Homework - Computations involving complex numbers

1. For each of the following complex numbers, draw the appropriate $s - plane$ diagram to describe the number geometrically, and express in equivalent exponential polar coordinates.

    (a) $1 + j2$

    (b) $2.7 + j3.1$

    (c) $-6.4 + j6.4$

    (d) $3.1 - j8.4$

    (e) $-17.7 + j42.3$

    (f) $-3. - j0.0$

    (g) $5.0 - j5.0$

2. Transform each of the following into rectangular coordinates.

    (a) $18e^{j25^0}$

    (b) $32e^{j270^0}$

    (c) $8e^{j180^0}$

    (d) $144e^{j350^0}$

    (e) $9.7e^{j123^0}$

3. For each of the complex pairs listed below, form the quantities $s_1 s_2$ and s_1 / s_2. Draw the resulting $s - plane$ vector diagrams.

    (a) $s_1 = 2 + j3$, $s_2 = -4 + j8$

    (b) $s_1 = 0.5 + j7.0$, $s_2 = 14e^{j45^0}$

    (c) $s_1 = 126e^{j67^0}$, $s_2 = 11e^{j344^0}$

    (d) $s_1 = 18 + j0$, $s_2 = 0 + j3$

    (e) $s_1 = 4 - j5$, $s_2 = -2 - j7$

4. Compute the following distinct roots, and describe the results graphically.

    (a) $\sqrt[3]{2}$

    (b) $\sqrt{-1 + j\sqrt{3}}$

    (c) $\sqrt[3]{-1}$

    (d) $\sqrt[5]{-1 - j1}$

    (e) $\sqrt[4]{0 + j16}$

    (f) $\sqrt[3]{e^{j10^0}}$