180106

A

1): Rešite enačbo : $4 \sin^2 x + 2 \cos^2 x = 6 - 7 \sin x$

2)) Faktoriziraj : $\dfrac{\cos^2 x - \frac{1}{4}}{\tan 60° - \tan x}$

3) Narišite graf funkcije $f(x) = -2 \sin \left(\frac{\pi}{2} - 2x \right)$, ter zapišite točke v katerih dana funkcija doseže maksimalno vrednost !

B

1) **Rešite enačbo** : $1 - 4 \cos^2 \left(x + \frac{\pi}{3} \right) = 0$

2) Faktoriziraj : $\dfrac{\sin x - \sin 3x}{\tan x - \tan 3x}$

3) Narišite graf funkcije $f(x) = -2 \cos \left(\frac{\pi}{2} - 2x \right)$, ter določite D_f , Z_f , periodo in začetno vrednost te funkcije !

1. $4\sin^2 x + 2\cos^2 x = 6 - 7\sin x$

$4\sin^2 x + 2\cdot(1-\sin^2 x) - 6 + 7\sin x = 0$

$4\sin^2 x + 2 - 2\sin^2 x - 6 + 7\sin x = 0$

$2\sin^2 x + 7\sin x - 4 = 0$ $\quad \boxed{\sin x = z}$

$2z^2 + 7z - 4 = 0$

$z_{1,2} = \frac{-b \pm \sqrt{D}}{2a}$ $\quad D = b^2 - 4ac$

$D = 49 - 4\cdot 2\cdot(-4)$

$D = 49 + 32 = 81$

$z_1 = \frac{-7+9}{4} = \frac{2}{4} = \frac{1}{2} \Rightarrow \sin x = \frac{1}{2}$ $\quad \boxed{k \in Z}$

$x_1 = \frac{\pi}{6} + 2k\pi$

$x_2 = \pi - \frac{\pi}{6} + 2k\pi$

$x_2 = \frac{5\pi}{6} + 2k\pi$

$z_2 = \frac{-7-9}{4} = \frac{-16}{4} = -4$

$\sin x = -4$

Ni rešitve!

$\boxed{-1 \le \sin x \le 1}$!

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2. Faktoriziraj

$\cos 60° = \frac{1}{2}$ $\quad \cos^2 60° = \frac{1}{4}$

$$\frac{\cos^2 x - \frac{1}{4}}{\tan 60° - \tan x} = \frac{\cos^2 x - \cos^2 60°}{\frac{\sin(60°-x)}{\cos 60°\cdot\cos x}} =$$

$$= \frac{(\cos x - \cos 60°)(\cos x + \cos 60°)}{\frac{\sin(60°-x)}{\frac{1}{2}\cdot\cos x}} =$$

sinus dvojnega kota

$$= \frac{-2\cdot\sin\left(\frac{x+60°}{2}\right)\cdot\sin\left(\frac{x-60°}{2}\right)\cdot 2\cdot\cos\left(\frac{x+60°}{2}\right)\cdot\cos\left(\frac{x-60°}{2}\right)}{\frac{\sin(60°-x)\,2}{\cos x}} =$$

$$= \frac{-\sin 2\left(\frac{x+60°}{2}\right)\cdot\sin 2\left(\frac{x-60°}{2}\right)}{\frac{\sin(60°-x)\,2}{\cos x}} = \frac{-\sin(x+60°)\cdot\sin(x-60°)}{\frac{\sin(60°-x)\,2}{\cos x}} =$$

→ upoštevamo lihost ...

se znebimo ulomkov!

$$= \frac{\sin(x+60°)\cdot\sin(-(-x+60°))}{\frac{\sin(60°-x)}{\cos x}\cdot 2} = \frac{\sin(x+60°)\cdot\sin(60°-x)\cdot\cos x}{\sin(60°-x)\cdot 2}$$

$$= \frac{-\sin(x+60°)\cdot\sin(x-60°)}{-\sin(x-60°)\cdot 2}\cdot\cos x = \frac{\sin(x+60°)\cdot\sin(x-60°)\cdot\cos x}{\sin(x-60°)\cdot 2} =$$

