שאלה 4

$$f(x) = \frac{\cos^2(x)}{\sin(x)} + 3$$

$$0 \leq x \leq 2\pi$$

א)

(1) תנאי

$$\sin x \neq 0$$

$$x \neq \pi k$$

k	x
0	0
1	π
2	2π

$$\boxed{x \neq 0,\ x \neq \pi,\ x \neq 2\pi}$$

(2) $x = 0$, $x = \pi$, $x = 2\pi$

(3) $$f'(x) = \frac{-2\cos(x)\sin(x)\cdot\sin(x) - \cos^2(x)\cdot\cos}{\sin^2(x)}$$

$$f'(x) = \frac{-2\cos(x)\sin^2(x) - \cos^3(x)}{\sin^2(x)}$$

$$f'(x) = \frac{-\cos(x)\left(2\sin^2(x) - \cos^2(x)\right)}{\sin^2(x)}$$

$$0 = -\cos(x)\left(2\sin^2(x) - \cos^2(x)\right)$$

↙ $x_1 = \frac{\pi}{2} + \pi k$

↘ $2\sin^2(x) = \cos^2(x) \;/\div \cos^2(x)$

$$2\tan^2(x) = 0$$

$$\tan^2(x) = 0$$

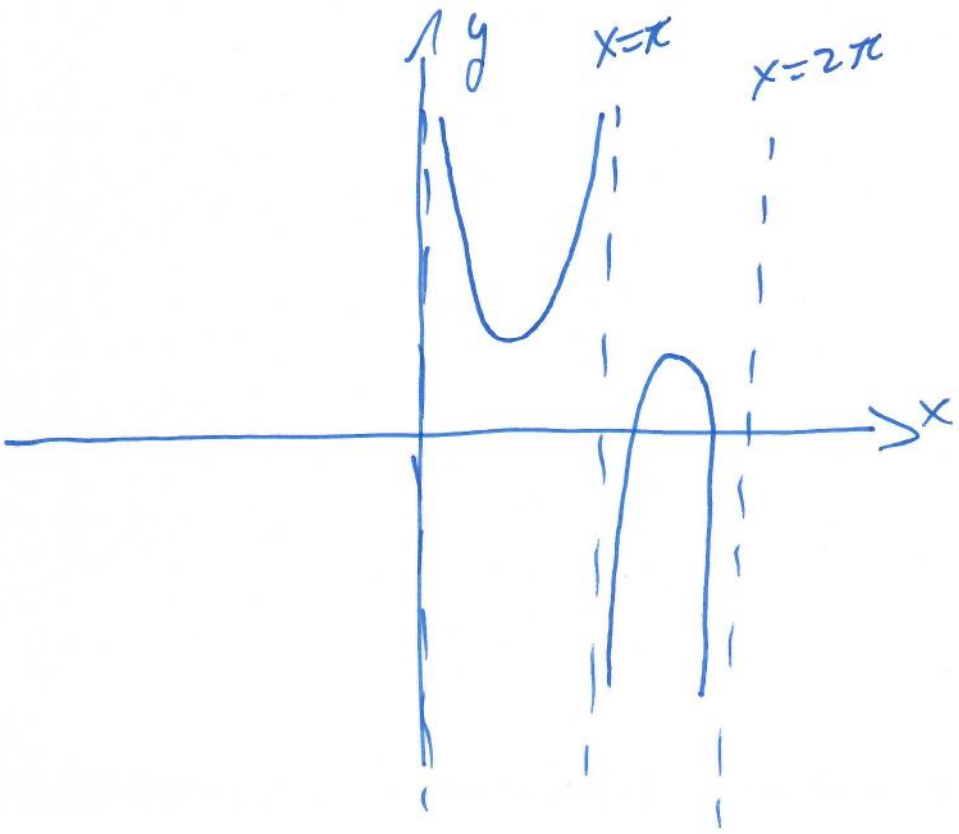
$$\tan(x) = 0$$

$$x_2 = \pi k$$

k	x_1	x_2
0	$\frac{\pi}{2}$	X
1	$\frac{3}{2}\pi$	X
2	X	X

x	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3}{4}\pi$	π	$\frac{4}{3}\pi$	$\frac{3}{2}\pi$	$\frac{7\pi}{4}$	2π
$f'(x)$	//	−	0	+	//	+	0	−	//
$f(x)$	//	↓	min	↑	//	↑	max	↓	//

$\min\left(\frac{\pi}{2}, 3\right)$ $\max\left(\frac{3}{2}\pi, 3\right)$



ירידה:

$\frac{\pi}{2} < x < \pi$

$\frac{4\pi}{3} < x < \frac{7\pi}{4}$

עליה:

$0 < x < \frac{\pi}{2}$

$\frac{3\pi}{2} < x < 2\pi$

$g(x) = \sqrt{f(x) - 3}$

יורד א

$k(x) = f(x) - 3$

יורד ג