

# MAS115: Homework 1

Sam Marsh

October 16, 2013

## 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,  $\frac{dy}{dx} = e^x \cdot (-\sin x) + e^x \cdot \cos x = e^x(\cos x - \sin x)$ . 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.