Ex 2.10.7

h) $f(x) = \cos^2(x)$ sur $[0; 2\pi]$

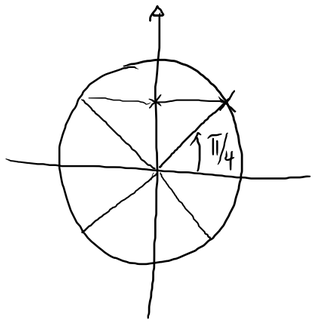
$$f'(x) = 2\cos(x)\cdot(-\sin(x)) = -2\cos(x)\sin(x)$$

$$f''(x) = +2\sin(x)\cdot\sin(x) - 2\cos(x)\cos(x) = 2\sin^2(x) - 2\underbrace{\cos^2(x)}_{1-\sin^2(x)} \qquad (\sin^2(x)+\cos^2(x)=1)$$

$$= 2\sin^2(x) - 2(1-\sin^2(x)) = 4\sin^2(x) - 2$$

$$= 2(2\sin^2(x) - 1)$$

zéros de f'' : $2\sin^2(x) - 1 = 0 \iff \sin^2(x) = \frac{1}{2} \iff \sin(x) = \pm\frac{\sqrt{2}}{2}$



$X = \frac{\pi}{4}$ ou $x = \pi - \frac{\pi}{4} = \frac{3\pi}{4}$ $\left(+\frac{\sqrt{2}}{2}\right)$

ou

$X = \frac{5\pi}{4}$ ou $x = \frac{7\pi}{4}$ $\left(-\frac{\sqrt{2}}{2}\right)$

X	0		$\pi/4$		$3\pi/4$		$5\pi/4$		$7\pi/4$		2π
f''	|	$-$	0	$+$	0	$-$	0	$+$	0	$-$	
f	|	$\cap$	I	$\cup$	I	$\cap$	I	$\cup$	I	$\cap$	

à calculer dans chaque intervalle ⚠

$I\left(\frac{\pi}{4}; \frac{1}{2}\right)$ $I\left(\frac{3\pi}{4}; \frac{1}{2}\right)$ $I\left(\frac{5\pi}{4}; \frac{1}{2}\right)$ $I\left(7\pi/4; \frac{1}{2}\right)$

($f(\frac{\pi}{4})$)