

1500. $y = \cos x - \frac{1}{2} \cos 2x$.
непримогательна.

$T(\cos x) = 2\pi$; $T(\cos 2x) = \pi$, m° .
 $T(y) = 2\pi$

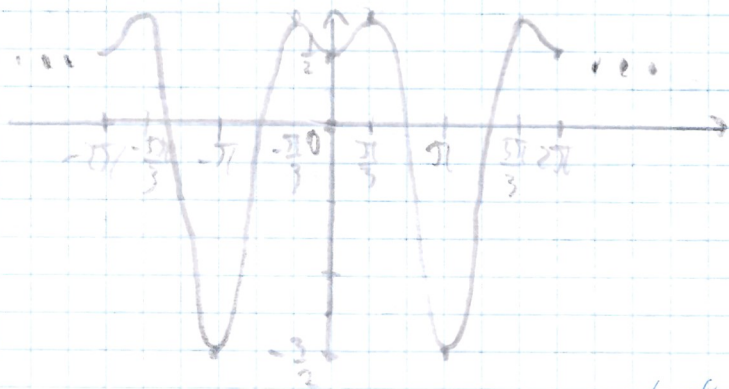
$x = 0 + 2\pi k$: $y = \frac{1}{2}$; $x = \pi + 2\pi k = y = \frac{1}{2} - \frac{3}{2}$

$y' = -\sin x + \sin 2x = \sin x(2\cos x - 1)$. $y' = 0$: $\begin{cases} \sin x = 0 \\ \cos x = \frac{1}{2} \end{cases} \begin{cases} x = \pi n, n \in \mathbb{Z} \\ x = \pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z} \end{cases}$

$y' > 0$: $\begin{cases} 0 + 2\pi n < x < \frac{\pi}{3} + 2\pi n \\ \frac{5\pi}{3} + 2\pi n < x < \frac{7\pi}{3} + 2\pi n \end{cases}$

$y' < 0$: $\begin{cases} \frac{\pi}{3} + 2\pi n < x < \pi + 2\pi n \\ \frac{2\pi}{3} + 2\pi n < x < \frac{4\pi}{3} + 2\pi n \end{cases}$

$y(\frac{\pi}{3}) = \frac{3}{4}$; $y(-\frac{\pi}{3}) = \frac{3}{4}$



$y'' = -\cos x + 2\cos 2x =$
 $= 4\cos^3 x - \cos x - 2$

$y' = 0 \Rightarrow 4\cos^3 x - \cos x - 2 = 0$
 $0 > 1 \text{ or } 4 < 3$

$\cos x = \frac{1 \pm \sqrt{3}}{2}$

$x = \pm \arccos\left(\frac{1 \pm \sqrt{3}}{2}\right)$

1509. $y = x^{\frac{2}{3}} e^{-x}$

$x = \text{модуль}$
 $x^{\frac{2}{3}} e^{-x} = \frac{x^{\frac{2}{3}}}{e^x} = \frac{x^{\frac{2}{3}}}{1 + x + \frac{x^2}{2} + \dots} = \frac{1}{\frac{1}{x^{\frac{2}{3}}} + \frac{1}{x} + \frac{x^{\frac{1}{3}}}{2} + \dots}$ $\text{при } x \rightarrow \infty \quad y \rightarrow 0$

$y = 0$ — длина

$y' = \frac{2}{3\sqrt{x}} e^{-x} - e^{-x} \cdot x^{\frac{2}{3}} = e^{-x} \left(\frac{2}{3\sqrt{x}} - \sqrt{x} \right) = e^{-x} \frac{2 - 3x}{3\sqrt{x}} = -e^{-x} \frac{3x - 2}{3\sqrt{x}}$

$y' = 0$ при $x = \frac{2}{3}$. y' не y'' при $x = 0$.

$y' > 0$ при $0 < x < \frac{2}{3}$; $y' < 0$ при $x > \frac{2}{3}$

$y(\frac{2}{3}) = \left(\frac{2}{3}\right)^{\frac{2}{3}} e^{-\frac{2}{3}}$

