18. $y = \underbrace{e^x}_{P} \underbrace{\cos x}_{Q} \quad [0, \pi]$

① $P' = e^x \quad Q' = -\sin x$

$P'Q + PQ'$

$y' = e^x \cos x + e^x(-\sin x)$

$= e^x(\cos x - \sin x)$

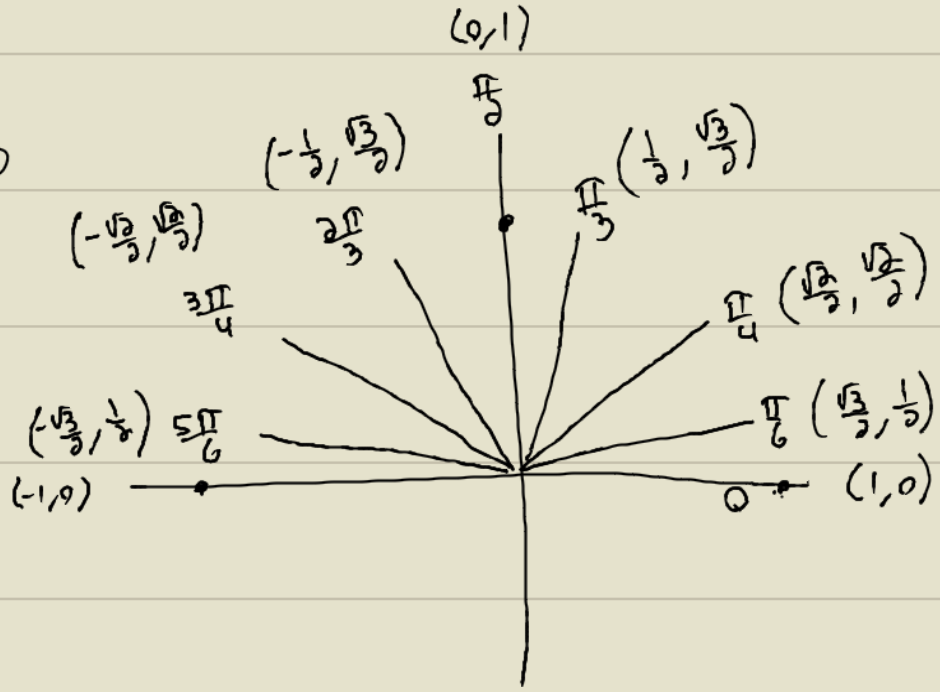
② $e^x(\cos x - \sin x) = 0$

$e^x = 0 \quad \cos x - \sin x = 0$

~~$\ln e^x = \ln 0$~~ $\cos x = \sin x$

$\downarrow$

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



③ $y = e^x \cos x$

$y = e^{\frac{\pi}{4}} \cos \frac{\pi}{4}$

$y = e^{\frac{\pi}{4}} \cdot \frac{\sqrt{2}}{2}$

$y = \frac{e^{\pi/4}\sqrt{2}}{2}$

$\left(\frac{\pi}{4}, \frac{e^{\pi/4}\sqrt{2}}{2}\right)$

ALT WAY

$\cos x = \sin x$

$\cos^2 x = \sin^2 x$

$\cos^2 x = 1 - \cos^2 x$

$\cos^2 x + \cos^2 x = 1$

$2\cos^2 x = 1$

$\cos^2 x = \frac{1}{2}$

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

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

$x = \frac{\pi}{4}, \frac{3\pi}{4}$

$\sin^2 + \cos^2 = 1$