Assignment 1

MATH1021: Single Variable Calculus

Lecturers: Goldys, Taji, Viera

This assignment is due by **23:59 Thursday 21 March 2019**, via Turnitin. Late assignments will receive a mark of zero. A PDF copy of your answers must be uploaded in the Learning Management System (Canvas) at https://canvas.sydney.edu.au/courses/15252.

Please submit only a PDF document (scan or convert other formats). It should include your SID, your tutorial time, day, room and Tutor's name. Once you have submitted, you will be able to download a digital receipt.

Please note: Turnitin in Canvas does NOT automatically send an email digital receipt. We strongly recommend downloading and saving a copy of the digital receipt as proof that you have submitted your work.

You should go back to where you submitted the assignment and click on VIEW. What you see is exactly how the marker will see your assignment. Click on the download button on the right (arrow pointing down) and print a PDF receipt and PDF of your submission.

Submissions can be overwritten until the due date. To ensure compliance with our anonymous marking obligations, please do not under any circumstances include your name in any area of your assignment; only your SID should be present.

The School of Mathematics and Statistics encourages some collaboration between students when working on problems, but students must write up and submit their own version of the solutions. If you have technical difficulties with your submission, see the University of Sydney Canvas Guide, available from the Help section of Canvas.

This assignment is worth 2.5% of your final assessment for this course. Your answers should be well written, neat, thoughtful, mathematically concise, and a pleasure to read. Please cite any resources used and show all working.

Mark	Grade	Criterion
5	A	Outstanding and scholarly work, answering all parts correctly, with clear accurate explanations and all relevant diagrams and working. There are at most only minor or trivial errors or omissions.
4	B	Very good work, making excellent progress, but with one or two substantial errors, misunderstandings or omissions throughout the assignment.
3	C	Good work, making good progress, but making more than two distinct substantial errors, misunderstandings or omissions throughout the assignment.
2	D	A reasonable attempt, but making more than three distinct substantial errors, misunderstandings or omissions throughout the assignment.
1	E	Some attempt, with limited progress made.
0	F	No credit awarded.

1. Show that the complex number $z = \dfrac{(1-i)^4}{i^{47}}$ can be expressed in the Cartesian form $z = a + ib$ where $a = 0$ and $b = -4$.

2. Let $z = 1 + i$. Express $\dfrac{z^9}{(\overline{z})^8}$ in polar form using the principal argument.

3. Solve the following equations over $\mathbb{C}$:

   (a) $2z - z^2 - 10 = 0$ (b) $z^4 = 16$.

4. Find all the fourth roots of $1 + \sqrt{3}i$.

5. Let $p(z) = z^4 - 5z^3 + 10z^2 - 10z + 4$. Find all roots of the polynomial equation $p(z) = 0$, where $z \in \mathbb{C}$, given that $1 + i$ is one root.