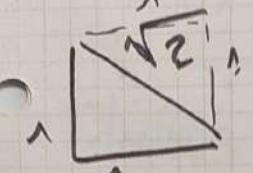
rec

( ) numérique

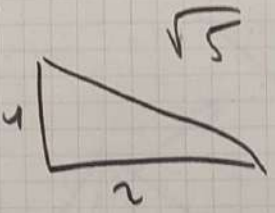


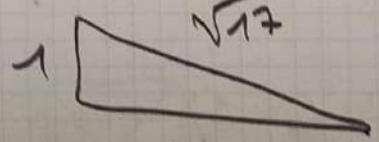

$-\sqrt{13}$



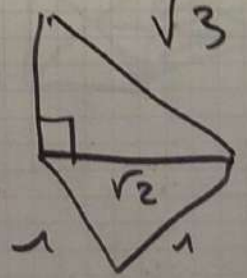

fractions




Comment construire segment de mesure $\sqrt{17}$ ?



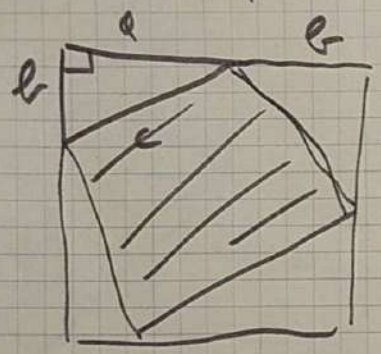

$\sqrt{3}$ ?




4 T classiques

Ts clas

T Pythagore




Calcul d'aire 2 façons ≠

$(a+b)^2 = 2ab + c^2$

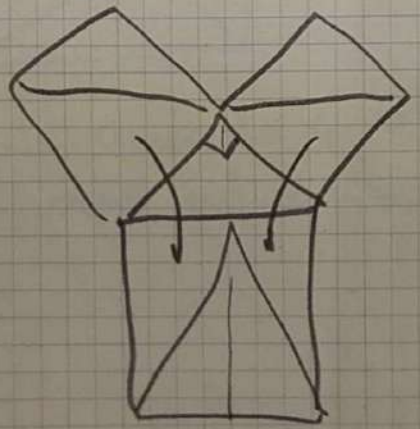
$a^2 + b^2 = c^2$

~~Sans~~

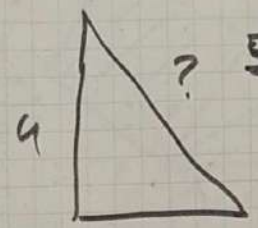
Si Δ rec, somme carrés 2 côtés = carré hypo

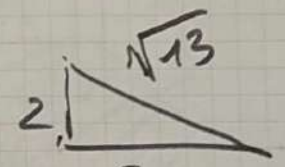
Réc : Si un Δ, si somme carrés de 2 côté = carré 3ème alors rec

Preuve visuelle



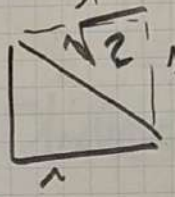
( ) numérique

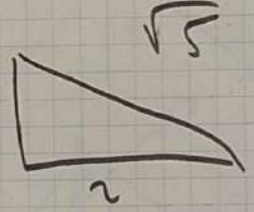


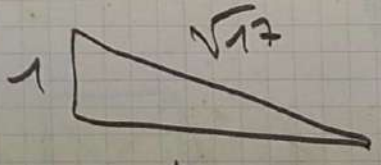

$-\sqrt{13}$

fractions

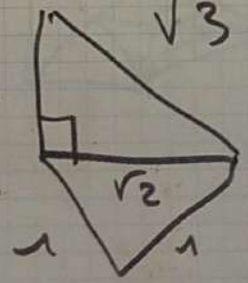



Comment construire segment de mesure $\sqrt{17}$ ?

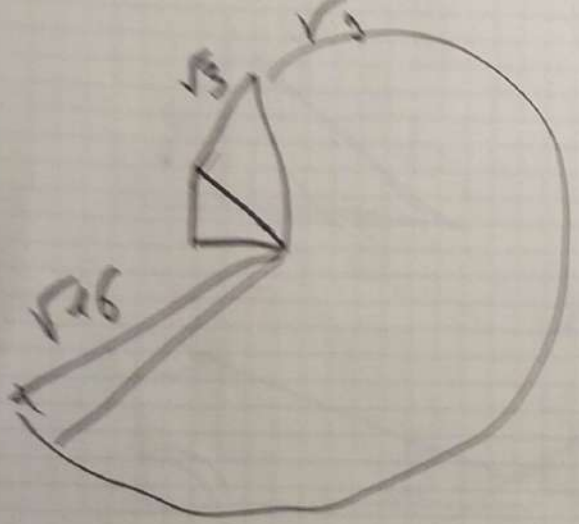



$\sqrt{3}$ ?

