University of Guyana
Faculty of Technology

EMT 121 - Problem Set X

April 19, 2011

1. Write down the complex conjugate of z when z is:
   (a) $3 + 4i$ (b) $-4 - 3i$ (c) $2 - 6i$

2. Simplify.
   (a) i^4 (b) i^9 (c) $(8 + 4i) + (2 - 6i)$ (d) $3(8 + i) - 2(3 - 5i)$

3. Solve each of the following.

   (a) $z^2 + 2z + 4 = 0$

   (b) $4z - 3 - 2z^2 = 0$

4. Evaluate.
   (a) $(3+i)(2+3i)$ (b) $(4-2i)(5+3i)$ (c) $(3-2i)(7-5i)$ (d) $i(2-3i)(i+4)$

5. Express in the form $a + ib$, where a, $b \in R$.

   (a) $\frac{2+3i}{4-i}$

   (b) $\frac{8-i}{2+3i}$

6. If $z = 3 + i$, find the value of $z + \frac{1}{z}$.

7. Simplify the Boolean expressions.

   (a) $(A + C)(AD + A\overline{D}) + AC + C$

   (b) $\overline{A}(A + B) + (B + AA)(A + \overline{B})$

8. According to De Morgan's laws $\overline{AB} = \overline{A} + \overline{B}$, and $\overline{A + B} = \overline{A} \cdot \overline{B}$. Use this knowledge to simplify the following Boolean expressions.

   (a) $C + \overline{BC}$

   (b) $\overline{AB}(\overline{A} + B)(\overline{B} + B)$

9. Draw truth tables for the following:

   (a) $A + BC$.

(b) $(A + B)(A + C)$

10. Draw logic circuits for the following:

    (a) $(A + B)C$

    (b) $A + BC + \overline{D}$

11. Convert the following truth table to SOP and POS expressions.

A	B	Z
0	0	1
0	1	0
1	0	0
1	1	0