Complex Number Exercises

Solutions

CS 145 Images and Imagination

1. Put in z standard form (a + b i):
   a. $z = 4 + \sqrt{16}$ = ____8__
   b. $z = i^2 + i\sqrt{25}$ = _____-1 + 5 *i*___
   c. $z = -72\ i^2 + i$ = _____72 + *i*___
   d. $z = i^5$ = ___*i*_____
2. Convert from polar to standard form (Cartesian coordinates) in standard form
   a. $r = 4,\ \theta = 25,\ z = 3.62 + 1.69\ i$
   b. $r = 5,\ \theta = 200\ z = -4.69 - 1.71\ i$
3. Compute the modulus (length) of
   a. $z = 2 + 4\ i,\quad r = \sqrt{20} = 4.47$_____
   b. $z = -3 + 1.5\ i,\quad r = \sqrt{11.25} = 3.35$_____
4. What is the $\bar{z}$ = complex conjugate of each of the z values in problem 3
   a. $\bar{z}$ = __2 - 4 *i* _____
   b. $\bar{z}$ = ___-3 - 1.5 *i* ___
5. Suppose $z_1 = (1 + 3\ i)$ and $z_2 = (-2 + 4\ i)$. Calculate the following, placing the result in standard form
   a. $z_1 + z_2$ = __- 1 + 7 *i* ____
   b. $z_1 - z_2$ = _3 – 1 *i* ___
   c. $2\ z_1$ = ___2 + 6 *i* _____
   d. $z_1\ z_1 = z_1^2$ = __-8 + 6 *i* _____
   e. $z_1\ z_2$ = ___- 14 – 2 *i* ___
   f. $\bar{z}_1 + z_1$ = ___2_____
   g. $\bar{z}_1 z_1$ = ____10_____
   h. z_1 / z_2 = ____.5 + .5 *i* ____