ECE 2202 – CIRCUIT ANALYSIS II

HOMEWORK #6

1. A complex number with a phase between 90˚ and 180˚ (in the 2nd quadrant) is added to a second complex number with a phase between –90˚ and –180˚ (in the 3rd quadrant).

a) What is the sign of the real part of this sum?

b) What can you say about the sign of the imaginary part of the sum?

c) What can you say about the phase of the sum?

d) What can you say about the magnitude of the sum?

2. A complex number with an arbitrary real part and a positive imaginary part is multiplied by a second complex number that is purely imaginary, with a negative coefficient for *j*.

a) What can you say about the phase of the product?

b) What can you say about the magnitude of the product?

c) What can you say about the real part of the product?

d) What can you say about the imaginary part of the product?

3. Three complex numbers are to be multiplied. Each complex number has a real part which is positive, and an imaginary part which is positive. For each complex number, the imaginary part is larger than the real part. What can you say about the sign of the real part of the product of the three complex numbers? Show your work, explaining how you reached your solution.4. Solve the following equation for *m* and *n*. You should assume that *m* and *n* are real numbers. The variable *n* is an angle. There are two sets of solutions, and you should find both sets of solutions. In your solutions, show your units.



5. Find the nonzero value of *ω* for which the expression for *Z(ω)* given is purely real. Give your answer as a function of *R*, *L*, and *C*.

 

6. Solve the following equation for *m* and *n*. You should assume that *m* and *n* are real numbers. The variable *n* is an angle. Show your units in your solutions.



7. The variables *a* and *b* are real. Find all of the solutions for *a* and *b* that are valid for the following equation. Show your work, showing the steps you have taken to get your answer or answers.



Selected Numerical Solutions

1. Solution omitted

2. Solution omitted

3. The real part will be negative.

4. 

5. ****

6. Solution omitted.

7. *a* = 2.74; *b* = 6.10