Distante

- *Distanta dintre doua puncte*

Distanta dintre doua puncte este segmentul de dreapta ce uneste cele doua puncte.

- *Distanta de la un punct la o dreapta*

Distanta de la un punct la o dreapta este lungimea perpendicularei duse din acest punct pe dreapta data.

- *Distanta de la un punct la un plan*

Prin distanta de la un punct M la un plan α, intelegem lungimea MN, unde $N \in \alpha$ este piciorul perpendicularei duse din M pe α.

- *Distanta dintre doua drepte paralele*

Distanta dintre doua drepte paralele este distanta de la un punct de pe una din drepte la cealalta drepta.

- *Distanta dintre doua plane paralele*

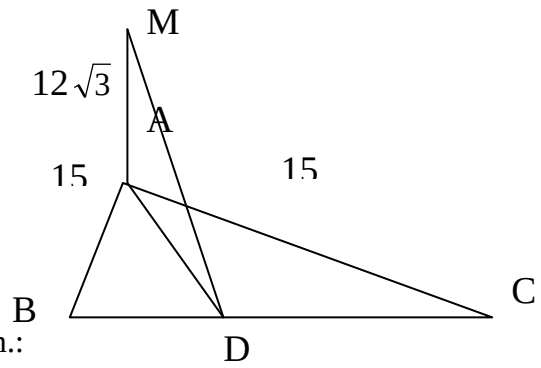
Distanta dintre doua plane paralele este distanta de la un punct dintr-un plan la celalalt plan.

- ✓ **Observatie: Pentru calcularea distantei de la un punct la o dreapta construim perpendiculara din acel punct pe acea drepta si cautam un triunghi eventual dreptunghic in care aceasta distanta sa fie o latura sau linie importanta.**
- ✓ Observatie(2): Segmentul cel mai scurt de la un punct exterior unui plan la acel plan este segmentul perpendicular pe planul dat.

Aplicatii

1)

Ip.	ΔABC isoscel AB=AC=15cm, BC=18cm $AM\perp(ABC)$, $AM=12\sqrt{3}$
C.	dist.(M, BC)=?



Dem.:

Ducem $AD\perp BC$, $D\in BC$

$AM\perp(ABC)$, $AD\perp BC$, $AD\subset(ABC)$, $BC\subset(ABC)$ } *T.3.⊥.* $\Rightarrow MD\perp BC \Rightarrow$ dist.(M,BC)=MD

ΔABC isoscel, AD inaltime } $\Rightarrow$ AD mediana $\Rightarrow BD\equiv DC$ } dar BC=18 $\Rightarrow BD=DC=9$

$AD\perp BC \Rightarrow \Delta ABD$ dreptunghic

$\Rightarrow AD^2=AB^2-BD^2$

$AD^2=225-81$

$AD^2=144$

$AD=12$

$AM\perp(ABC)$, $AD\subset(ABC)$ } $\Rightarrow AM\perp AD \Rightarrow \Delta MAD$ dreptunghic

$\Rightarrow MD^2=MA^2+AD^2$

$MD^2=144\cdot 3+144$

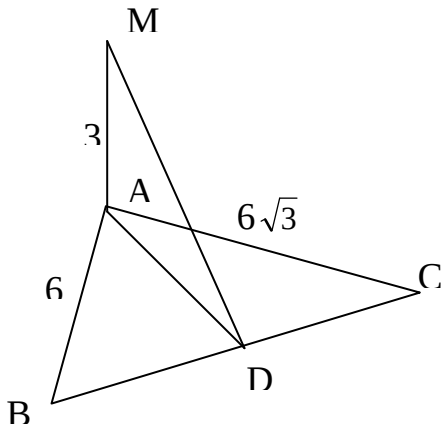
$MD^2=144\cdot 4$

$MD=24$

2)

Ip.	ΔABC dreptunghic($m(<A)=90°$) $AM\perp(ABC)$, AM=3cm AB=6cm, $AC=6\sqrt{3}$

C. dist.(M, BC)=?



Dem.:
Ducem $AD\perp BC$, $D\in BC$
$AM\perp(ABC)$
$AD\perp BC$ — *T.3.⊥.*
$AD\subset(ABC)$ $\Rightarrow MD\perp BC \Rightarrow$ dist.(M,BC)=MD
$BC\subset(ABC)$
$AM\perp(ABC)$ $\Rightarrow AM\perp AD \Rightarrow \Delta MAD$ dreptunghic
$AD\subset(ABC)$
ΔABC dreptunghic
$\Rightarrow BC^2=AB^2+AC^2$
$BC^2=36+108$
$BC^2=144$
$BC=12$

