

MATH101-10B - Introduction to Calculus

MAKEUP TEST 1

Wednesday 22 September 2010

Time Allowed: 50 mins

TEN Short Answer questions worth 10% each. **You do not need to show your working.**

Note: Marks for your record will not exceed 50%.

No one is to leave the lecture room **during the last 10 minutes** of the test period.

Calculators may be used but **NO Graphical or Symbolic calculators permitted.**

1. If $f(x) = x^3 + 2x^{-1}$ evaluate $f'(4)$.
2. If $g(x) = \frac{x^3}{3} + \frac{x^2}{2} - 6x + 1$ find the 2 points where $g'(x) = 0$.
3. Find the equation of the tangent to the curve $y = \frac{2}{x}$ at $(1, 2)$.
4. If u and v are functions of x find an expression for $(2u + 3uv)'$ in terms of u, v, u' , and v' .
5. State the chain rule for $(f \circ g)'(a)$ in functional form and then for $\frac{dy}{dx}$ using $y = f(u), u = g(x)$, indicating where the derivatives are evaluated.
6. If $f(x) = \sqrt{16 + (x+2)^2}$ evaluate $f'(1)$.
7. If $f(x) = x \cos(x^2)$ evaluate $f'(0)$.
8. Find the maximum domain in \mathbb{R} of the function given by the expression $f(x) = \frac{\sqrt{x}}{x+3}$.
9. If $f(x) = \begin{cases} x^2 + 1 & \text{if } x \neq 0, \\ 2 & \text{if } x = 0, \end{cases}$
evaluate $\lim_{x \rightarrow 0} f(x)$.
10. Evaluate $\lim_{\theta \rightarrow 0} \frac{\sin(2\theta)}{\theta} \left(\frac{\theta^2 + 1}{\theta + 1} \right)$.