10.01.2024 (среда)

1013 ❑ Найдите $\sin\alpha$, если:

а) $\cos\alpha = \frac{1}{2}$; б) $\cos\alpha = -\frac{2}{3}$; в) $\cos\alpha = -1$.

а) $\cos\alpha = \frac{1}{2}$; $\sin\alpha = ?$

б) $\cos\alpha = -\frac{2}{3}$; $\sin\alpha = ?$

Основное тригонометрическое тождество: $\sin^2\alpha + \cos^2\alpha = 1$

$\sin^2\alpha + \left(\frac{1}{2}\right)^2 = 1$

$\sin^2\alpha = 1 - \frac{1}{4}$

$\sin^2\alpha = \frac{3}{4}$

$\sin\alpha = \pm\frac{\sqrt{3}}{2}$

$\left(-\frac{2}{3}\right)^2 + \sin^2\alpha = 1$

$\sin^2\alpha = 1 - \frac{4}{9}$

$\sin^2\alpha = \frac{5}{9}$

$\sin\alpha = \pm\frac{\sqrt{5}}{3}$

1014 Найдите $\cos\alpha$, если:

а) $\sin\alpha = \frac{\sqrt{3}}{2}$; б) $\sin\alpha = \frac{1}{4}$; в) $\sin\alpha = 0$.

а) $\sin\alpha = \frac{\sqrt{3}}{2}$

$\left(\frac{\sqrt{3}}{2}\right)^2 + \cos^2\alpha = 1$

$\frac{3}{4} + \cos^2\alpha = 1$

$\cos^2\alpha = \frac{1}{1} - \frac{3}{4}$

$\cos^2\alpha = \frac{1}{4}$

$\cos\alpha = \pm\sqrt{\frac{1}{4}}$

$\cos\alpha = \pm\frac{\sqrt{1}}{\sqrt{4}} = \pm\frac{1}{2}$;

б) $\sin\alpha = \frac{1}{4}$

$\left(\frac{1}{4}\right)^2 + \cos^2\alpha = 1$

$\frac{1}{16} + \cos^2\alpha = 1$

$\cos^2\alpha = \frac{1}{1}\cdot\frac{16}{} - \frac{1}{16}$

$\cos^2\alpha = \frac{15}{16}$

$\cos\alpha = \pm\frac{\sqrt{15}}{4}$;

1015 Найдите $\operatorname{tg}\alpha$, если:

а) $\cos\alpha = 1$; б) $\cos\alpha = -\frac{\sqrt{3}}{2}$; в) $\sin\alpha = \frac{\sqrt{2}}{2}$ и $0° < \alpha < 90°$;

г) $\sin\alpha = \frac{3}{5}$ и $90° < \alpha < 180°$.

в) $\sin\alpha = \frac{\sqrt{2}}{2}$; $\operatorname{tg}\alpha = ?$

$\frac{1}{\sqrt{2}} = \frac{1\cdot\sqrt{2}}{\sqrt{2}\cdot\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha}$; $\sin^2\alpha + \cos^2\alpha = 1$

$\operatorname{tg}\alpha = \frac{\sqrt{2}}{2} : \frac{\sqrt{2}}{2} =$ $\left(\frac{\sqrt{2}}{2}\right)^2 + \cos^2\alpha = 1$

$= \frac{\sqrt{2}}{2} \cdot \frac{2}{\sqrt{2}} = 1$ $\cos^2\alpha = 1 - \frac{2}{4}$

