16.
(642) $y' = -3\cos x + 3\cos 3x = 0 \longrightarrow 3\cos 3x = 3\cos x$ ⑴

$3\cos x - 4\cos^3 x = \cos x$

$2\cos x(1 - 2\cos^2 x) = 0$

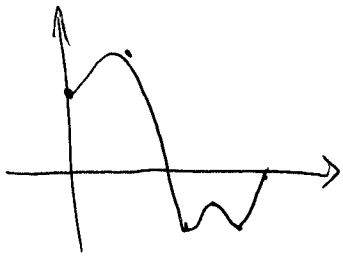
$\cos x = 0$ $\quad \cos x = \pm\sqrt{\frac{1}{2}}$

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

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

min נקודת $(0, 2)$ $\quad \max\left(\frac{\pi}{4}, 2\sqrt{2}\right)$ $\quad \min\left(\frac{5\pi}{4}, -2\sqrt{2}\right)$

$\max(\pi, -2)$ $\quad \min\left(\frac{3\pi}{4}, -2\sqrt{2}\right)$ $\quad \left(\frac{3\pi}{2}, 0\right)$ max נקודת



$y'' = -3\cos x + 9\cos 3x$

$y''\left(\frac{\pi}{4}\right) < 0$ $\quad y''\left(\frac{5\pi}{4}\right) > 0$ $\quad y''\left(\frac{3\pi}{4}\right) > 0$ $\quad y''(\pi) < 0$

⑵ עולה $\quad 0 < x < \pi/4$, $\frac{3\pi}{2} > x > \frac{3\pi}{4}$

יורדת $\quad \pi/4 > x > 0$, $\frac{3\pi}{4} > x > \pi$

$\frac{5\pi}{4} < x < \frac{3\pi}{2}$ $\quad \pi < x < \frac{5\pi}{4}$

⑶ חותך עם ציר ה- y $\quad y(0) = 3\cos 0 - \cos 0 = 2 \quad (0, 2)$

חותך עם ציר ה- x

$3\cos x - \cos 3x = 0$

$3\cos x = \cos 3x = 4\cos^3 x - 3\cos x$

$0 = 6\cos x(1 - \frac{2}{3}\cos^2 x) \longrightarrow \cos x = 0$

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

$\left(\frac{\pi}{2}, 0\right)$

17.
(642) ⑴ $x \neq \frac{\pi}{2}, -\frac{\pi}{2}$ $\quad$ ⑵ $y' = \frac{2}{\cos^2 x} - \frac{2\tan x}{\cos^2 x} = \frac{2}{\cos^2 x}(1 - \tan x) \overset{\text{קוצין}}{=} 0$

$x = \frac{\pi}{4}$

$+ \nearrow \; \searrow -$ $\quad \max\left(\frac{\pi}{4}, 1\right)$

$\frac{\pi}{4}$

⑶ עולה $\quad -\frac{\pi}{2} < x < \frac{\pi}{4}$ $\quad$ ⑷ $y(0) = 0 \quad (0, 0)$

יורדת $\quad \frac{\pi}{4} < x < \frac{\pi}{2}$

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

$(1.1, 0) \qquad x = 1.1$

⑸ $x = \frac{\pi}{2}, -\frac{\pi}{2}$ $\quad$ ⑹