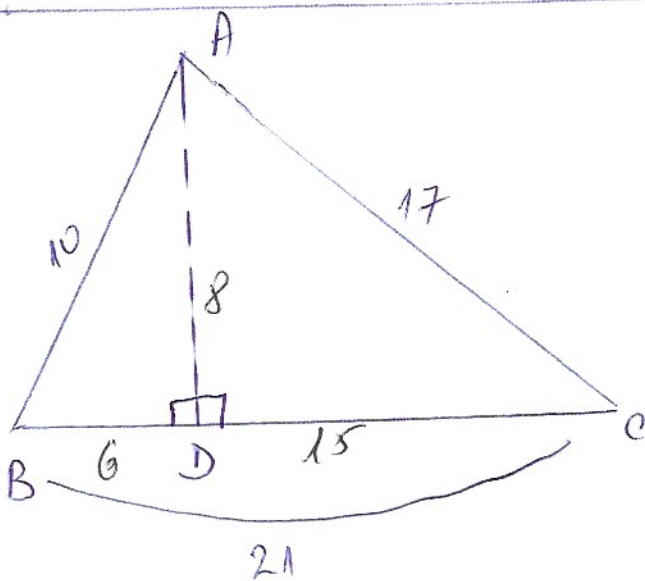


PROBLEME - NOTIUNI TRIGONOMETRICE (2)

48/87. Ip:

ΔABC
 $AB = 10 \text{ cm}$
 $BC = 21 \text{ cm}$
 $AC = 17 \text{ cm}$



cl: functiile trig ($\angle B, \angle C$) = ?

Dem:

$$\left. \begin{array}{l} \text{In } \Delta ABC : AB^2 = 10^2 = 100 \\ AC^2 = 17^2 = 289 \\ BC^2 = 21^2 = 441 \end{array} \right\} \Rightarrow AB^2 + AC^2 \neq BC^2 \xRightarrow{R.T.P.} \Delta ABC \neq \text{drept.} \Rightarrow \text{darecarea}$$

\Rightarrow nu putem aplica funct. trigon.

Ne construim Δ dr., decând $AD \perp BC$.

Aflăm $A_{\Delta ABC} = \sqrt{p \cdot (p-a)(p-b)(p-c)}$
 $a, b, c = \text{laterile } \Delta, p = \frac{a+b+c}{2} = \frac{10+17+21}{2}$
 $p = \frac{48}{2} = 24$

$$A_{\Delta ABC} = \sqrt{24 \cdot (24-10)(24-21)(24-17)}$$

$$= \sqrt{24 \cdot 14 \cdot 3 \cdot 7} = \sqrt{4 \cdot 2 \cdot 3 \cdot 2 \cdot 7 \cdot 3 \cdot 7} =$$

$$= 2 \cdot 2 \cdot 3 \cdot 7 = 84 \text{ cm}^2$$

$$A_{\Delta ABC} = \frac{b \cdot h}{2} \Rightarrow \frac{84}{1} = \frac{21 \cdot AD}{2} \Rightarrow AD = \frac{84 \cdot 2}{21} = 8 \text{ cm}$$

In ΔADB , $m(\hat{D}) = 90^\circ \xRightarrow{TP} BD^2 = AB^2 - AD^2$
 $BD^2 = 10^2 - 8^2 = 6^2 \Rightarrow BD = 6 \text{ cm}$
 $DC = 15 \text{ cm}$

In $\triangle ADB$, $m(\hat{D}) = 90^\circ \Rightarrow \sin B = \frac{AD}{AB} = \frac{8^{12}}{10} = \frac{4}{5} = \cos C$

$\cos B = \frac{BD}{AB} = \frac{6^{12}}{10} = \frac{3}{5} = \sin C$

$\operatorname{tg} B = \frac{AD}{BD} = \frac{8^{12}}{6} = \frac{4}{3} = \operatorname{ctg} C$

$\operatorname{ctg} B = \frac{BD}{AD} = \frac{6}{8} = \frac{3}{4} = \operatorname{tg} C$

47/87 ∇ :

