LECȚIA 16 ① 19.05

CLASA VII A PROF. SCHNAKOVSZKI C.

ARIA TRIUNGHIULUI – REZOLVAREA TRIUNGHIULUI DREPTUNGHIC

1. $\mathcal{A}_{\Delta\,oarecare} = \dfrac{bază \cdot înălțime}{2} = \dfrac{b \cdot h}{2}$

$\mathcal{A}_{\Delta\,oarecare} = \dfrac{l_1 \cdot l_2 \cdot \sin(\widehat{l_1, l_2})}{2}$

$\mathcal{A}_{\Delta\,oarecare} = \sqrt{p\cdot(p-a)(p-b)(p-c)}$, formula lui Heron

unde a, b, c = lungimile laturilor Δ

$p = \dfrac{a+b+c}{2}$ = semiperimetrul Δ.

2. $\mathcal{A}_{\Delta\,isoscel} = \mathcal{A}_{\Delta\,oarecare}$

3. $\mathcal{A}_{\Delta\,dreptunghic} = \mathcal{A}_{\Delta\,oarecare}$ sau $\mathcal{A}_{\Delta\,dr} = \dfrac{cat_1 \cdot cat_2}{2}$

4. $\mathcal{A}_{\Delta\,echilateral} = \dfrac{l^2\sqrt{3}}{4}$.

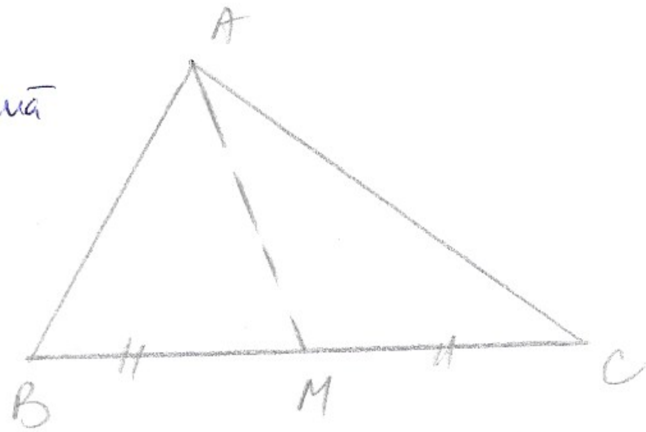
LEMĂ: Într-un triunghi, produsul dintre lungimea unei laturi și lungimea înălțimii corespunzătoare ei este același pentru toate cele trei laturi.

Adică: $b_1 \cdot h_1 = b_2 \cdot h_2 = b_3 \cdot h_3 =$ constant (din arie)

Prop: Într-un triunghi, mediana împarte triunghiul în două triunghiuri cu aceeași arie (triunghiuri

În ΔABC, din (AM) - mediană

$\Rightarrow \mathcal{A}_{\Delta ABM} = \mathcal{A}_{\Delta ACM}$.

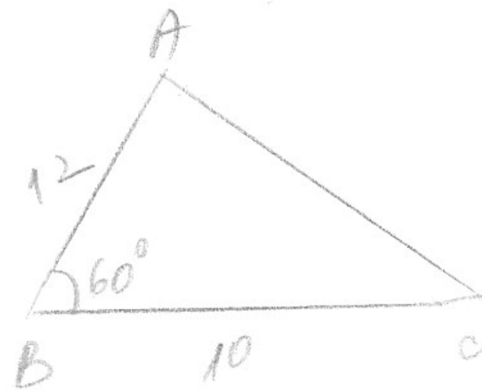


<u>TEOREMĂ</u>: Raportul ariilor a două triunghiuri asemenea este egal cu pătratul raportului de asemănare.

$\Delta ABC \sim \Delta MNP$ ~~și~~ $\frac{AB}{MN} = k \Rightarrow \frac{\mathcal{A}_{\Delta ABC}}{\mathcal{A}_{\Delta MNP}} = k^2$.

