Complex Number Exercises

CS 145 Images and Imagination

1. Put in z standard form (a + b i):
   a. $z = 4 + \sqrt{16}$ = _____
   b. $z = i^2 + i\sqrt{25}$ = _____
   c. $z = -72\ i^2 + i$ = _____
   d. $z = i^5$ = _____
2. Convert from polar to standard form (Cartesian coordinates) in standard form
   a. $r = 4,\ \theta = 25,\quad z$ = _____
   b. $r = 5,\ \theta = 200\quad z$ = _____
3. Compute the modulus (length) of
   a. $z = 2 + 4\ i,\qquad r$ = _____
   b. $z = -3 + 1.5\ i,\quad r$ = _____
4. What is the $\bar{z}$ = complex conjugate of each of the z values in problem 3
   a. $\bar{z}$ = _____
   b. $\bar{z}$ = _____

5. Suppose $z_1 = (1 + 3\ i)$ 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 = _____