$$= \frac{1}{2}\cdot\sin(x+60°)\cdot\cos x$$

3. $f(x) = -2\sin\left(\frac{\pi}{2} - 2x\right)$

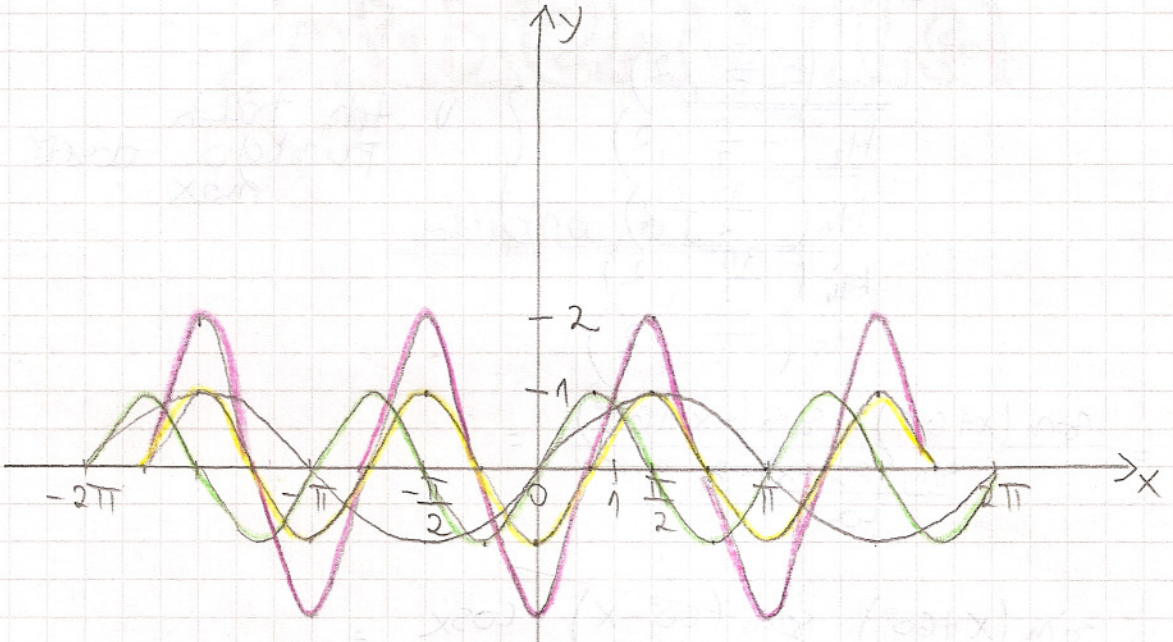
$y = -2\sin\left(-2x + \frac{\pi}{2}\right)$

$y = -2\sin\left(-\left(2x - \frac{\pi}{2}\right)\right)$

$y = 2\sin\left(2x - \frac{\pi}{2}\right)$

$2\left(x - \frac{\pi}{4}\right) = 2x - \frac{2\pi}{4} = 2x - \frac{\pi}{2}$

1. $y_1 = \sin x$
2. $y_2 = \sin 2x$; $\omega = 2$ 2 vuč na 2π ; $R_x : k = \frac{1}{2}$
3. $y_3 = \sin 2\left(x - \frac{\pi}{4}\right)$ Premik v desno za $\frac{\pi}{4}$
4. $y_4 = 2 \cdot \sin 2\left(x - \frac{\pi}{4}\right)$ $R_y : k = 2$



b) Točke, kjer funkcija doseže MAKSIMALNO VREDNOST!

- Max. funkcije SINUS

$x - \frac{\pi}{2} = 2k\pi$

Nazaj ↓

$x - \frac{\pi}{4} = \frac{\pi}{2} + 2k\pi \mid \cdot 4$

$4x - \pi = 2\pi + 8k\pi$

$4x = 3\pi + 8k\pi$

$4x = \pi(3 + 8k)$

$x = \frac{\pi(3+8k)}{4}$

$k \in \mathbb{Z}$

k	x
-2	$-\frac{13\pi}{4}$
-1	$-\frac{5\pi}{4}$
0	$\frac{3\pi}{4}$
1	$\frac{11\pi}{4}$
2	$\frac{19\pi}{4}$

$M_1(x_1, 2)$ ↓ vedno, v vseh točkah. To nam daje amplituda

$M_1\left(-\frac{13\pi}{4}, 2\right)$

$M_2\left(-\frac{5\pi}{4}, 2\right)$

$M_3\left(\frac{11\pi}{4}, 2\right)$

$M_4\left(\frac{19\pi}{4}, 2\right)$

$M_5\left(\frac{3\pi}{4}, 2\right)$ →

↓ pri teh x-ih doseže funkcija max. vrednost

Ab $x = \frac{\pi}{2} + 2k\pi$

$2x - \frac{\pi}{2} = \frac{\pi}{2} + 2k\pi \quad / 2$

$4x - \pi = \pi + 4k\pi$

$4x = 2\pi + 4k\pi$

$4x = 2\pi(1 + 2k)$

$x = \frac{2\pi(1+2k)}{4_2}$

$x = \frac{\pi(1+2k)}{2}$ ✓

$k \in \mathbb{Z}$

k	x
-2	$-\frac{3\pi}{2}$
-1	$-\frac{\pi}{2}$
0	$\frac{\pi}{2}$
1	$\frac{3\pi}{2}$
2	$\frac{5\pi}{2}$

$T_m(\quad , 1)$

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$M_1\left(-\frac{3\pi}{2}, 2\right)$
$M_2\left(-\frac{\pi}{2}, 2\right)$
$M_3\left(\frac{\pi}{2}, 2\right)$
$M_4\left(\frac{3\pi}{2}, 2\right)$
$M_5\left(\frac{5\pi}{2}, 2\right)$

} V teh točkah funkcija doseže max.

2.

$= \frac{\sin(x+60°) \cdot \sin(-x+60°)}{\frac{\sin(60°-x) \cdot 2}{\cos x}} =$

$= \frac{\sin(x+60°) \cdot \sin(60°-x) \cdot \cos x}{\sin(60°-x) \cdot 2} =$

$= \frac{1}{2} \sin(x+60°) \cdot \cos x$

odd (5) ≠