ABCD - trapez

$AB \parallel CD$

$AD = 16 \text{ cm}$

$DC = 20 \text{ cm}$

$BC = 12 \text{ cm}$

$AB = 40 \text{ cm}$

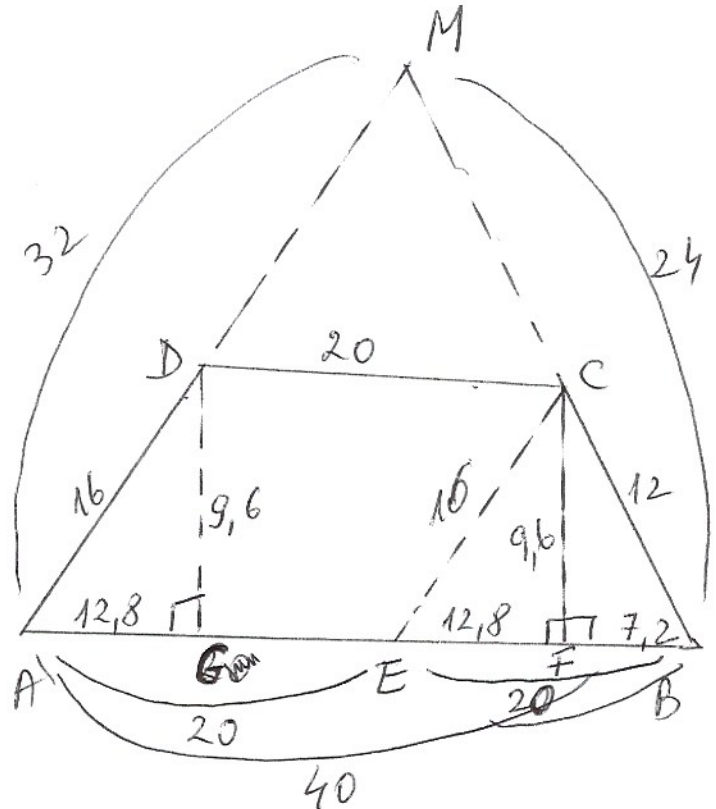
Cl: $\cos(\hat{A}BC) = ?$

$\operatorname{tg}(\hat{D}AB) = ?$

$\sin(\hat{D}AB) = ?$

$AD \cap BC = \{M\}$

$P_{\triangle MAB} = ?$



Dem:

ABCD = trapez oarecare.

Construim $CE \parallel AD$ } \Rightarrow AECD = paralelogram \Rightarrow
 $DC \parallel AE$ } $\Rightarrow AE = DC = 20 \Rightarrow EB = 20 \text{ cm}$
 $CE = AD = 16 \text{ cm}$.

In $\triangle CEB$: $CE^2 + CB^2 \neq EB^2 \Rightarrow \triangle CEB \neq dr. \Rightarrow \triangle CEB$ - oarecare

Fie $CF \perp EB \Rightarrow$ (ca la probl. 48)

$A_{\triangle CEB} = \sqrt{p(p-a)(p-b)(p-c)}$

$p = \frac{a+b+c}{2} = \frac{16+20+12}{2} = \frac{48}{2} = 24 \text{ cm}$

$$A_{\Delta CEB} = \sqrt{24 \cdot (24-16)(24-20)(24-12)}$$

$$= \sqrt{24 \cdot 8 \cdot 4 \cdot 12} = \sqrt{2 \cdot 12 \cdot 2 \cdot 4 \cdot 4 \cdot 12} =$$

$$= 2 \cdot 4 \cdot 12 = 8 \cdot 12 = 96 \text{ cm}^2$$

$$A_{\Delta CEB} = \frac{b \cdot h}{2} \Rightarrow 96 = \frac{20 \cdot CF}{2} \Rightarrow CF = \frac{96}{10}$$

$CF = 9,6 \text{ cm}$

In ΔCFE , $m(\hat{F}) = 90^\circ \overset{T.P.}{\Rightarrow} EF^2 = CE^2 - CF^2$

$$= 16^2 - 9,6^2$$

$$= 1,6^2 \cdot (10^2 - 6^2)$$

$$= 1,6^2 \cdot 8^2 \Rightarrow EF = 16 \cdot 8$$

$EF = 12,8 \text{ cm} \Rightarrow$

In ΔCFB , $m(\hat{F}) = 90^\circ \Rightarrow FB = 20 - 12,8 = 7,2 \text{ cm}$

$$\Rightarrow \cos \hat{B} = \frac{c \cdot \text{adj}}{ip} = \frac{FB}{BC} = \frac{7,2}{12} = \frac{1,2}{2} = 0,6 = \frac{6}{10} = \frac{3}{5}$$

