東大理科　1965前期　⑤

$y' = 3\cos 2x \cdot 2 - \sin 3x \cdot 3$

$y' = -3$ のとき　$6\cos 2x - 3\sin 3x = -3$，　$2\cos 2x - \sin 3x + 1 = 0$

$\sin 3x = \sin(2x + x) = \sin 2x \cos x + \cos 2x \sin x = 2\sin x(1 - \sin^2 x) + (1 - \sin^2 x - \sin^2 x)\sin x$

$= 3\sin x - 4\sin^3 x$ であるから

$2(1 - \sin^2 x - \sin^2 x) - 3\sin x + 4\sin^3 x + 1 = 0$.

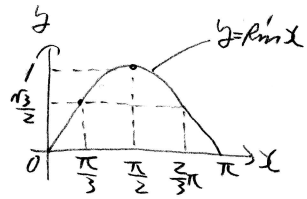
$4\sin^3 x - 4\sin^2 x - 3\sin x + 3 = 0$

$4\sin^2 x(\sin x - 1) - 3(\sin x - 1) = 0$

$(2\sin x + \sqrt{3})(2\sin x - \sqrt{3})(\sin x - 1) = 0$.

$\sin x = -\frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{2}, 1$

$0 < x < \pi$ より　$x = \frac{\pi}{3}, \frac{\pi}{2}, \frac{2}{3}\pi$



よって求める方程式は

$y - 3\sin\frac{2}{3}\pi - \cos\pi = -3(x - \frac{\pi}{3})$，　$y - 3\frac{\sqrt{3}}{2} + 1 = -3x + \pi$，　$y = -3x - 1 + \frac{3}{2}\sqrt{3}\pi$

$y - 3\sin\pi - \cos\frac{3}{2}\pi = -3(x - \frac{\pi}{2})$，　$y = -3x + \frac{3}{2}\pi$

$y - 3\sin\frac{4}{3}\pi - \cos 2\pi = -3(x - \frac{2}{3}\pi)$，$y + 3\frac{\sqrt{3}}{2} - 1 = -3x + 2\pi$，$y = -3x + 1 - \frac{3}{2}\sqrt{3} + 2\pi$