<u>EXERCIȚII</u>:

1/91 <u>cul</u>: $\mathcal{A}_{\Delta ABC} = ?$



a) $AB = 12$ cm

$BC = 10$ cm

$m(\hat{B}) = 60°$.

<u>Dem</u>:

$$\mathcal{A}_{\Delta ABC} = \frac{l_1 \cdot l_2 \cdot \sin(\widehat{l_1, l_2})}{2} = \frac{AB \cdot BC \cdot \sin B}{2} =$$

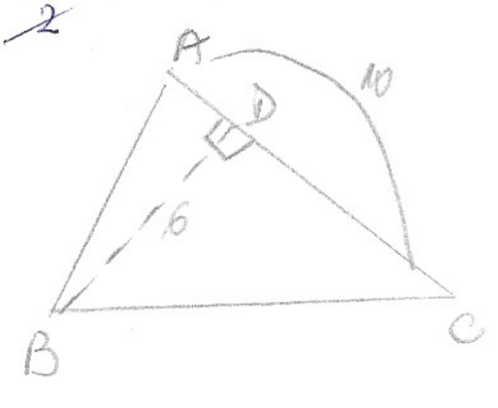
$$= \frac{\overset{6}{\cancel{12}} \cdot 10 \cdot \sin 60°}{\underset{1}{\cancel{2}}} = \overset{30}{\cancel{60}} \cdot \frac{\sqrt{3}}{\cancel{2}} = 30\sqrt{3} \text{ cm}^2$$

b) $AC = 10$ cm

$BD = 6$ cm

$D = pr_{AC}^{B}$

$$\mathcal{A}_{\Delta ABC} = \frac{b \cdot h}{2} = \frac{AC \cdot BD}{2} = \frac{10 \cdot \overset{3}{\cancel{6}}}{\underset{1}{\cancel{2}}} =$$



c) AB = 6 cm , AC = 9 cm , BC = 12 cm

$$\mathcal{A} = \sqrt{p\cdot(p-a)(p-b)(p-c)}$$

$$p = \frac{a+b+c}{2} = \frac{6+9+12}{2} = \frac{27}{2}\ cm$$

$$\mathcal{A} = \sqrt{\frac{27}{2}\cdot\left(\frac{27}{2} - {}^{2)}6\right)\left(\frac{27}{2} - {}^{2)}9\right)\left(\frac{27}{2} - {}^{2)}12\right)} =$$

$$= \sqrt{\frac{27}{2}\cdot\frac{15}{2}\cdot\frac{9}{2}\cdot\frac{3}{2}} = \frac{\sqrt{9\cdot\cancel{3}\cdot 5\cdot\cancel{3}\cdot 9\cdot 3}}{4} = \frac{3\cdot 3\cdot 3\sqrt{15}}{4} =$$

$$= \frac{27\sqrt{15}}{4}\ cm^2$$

2/a) $\mathcal{A}_{\Delta ABC} = ?$

$AB = AC = BC = 8\sqrt{3}$ cm $\Rightarrow \Delta ABC$ = echi.

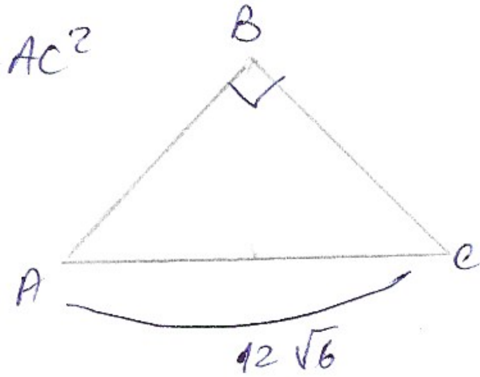
$$\mathcal{A}_{\Delta ABC} = \frac{l^2\cdot\sqrt{3}}{4} = \frac{(8\sqrt{3})^2\cdot\sqrt{3}}{4} = \frac{\overset{2}{\cancel{8}}\sqrt{3}\cdot 8\sqrt{3}\cdot\sqrt{3}}{\cancel{4}_1} = 16\cdot 3\cdot\sqrt{3} = 48\sqrt{3}\ cm^2$$

