

MPS115/6: HOMEWORK 1

ANNE ONYMOUS

1. QUESTION

Let $y = e^x \cos x$. Show that the stationary points on the curve occur precisely where $\tan x = 1$.

2. SOLUTION

Let $y = e^x \cos x$. Differentiating, we find $\frac{dy}{dx} = e^x(-\sin x) + e^x \cos x = e^x(\cos x - \sin x)$. Thus, $\frac{dy}{dx} = 0$ if and only if $e^x(\cos x - \sin x) = 0$. Since $e^x > 0$ for all x , it follows that $\frac{dy}{dx} = 0$ precisely when $\cos x = \sin x$; that is, when $\tan x = 1$. Hence the stationary points on the curve occur precisely when $\tan x = 1$, as required.