Dr Halbeisen*

Modules 110PMA003 & 110PMA107

Department of Pure Mathematics

Week 4, 2001

The pdf-file you may download from
`http://www.math.berkeley.edu/~halbeis/4students/zero.html`

Please hand in your solutions (stapled together with your full name on the first page) at the lecture on Thursday, 25th of October 2001.

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14. Let $z = \dfrac{(3-i)}{(2+i)}$.
    (a) Write z in the form $(a+ib)$.
    (b) Write z in the form $re^{i\varphi}$.
    (c) Evaluate z^{12}.

15. On an Argand diagram show the set of complex numbers z for which
$$\left| \overline{z} + \frac{1}{z} \right| \leq \frac{5}{2}.$$
    Hint: Write z in the form $z = re^{i\varphi}$.

16. Plot all solutions of the following equations on an Argand diagram.
    (a) $z^6 = -27$ (b) $z^8 = 16$

17. Write the complex number
$$\frac{\big(\sin(\alpha) + i\cos(\alpha)\big)}{\big(\cos(\beta) + i\sin(\beta)\big)}$$
    in the form $(a+ib)$, where a and b are in terms of $\sin(\alpha), \sin(\beta), \cos(\alpha)$ and $\cos(\beta)$.

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Office hours (Room 1007): Monday 1 pm–2 pm, Wednesday 2 pm–3 pm