

Math 1A Midterm 2 2012 Oct 30 3:30pm-5:00pm

Name	Student ID	Name of GSI
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You are allowed 1 sheet of notes. Calculators are not allowed. Each question is worth 3 marks, which will only be given for correct working and a clear and correct answer in simplified form. Write the final answer to questions 1 to 7 (but not questions 8 to 10) on this cover-sheet. There are questions on both sides of the paper.

1.

2.

3.

4.

5.

6.

7.

8. There is no need to copy the answer to question 8 here.

9. There is no need to copy the answer to question 9 here.

10. There is no need to copy the answer to question 10 here.

1. Differentiate $\sin(\cos(\tan(x)))$.

2. Find the equation of the tangent line to the curve $y = x + \tan x$ at the point (π, π) .

3. Find dy/dx by implicit differentiation if $x \sin y + 2y \sin x = 3$.

4. Find the derivative of $\tanh(1 + e^{2x})$

5. Use differentials or a linear approximation to estimate $\sqrt[3]{999.4}$.

6. Find the absolute maximum and absolute minimum values of

$$f(x) = x^3 - 12x + 2$$

on the interval $[-3, 5]$.

7. Find the limit

$$\lim_{x \rightarrow 0} (\sin(2x) - 2x)/x^3$$

8. Show that the equation $\cos x = 3x$ has exactly one real root.

9. Sketch the curve $y = \sqrt[3]{x(x-1)(x-2)}$. Your sketch should show the domain of the function, all local maxima and minima, where the function is increasing or decreasing, all zeros of the function, the behavior for large values of $|x|$, and the behavior near points where the function is not differentiable. You need not show convexity or points of inflection.

10. Sketch the graph of $y = x^3 e^{1/x}$. Your sketch should show the domain of the function, all local maxima and minima, where the function is increasing or decreasing, the behavior for large values of $|x|$, and the behavior near any points where the function is not defined. You need not show convexity or points of inflection.