

18 (642) ①  $x \neq 0, \pi$  ②  $y' = 4\cos x - \frac{\cos x}{\sin^2 x} \stackrel{1311}{=} 0$

$0 = \cos x (4 - \frac{1}{\sin^2 x})$   $\begin{cases} \cos x = 0 \rightarrow x = \frac{\pi}{2} \\ \sin x = \pm \frac{1}{2} \end{cases}$

$\begin{cases} x = \frac{\pi}{6} + 2\pi k \\ x = \pi - \frac{\pi}{6} + 2\pi k \\ x = -\frac{\pi}{6} + 2\pi k \\ x = \pi + \frac{\pi}{6} + 2\pi k \end{cases}$

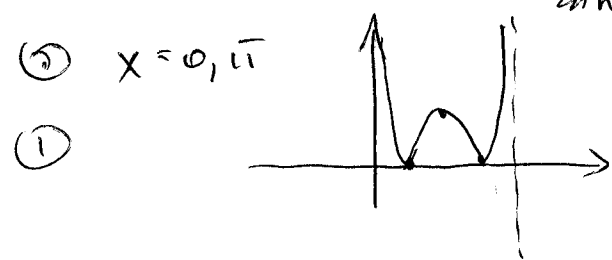
$\max(\frac{\pi}{2}, 1) \quad \min(\frac{\pi}{6}, 0) \quad \min(\frac{5\pi}{6}, 0)$

$y'' = -4\sin x - \frac{-\sin^3 x - 2\sin x \cos^2 x}{\sin^4 x} =$   
 $= -4\sin x + \frac{\sin^3 x - 2\sin x \cos^2 x}{\sin^4 x}$

$y''(\frac{\pi}{2}) < 0 \quad y''(\frac{\pi}{6}) > 0 \quad y''(\frac{5\pi}{6}) > 0$

④  $\frac{5\pi}{6} < x < \pi$  ,  $\frac{\pi}{6} < x < \frac{\pi}{2}$   $\pi/4$   
 $\frac{\pi}{2} < x < \frac{5\pi}{6}$  ,  $0 < x < \frac{\pi}{6}$   $\pi/3$

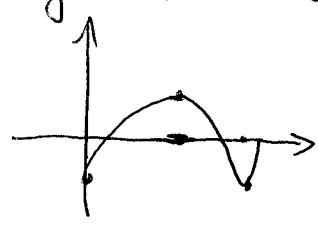
③  $y(0) = \dots$   $0 = 4\sin x + \frac{1}{\sin x} - 4 = 4\sin^2 x + 1 - 4\sin x$   
 $0 = 4t^2 - 4t + 1 \rightarrow t = 1/2$   
 $\sin x = 1/2 \rightarrow x = \frac{\pi}{6}, \frac{5\pi}{6} \quad (\frac{\pi}{6}, 0) \quad (\frac{5\pi}{6}, 0)$



24 (642) ①  $y' = \cos x + a \sin x$   $y'(\frac{\pi}{2}) = 0 = 0 + a \sin(\frac{\pi}{2})$   
 $a = 0$   $\frac{x}{2} a = k$   
 $a = 2k \rightarrow \boxed{|a|=2}$

②  $y = \sin x - \cos 2x$   
 $y' = \cos x + 2\sin 2x = \cos x + 4\sin x \cos x = \cos x(1 + 4\sin x)$   
 $\max(\frac{\pi}{2}, 2) \quad \min(3.39, -1.12)$   
 $\min(0, -1) \quad \max(\frac{3\pi}{2}, 0)$   
 $y'' = -\sin x + 4\cos 2x$   $y''(\frac{\pi}{2}) < 0$   $y''(3.39) > 0$   
 $y(0) = -1$   $\sin x - \cos 2x = 0$   $x = \frac{3\pi}{2}, \frac{\pi}{6}$   
 $(0, -1)$   $(\frac{3\pi}{2}, 0) \quad (\frac{\pi}{6}, 0)$

חומת פרטנורס



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④  $3.39 < x < \frac{3\pi}{2}$  ,  $0 < x < \frac{\pi}{2}$   $\pi/4$   
 $\frac{\pi}{2} < x < 3.39$   $\pi/3$