$\Delta DGA \equiv \Delta CFE \Rightarrow AG = EF = 12,8 \text{ cm}$

In ΔDGA , $m(\hat{G}) = 90^\circ \Rightarrow \tan(\hat{DAB}) = \frac{DG}{AG} = \frac{9,6}{12,8} = \frac{96}{128}$

$$= \frac{24}{32} = \frac{3}{4}$$

$$\sin(\hat{DAB}) = \frac{DG}{AD} = \frac{9,6}{16} = \frac{0,6}{1} = \frac{6}{10} = \frac{3}{5}$$

Sim $DC \parallel AB \overset{T.F.A}{\Rightarrow} \Delta MDC \sim \Delta MAB \Rightarrow \frac{MD}{MA} = \frac{DC}{AB} = \frac{MC}{MB}$

$$\Rightarrow \frac{MD}{MD+16} = \frac{20}{40} = \frac{MC}{MC+12} \Rightarrow \frac{MD}{MD+16} = \frac{1}{2} \Rightarrow 2MD = MD+16$$

$$MD = 16 \Rightarrow$$

$MA = 32 \text{ cm}$

$$\frac{MC}{MC+12} = \frac{1}{2} \Rightarrow 2 \cdot MC = MC + 12$$

$$MC = 12 \text{ cm} \Rightarrow MB = 24 \text{ cm}$$

$$\Rightarrow P_{\Delta MAB} = 32 + 40 + 24 = 96 \text{ cm}$$

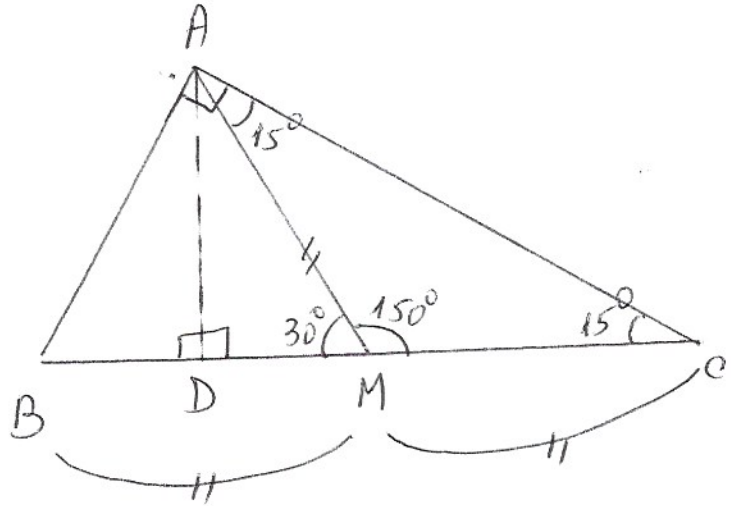
49) 87) \underline{P} :

$\Delta ABC = \text{dr.}$

$$m(\hat{C}) = 15^\circ$$

$AD \perp BC$

$$\underline{cl.}: AD = \frac{1}{4} \cdot BC$$



Dem:

$$\left. \begin{array}{l} \text{Fie } AM = \text{mediană} \\ \Delta ABC = \text{dr.} \end{array} \right\} \Rightarrow AM = \frac{BC}{2} = BM = MC$$

$$\Rightarrow \Delta AMC - \text{is.} \Rightarrow m(\hat{MAC}) = m(\hat{MCA}) = 15^\circ \Rightarrow$$

$$\Rightarrow m(\hat{AMC}) = 180^\circ - 2 \cdot 15^\circ = 150^\circ \Rightarrow m(\hat{AMD}) = 30^\circ$$

$$\left. \begin{array}{l} \text{In } \Delta ADM, m(\hat{D}) = 90^\circ \\ m(\hat{AMD}) = 30^\circ \end{array} \right\} \Rightarrow AD = \frac{AM}{2} = \frac{\frac{BC}{2}}{2} = \frac{BC}{4}$$

$$\boxed{AD = \frac{BC}{4}}$$

TEMĂ cul pag 88 / T1 + T2