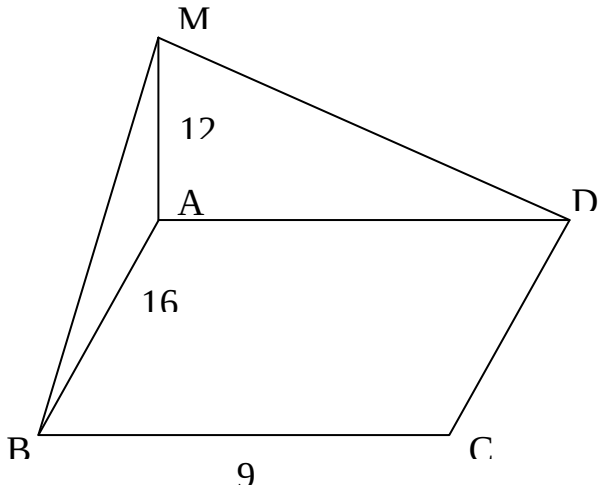
$AD\perp BC \Rightarrow$ AD inaltime, ΔABC dreptunghic $\Rightarrow AD=\frac{AB\cdot AC}{BC} \Rightarrow AD=\frac{6\cdot 6\sqrt{3}}{12}$

$\Rightarrow AD=3\sqrt{3}$
ΔMAD dreptunghic
$\Rightarrow MD^2=AM^2+AD^2$
$MD^2=9+27$
$MD^2=25$
$MD=5$

3)

Ip.	ABCD dreptunghi, AB=16cm, Bc=9cm AM⊥(ABC), AM=12cm
C.	dist.(M, AB)=?

dist.(M, BC)=?
dist.(M, CD)=?
dist.(M, AD)=?



Dem.:

$\left.\begin{array}{l} AM\perp(ABC) \\ AD\subset(ABC) \end{array}\right\} \Rightarrow MA\perp AD \Rightarrow$ dist.(M, AD)=AM=12

$\left.\begin{array}{l} AM\perp(ABC) \\ AB\subset(ABC) \end{array}\right\} \Rightarrow MA\perp AB \Rightarrow$ dist.(M, AB)=AM=12

$\left.\begin{array}{l} AM\perp(ABC) \\ AD\perp DC \\ AD\subset(ABC) \\ DC\subset(ABC) \end{array}\right.$ *T.3.⊥.* $\Rightarrow MD\perp DC \Rightarrow$ dist.(M, DC)=MD

$\left.\begin{array}{l} AM\perp(ABC) \\ AB\perp BC \\ AB\subset(ABC) \\ BC\subset(ABC) \end{array}\right.$ *T.3.⊥.* $\Rightarrow MB\perp BC \Rightarrow$ dist.(M, BC)=MB

$MA\perp AD \Rightarrow \Delta MAD$ dreptunghic $\Rightarrow MD^2=AM^2+AD^2$

$MD^2=144+81$

$MD^2=225$

$MD=15$

$MA\perp AB \Rightarrow \Delta MAB$ dreptunghic $\Rightarrow MB^2=AM^2+AB^2$

$MB^2=144+256$

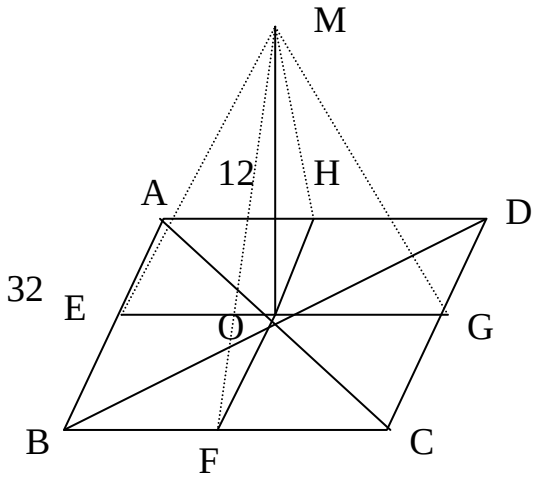
$MB^2=400$

$MB=20$

4)

Ip.	ABCD dreptunghi($AC\cap BD=\{O\}$), AB=32cm, BC=18cm $OM\perp(ABC)$, OM=12cm
C.	dist.(M, AB)=?

dist.(M, BC)=?
dist.(M, CD)=?
dist.(M, AD)=?



