Math 121 Problem Set #12 on Chapter 12 C.S.Davis

Name _____

1. Evaluate the following.

   a. $j^1 + j^2 + j^3 + j^4 + j^5 + j^6 + j^7 + j^8 + j^9$

   b. The conjugate of -9 + 4j

   c. $\sqrt{-9} \quad \sqrt{-16}$

   d. $\sqrt{(-9)\ (-16)}$

2. Do the following arithmetic on the complex numbers in rectangular form.

   a. (3 + 5j) + (7 - 4j)

   b. (3 + 5j) - (7 - 4j)

   c. (3 + 5j) · (7 - 4j)

   d. (3 + 5j) ÷ (7 - 4j)

3. There are six popular ways to express a complex number.
   A. In graphical form,
   B in rectangular form, a+bj
   C. In polar form, $r(\cos\theta + j\sin\theta) \equiv r\angle\theta \equiv r\,e^{j\theta} \equiv r\,\mathrm{cis}\,\theta$

   Given one form of these complex numbers, find the other five. Keep three digits in the answers.

a.

A	B 3 - 4j	C

b.

A	B	C 4(cos 120°+ j sin 120°)

4. Perform the indicated operations on these polar expressions and leave the result in polar form.

   a. $[3(\cos 120° + j \sin 120°)]\ [5(\cos 45° + j \sin 45°)]$

   b. $\dfrac{3(\cos 120° + j \sin 120°}{5(\cos 45° + j \sin 45°)}$

   c. $[3(\cos 120° + j \sin 120°)]^5$

5. Use De Moivre"s theorem to find three cube roots of $\sqrt{3} - j$