

TRIGONOMETRIE

TEORIE

1. Formula de transformare din grade in radiani: $360^{\circ} = 2\pi$
 $180^{\circ} = \pi$

2. Teorema lui Pitagora: $Ip^2 = c_1^2 + c_2^2$
 $c_1^2 = Ip^2 - c_2^2$

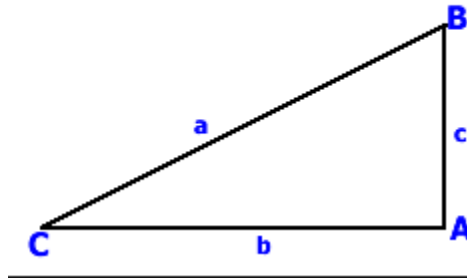
3. Definitia functiilor trigonometrice:
 Fie triunghiul ABC dreptunghic in A.

$$\sin B = \frac{\text{cateta_opusa}}{\text{ipotenuza}} = \frac{AC}{BC} = \cos C$$

$$\cos B = \frac{\text{cateta_alaturata}}{\text{ipotenuza}} = \frac{AB}{BC} = \sin C$$

$$\text{tg} B = \frac{\text{cateta_opusa}}{\text{cateta_alaturata}} = \frac{AC}{AB} = \text{ctg} C$$

$$\text{ctg} B = \frac{\text{cateta_alaturata}}{\text{cateta_opusa}} = \frac{AB}{AC} = \text{tg} C$$



4. Formula fundamentala a trigonometriei: $\sin^2 x + \cos^2 x = 1$.

5. Daca $m(\sphericalangle C) = x^{\circ}$ atunci $m(\sphericalangle B) = 90^{\circ} - x^{\circ}$. De aici:

$$\sin x = \cos(90 - x)$$

$$\cos x = \sin(90 - x)$$

6. Tabel de valori:

	30°	45°	60°
\sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
\cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
tg	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$
ctg	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$

7. Axa Ox= cos
 Axa Oy=sin

Cadranul I : $(0^{\circ}, 90^{\circ})$ $\sin x > 0$

$\cos x > 0$

Cadranul II : $(90^{\circ}, 180^{\circ})$ $\sin x > 0$

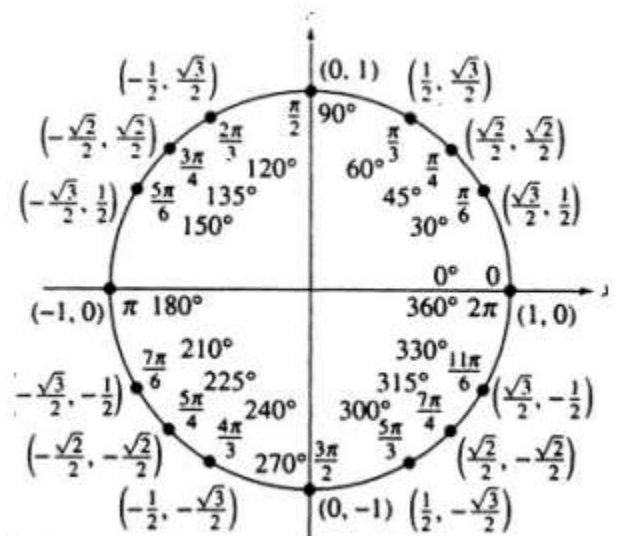
$\cos x < 0$

Cadranul III : $(180^{\circ}, 270^{\circ})$ $\sin x < 0$

$\cos x < 0$

Cadranul IV : $(270^{\circ}, 360^{\circ})$ $\sin x < 0$

$\cos x > 0$



8. Daca $x \in (90^0, 180^0) : \sin x = \sin(180 - x)$
 $\cos x = -\cos(180 - x)$
- Daca $x \in (180^0, 270^0) : \sin x = -\sin(180 - x)$
 $\cos x = -\cos(180 - x)$
- Daca $x \in (270^0, 360^0) : \sin x = -\sin(180 - x)$
 $\cos x = \cos(180 - x)$

9. Semnul functiilor trigonometrice:

x	0	90	180	270	360
sin x	0	+++	1	+++	0
cos x	1	+++	0	---	-1
tg x	0	+++		---	0
ctg x		+++	0	---	

10. Formule pentru aria triunghiului:

$$\text{Aria triunghiului oarecare: } A = \frac{B \cdot h}{2}$$

$$\text{Aria triunghiului dreptunghic: } A = \frac{c_1 \cdot c_2}{2}$$

$$\text{Aria triunghiului echilateral: } A = \frac{l^2 \cdot \sqrt{3}}{4}$$

Formula lui Heron: $A = \sqrt{p(p-a)(p-b)(p-c)}$ unde a,b si c sunt laturile triunghiului iar p

$$\text{este semiperimetrul } p = \frac{a+b+c}{2}.$$

$$\text{Daca } A(x_A, y_A), B(x_B, y_B), C(x_C, y_C) \text{ atunci } A = \frac{1}{2} |\Delta|, \Delta = \begin{vmatrix} x_A & y_A & 1 \\ x_B & y_B & 1 \\ x_C & y_C & 1 \end{vmatrix}$$

$$A_{\Delta} = \frac{abc}{4R} \quad (\text{a=BC, b=AC, c=AB sunt lungimile laturilor triunghiului, iar R este raza cercului circumscris})$$

$$A = \frac{a \cdot b \cdot \sin C}{2} = \frac{a \cdot c \cdot \sin B}{2} = \frac{b \cdot c \cdot \sin A}{2}.$$

11. Teorema sinusurilor:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R.$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A; \quad \cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

12. Teorema cosinusului: $b^2 = a^2 + c^2 - 2ac \cdot \cos B; \quad \cos B = \frac{a^2 + c^2 - b^2}{2ac}$

$$c^2 = a^2 + b^2 - 2ab \cdot \cos C; \quad \cos C = \frac{a^2 + b^2 - c^2}{2ab}$$