Dem.:

Ducem $OE\perp AB$, $E\in AB$
$OF\perp BC$, $F\in BC$
$OG\perp DC$, $G\in DC$
$OH\perp AD$, $H\in AD$

$OM\perp(ABC)$, $OE\perp AB$, $OE\subset(ABC)$, $AB\subset(ABC)$ $\Rightarrow$ *T.3.⊥* $\Rightarrow ME\perp AB \Rightarrow$ dist.(M, AB)=ME

$OM\perp(ABC)$, $OF\perp BC$, $OF\subset(ABC)$, $BC\subset(ABC)$ $\Rightarrow$ *T.3.⊥* $\Rightarrow MF\perp BC \Rightarrow$ dist.(M, BC)=MF

$OM\perp(ABC)$, $OG\perp CD$, $OG\subset(ABC)$, $CD\subset(ABC)$ $\Rightarrow$ *T.3.⊥* $\Rightarrow MG\perp AB \Rightarrow$ dist.(M, CD)=MG

$OM\perp(ABC)$, $OH\perp AD$, $OH\subset(ABC)$, $AD\subset(ABC)$ $\Rightarrow$ *T.3.⊥* $\Rightarrow MH\perp AD \Rightarrow$ dist.(M, AD)=MH

ABCD dreptunghi $\Rightarrow AO\equiv OC$, $BO\equiv OD$, $AC\equiv BD$ $\Rightarrow \Delta AOB, \Delta BOC, \Delta COD, \Delta AOD$ isoscele

ΔAOB isoscel, OE inaltime $\Rightarrow$ OE mediana $\Rightarrow AE\equiv EB$, $AB=32$ $\Rightarrow AE=EB=16$

ΔBOC isoscel, OF inaltime $\Rightarrow$ OF mediana $\Rightarrow BF\equiv FC$, $BC=18$ $\Rightarrow BF=FC=9$

ΔCOD isoscel $\Rightarrow$ OG mediana $\Rightarrow CG\equiv GD$ $\Rightarrow CG=GD=16$

$\left.\begin{matrix}OG \text{ inaltime} \\ \Delta AOD \text{ isoscel} \\ OH \text{ inaltime}\end{matrix}\right\} \Rightarrow OH \text{ mediana} \Rightarrow \left.\begin{matrix}CD=32 \\ DH \equiv HA \\ AD=18\end{matrix}\right\} \Rightarrow AH=HA=9$

$\left.\begin{matrix}OE \perp AB \\ AD \perp AB \\ OE \perp AE \\ OE \perp ON\end{matrix}\right\} \begin{matrix}\Rightarrow AD \parallel EO \\ \Rightarrow AE \parallel ON\end{matrix} \Rightarrow AEON \text{ paralelogram} \Rightarrow OE=9$

$\left.\begin{matrix}OF \perp BC \\ AB \perp BC \\ OE \perp AB \\ FB \perp AB\end{matrix}\right\} \begin{matrix}\Rightarrow AB \parallel OF \\ \Rightarrow OE \parallel BF\end{matrix} \Rightarrow EBFO \text{ paralelogram} \Rightarrow OF=16$

$\left.\begin{matrix}OG \perp DC \\ FC \perp DC \\ OF \perp BC \\ GC \perp BC\end{matrix}\right\} \begin{matrix}\Rightarrow OG \parallel FC \\ \Rightarrow GC \parallel OG\end{matrix} \Rightarrow OFCG \text{ paralelogram} \Rightarrow OG=9$

$\left.\begin{matrix}ON \perp AD \\ CD \perp AD \\ ND \perp DC \\ OG \perp DG\end{matrix}\right\} \begin{matrix}\Rightarrow ON \parallel GD \\ \Rightarrow ND \parallel OG\end{matrix} \Rightarrow NOGD \text{ paralelogram} \Rightarrow OE=16$

ΔMOE dreptunghic $\Rightarrow ME^2=OM^2+OE^2$

$ME^2=144+81$

$ME^2=225 \Rightarrow ME=15$

ΔMOF dreptunghic $\Rightarrow MF^2=OM^2+OF^2$

$MF^2=144+256$

$MF^2=400 \Rightarrow MF=20$

ΔMOG dreptunghic $\Rightarrow MG^2=OM^2+OG^2$

$MG^2=144+81$

$MG^2=225 \Rightarrow MG=15$

ΔMOH dreptunghic $\Rightarrow MH^2=OM^2+OH^2$

$MH^2=144+256$

$MH^2=400 \Rightarrow MG=20$