b) $AB = 4\sqrt{2}$ cm , $AC = 6\sqrt{2}$ cm , $m(\hat{A}) = 90^\circ \Rightarrow \Delta ABC$ = dr. $\Rightarrow$

$$\Rightarrow \mathcal{A}_{\Delta ABC} = \frac{cat_1\cdot cat_2}{2} = \frac{AB\cdot AC}{2} = \frac{\overset{2}{\cancel{4}}\sqrt{2}\cdot 6\sqrt{2}}{\cancel{2}_1} = 2\cdot 2\cdot 6 = 24\ cm^2$$

c) $AC = 12\sqrt{6}$ cm , $AB = BC$, $m(\hat{B}) = 90^\circ \Rightarrow \Delta ABC$ - dr. is.

In ΔABC, $m(\hat{B}) = 90^\circ \overset{T.P.}{\Longrightarrow} AB^2 + BC^2 = AC^2$



$$AB^2 + AB^2 = (12\sqrt{6})^2$$

$$2\cdot AB^2 = 12^2\cdot 6 \ /:2$$

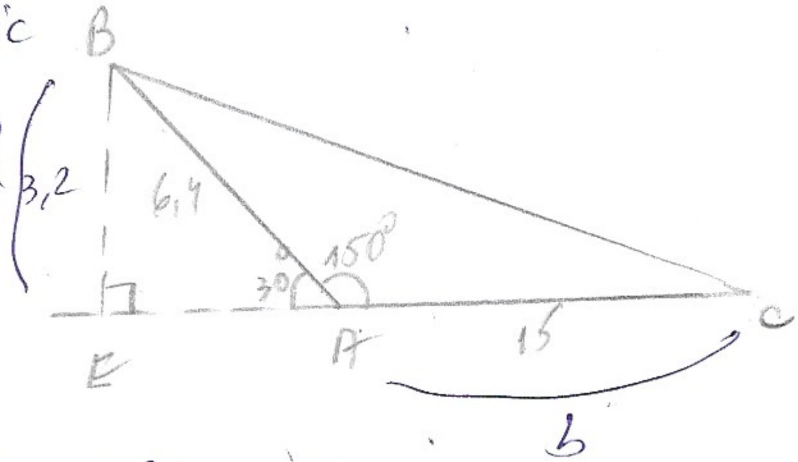
$$AB^2 = 12^2\cdot 3$$

$$AB = 12\sqrt{3}\ cm$$

$$\Rightarrow \mathcal{A}_{\Delta ABC} = \frac{AB\cdot BC}{2} = \frac{12\sqrt{3}\cdot\overset{6}{\cancel{12}}\sqrt{3}}{\cancel{2}} = 72\cdot 3 = 216\ cm^2$$

d) $AB = 6{,}4\,cm$, $AC = 15\,cm$, $m(\hat{A}) = 150^\circ$ $\Rightarrow$ Δ ~~$\mathcal{A}$~~

$\Rightarrow \Delta ABC$ obtuzunghic



Dem: Fie $BE \perp AC$

$\Rightarrow \Delta BEA$, $m(\hat{E}) = 90^\circ$

$m(\widehat{BAE}) = 180^\circ - 150^\circ = 30^\circ$

$\overset{T\,30-60-90}{\Rightarrow}$ $BE = \frac{AB}{2} = \frac{6{,}4}{2} = 3{,}2\,cm$

$\mathcal{A}_{\Delta ABC} = \frac{b \cdot h}{2} = \frac{AC \cdot BE}{2} = \frac{15 \cdot 3{,}2}{2} = 15 \cdot 1{,}6 = 24\,cm^2$

TEMĂ: culegere pag 91/ex 3,4,5,6,7