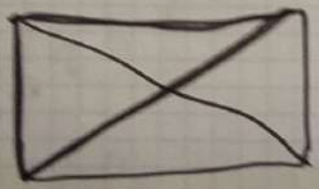


Rèdo $k$, $k^2$, $k^3$

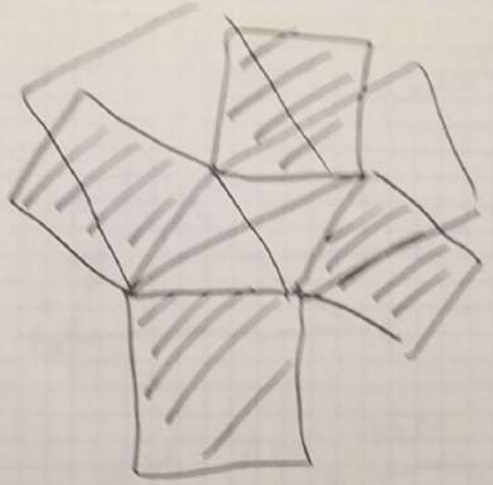
Exercice Pythagore




T parallélogramme



Somme carrés de 4 côtés 1
= somme carrés de ses diag

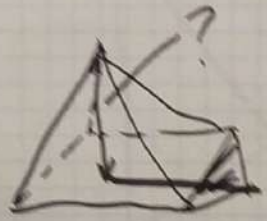


Thalès 365 + 1/4

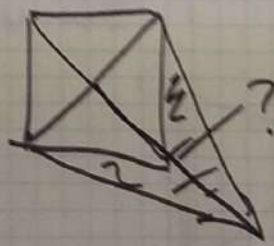
12 h

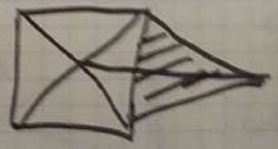
reproduction

366 jours



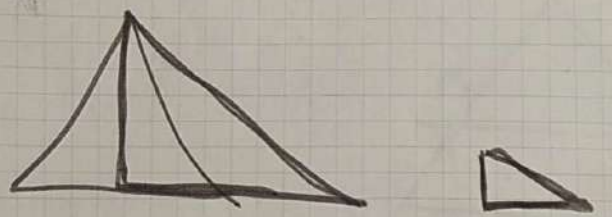

nombre de Pyt premier



Pyr

Pas vraiment T qui porte son nom

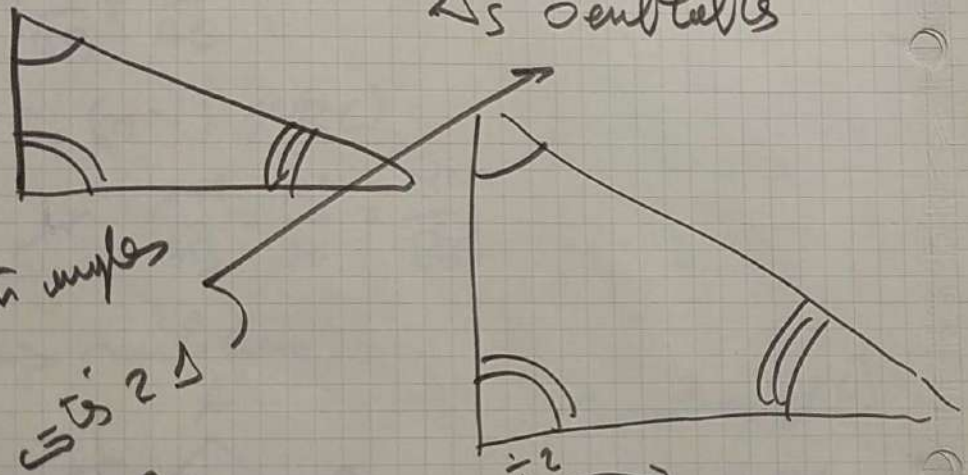




