

國立宜蘭大學 104 學年度第 1 學期 期中 考試試題紙			第 頁
考 試 科 目	班 級	學 號	姓 名
Calculus			

1. (20%) Apply Rolle's Theorem to  $f(x) = \sin x$  on the closed interval  $[0, 2\pi]$  for determining a value  $c$  such that  $f'(c) = 0$ .

2. (20%) Find the derivative of the function.

(a)  $f(x) = e^x \arcsin x$

(b)  $e^{xy} + x^2 - y^2 = 10$

3. (20%) Find an equation of the tangent line to the graph of the equation at the given point (1,0)

$$\arctan(x + y) = y^2 + \frac{\pi}{4}.$$

4. (20%) Determine the following limits.

(a)  $\lim_{x \rightarrow 0} \frac{4(e^{2x} - 1)}{e^x - 1}$

(b)  $\lim_{x \rightarrow \pi/4} \frac{1 - \tan x}{\sin x - \cos x}$

5. (20%) Find the critical numbers of  $f(x)$ .

(a)  $f(x) = \frac{x^4 + 1}{x^2}$

(b)  $f(x) = (x - 1)e^x$