Complex Number Exercises

CS 145 Images and Imagination

1. Put in z standard form (a + b i):
   a. $z = 4 + \sqrt{9}$ = _____
   b. $z = i^2 + i\sqrt{25}$ = _____
   c. $z = 254\ i^2$ = _____
   d. $z = i^7$ = _____
2. Convert from polar to standard form (Cartesian coordinates) in standard form
   a. $r = 4, \quad \theta = 25, \quad z =$ _____
   b. $r = 5, \quad \theta = 165 \quad z =$ _____
3. Compute the modulus (length) of
   a. $z = 3 + 4i, \qquad r =$ _____
   b. $z = -2 + 1.6i, \quad r =$ _____
4. What is the $\bar{z}$ = complex conjugate of each of the z values in problem 1
   a. $\bar{z}$ = _____
   b. $\bar{z}$ = _____
   c. $\bar{z}$ = _____
   d. $\bar{z}$ = _____

5. Suppose $z_1 = (4 + 3\ i)$ and $z_2 = (-2 + 4\ i)$. Calculate the following, placing the result in standard form
   a. $z_1 + z_2$ = _____
   b. $z_1 - z_2$ = _____
   c. $2\ z_1$ = _____
   d. $z_1\ z_1 = z_1^2$ = _____
   e. $z_1\ z_2$ = _____
   f. $\bar{z}_1 + z_1$ = _____
   g. $\bar{z}_1 z_1$ = _____
   h. z_1 / z_2 = _____