normal é

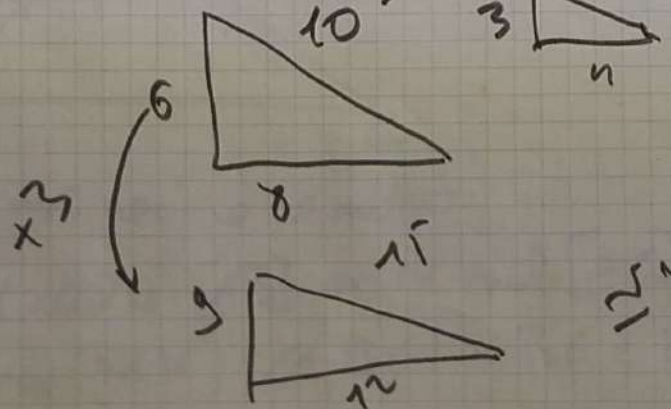
α ≠

Δs semblables



3 mêmes angles

⇒ les 2 Δ ont des côtés proportionnels



÷2

10 → 5

3 → 1

6 → 8

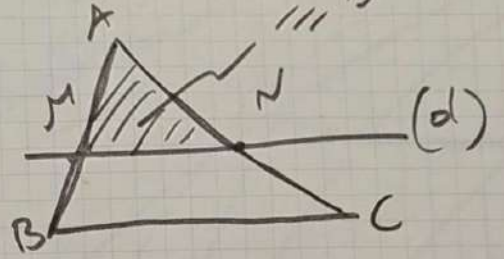
×3

9 → 12

15

Réciproque

T Thalès



A

M

N

(d)

B

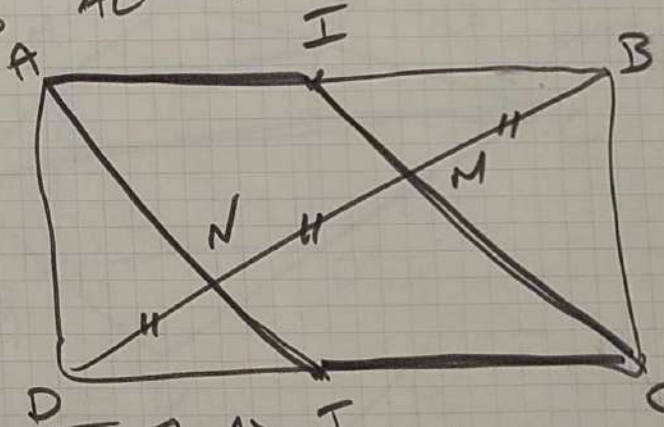
C

// réciproque

2 Δs

$\frac{AM}{AB} = \frac{AN}{AC} = \frac{MN}{BC}$

EXO



A

I

B

M

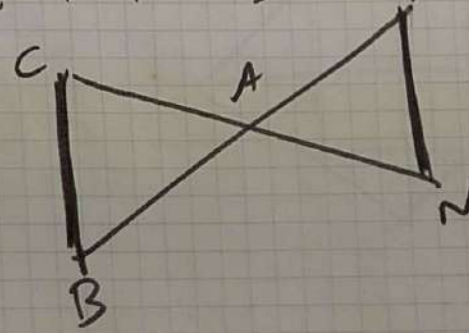
N

D

J

C

Variante T Thalès



C

A

M

N

B

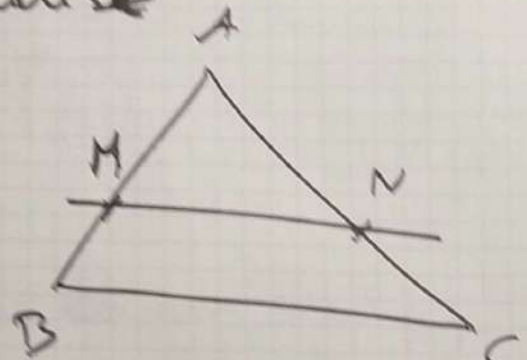
Si (MN) // (BC)