$\cos^2\alpha = \frac{1}{2}$

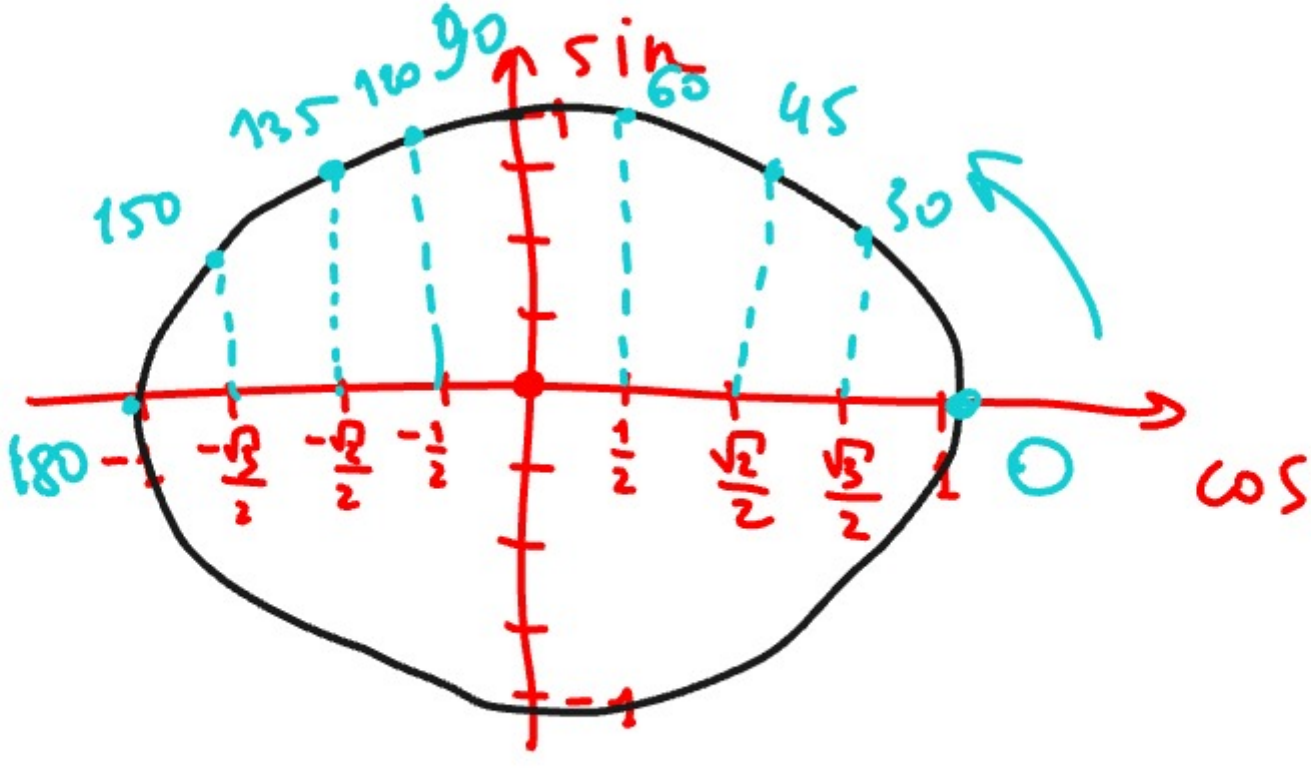
$\cos\alpha = \pm\sqrt{\frac{1}{2}} = \pm\frac{1}{\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$

$\cos\alpha = \frac{\sqrt{2}}{2}$ $\cos\alpha = -\frac{\sqrt{2}}{2}$

$\alpha = 45°$ ~~$\alpha = 135°$~~

Некоторые значения тригонометрических функций

α	градусы	0°	30°	45°	60°	90°	180°	270°	360°
$\sin\alpha$		0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	−1	0
$\cos\alpha$		1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	−1	0	1
$\operatorname{tg}\alpha$		0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	–	0	–	0



1015 ☐ Найдите $\operatorname{tg}\alpha$, если:

а) $\cos\alpha = 1$; б) $\cos\alpha = -\frac{\sqrt{3}}{2}$; в) $\sin\alpha = \frac{\sqrt{2}}{2}$ и $0° < \alpha < 90°$;

г) $\sin\alpha = \frac{3}{5}$ и $90° < \alpha < 180°$.

а) $\cos\alpha = 1$

$\operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha}$

$\operatorname{tg}\alpha = \frac{0}{1} =$

$= 0$

$\sin^2\alpha = 1 - \cos^2\alpha$

$\sin^2\alpha = 1 - 1^2$

$\sin^2\alpha = 0$

$\sin\alpha = 0$

б) $\cos\alpha = -\frac{\sqrt{3}}{2}$

$\sin^2\alpha = 1 - \cos^2\alpha$

$\sin^2\alpha = 1 - \frac{3}{4}$

$\sin^2\alpha = \frac{1}{4}$

$\sin\alpha = \pm\sqrt{\frac{1}{4}} = \pm\frac{1}{2}$

① $\sin\alpha = \frac{1}{2} \Rightarrow \operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{1}{2} : \frac{-\sqrt{3}}{2} = \frac{1 \cdot 2}{2 \cdot (-\sqrt{3})} =$

$= -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

② $\sin\alpha = -\frac{1}{2} \Rightarrow \operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha} = -\frac{1}{2} \cdot \frac{2}{+\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$