ENGR122 Assignment 2
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DUE: 1pm 3 August 2018

1. Express the following complex numbers in polar form:

   (a) $3 - i$

   (b) 2

   (c) $-i$

   (d) $-5 + 12i$

2. Find the modulus and argument of:

   (a) $z_1 = -\sqrt{3} + i$

   (b) $z_2 = 4 + 4i$

   (c) $z_3 = z_1 z_2$

   (d) $z_4 = z_1/z_2$

   and express them in polar form.

3. Find the modulus and the argument of:

   (a) $3e^{i\pi/4}$

   (b) $2e^{-i\pi/6}$

4. Find the real and the imaginary parts of:

   (a) $5e^{i\pi/3}$

   (b) $11e^{i\pi}$

5. Express
$$z = 6(\cos 30° + i \sin 30°)$$
   in exponential form. Plot z on an Argand diagram and find its real and imaginary parts.

6. Express

   (a) $7 + 5i$ and

   (b) $\frac{1}{2} - \frac{1}{3}i$

   in exponential form

7. Use De Moivre's theorem to simplify the formula:
$$\frac{\cos 8\theta + i \sin 8\theta}{\cos 2\theta - i \sin 2\theta}$$

8. Solve the equations:

   (a) $z^3 + 1 = 0$

   (b) $z^4 = 1 + i$

   (c) $z^4 + 25 = 0$

9. Find $\sqrt[3]{2 + 2i}$ and display your solutions on an Argand diagram.

10. Sketch the loci and the regions defined by:

   (a) $\arg(z) = 0$

   (b) $\arg(z) = \pi/2$

   (c) $|2z| = |z - 1|$

   (d) $|z - 1| < |z - 2|$

The marks are 8,8,8,8,10,10,10,12,10,16 for questions 1-10. Total is 100.