alors

$\frac{AM}{AB} = \frac{AN}{AC} = \frac{MN}{BC}$

Règle $k, k^2, k^3$ ... Vol

Rec T Thalès

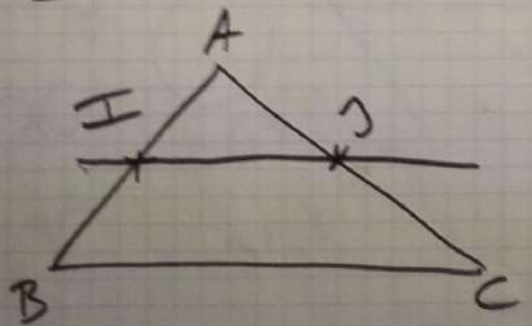



Si $\frac{AM}{AB} = \frac{AN}{AC}$

Alors $(MN) \parallel (BC)$

et $\frac{AM}{AB} = \frac{AN}{AC} = \frac{MN}{BC}$

Tes milieux




J milieu $[AC]$

$IJ = \frac{1}{2} BC$

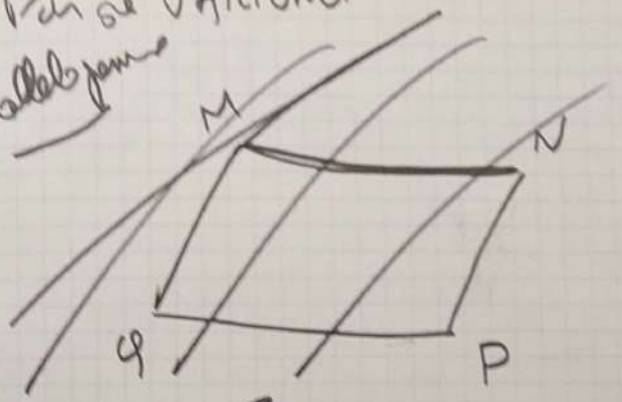
Trivial or rec ce résultat

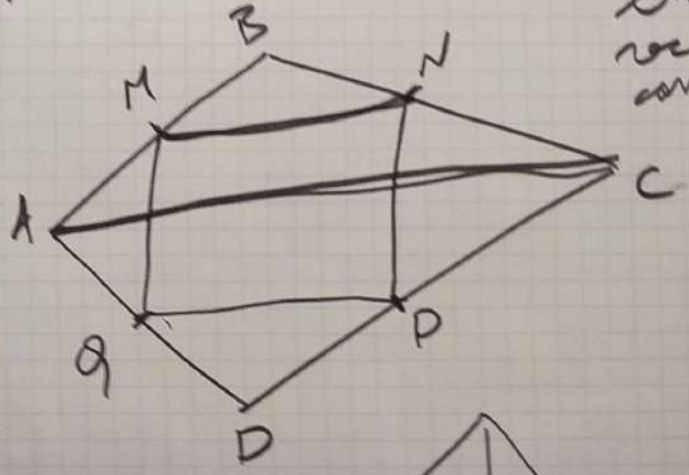
Si M milieu $[AB]$ et N mil $[AC]$

Alors $(MN) \parallel (BC)$ et $BC = 2MN$

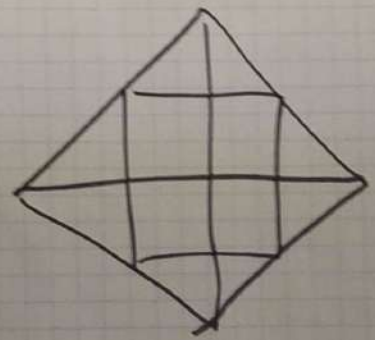
Par la VARIGNON

Parallélogramme

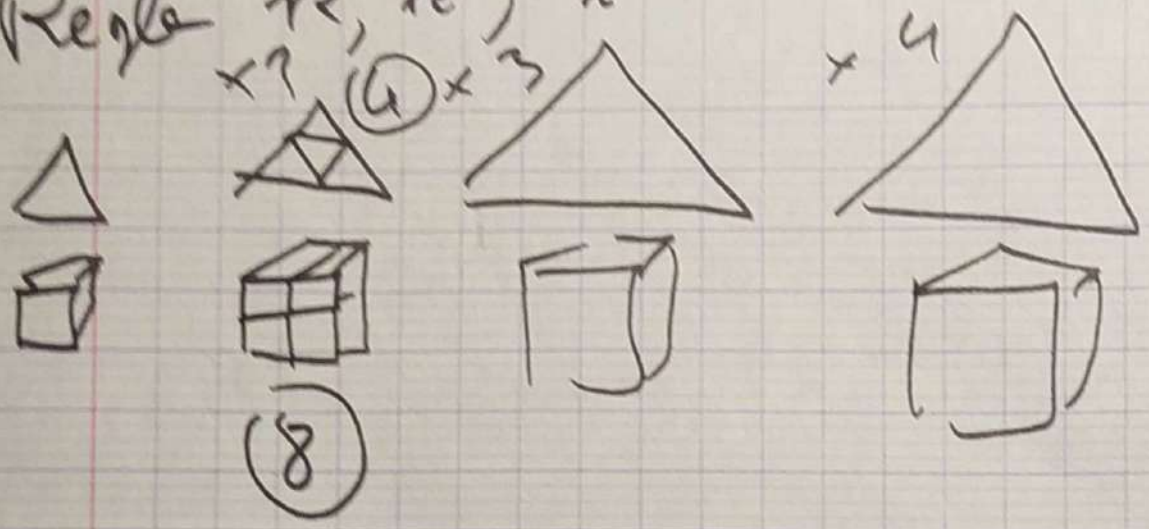



bon ? ne sont ?



Règle $k, k^2, k^3$




Si on multiplie les aires d'une fig (plane) par un nb $k$, alors le ou volume

Alors son Aire est multiplié par $k^2$

— Vol — $k^3$