Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (please print)

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ECE 2300 – Quiz #6

December 2, 2014

Keep this quiz closed and face up until you are told to begin.

1. This quiz is closed book, closed notes. You may use one 8.5” x 11” crib sheet, or its equivalent.

2. Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.

3. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**

4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.

5. Do not use red ink. Do not use red pencil.

6. You will have 30 minutes to work on this quiz.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/20

Room for extra work

Solve the following equation for *a*. You should assume that *a* and *b* are real variables, and not complex.



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Solution: Quiz #6, December 2, 2014

Version 1: Solve the following equation for *a*. You should assume that *a* and *b* are real variables, and not complex.



We begin the solution by cross-multiplying. This will allow us to have the two variables on one side of the equation, and to evaluate the other side.



We evaluated the right hand side of this equation by plugging it into our calculator.

Next, we write real equations in the two real unknowns by taking either the real part, the imaginary part, the magnitude, or the phase of both sides of the equation, and setting them equal to each other. After some consideration of the equation, we choose to take the phase of both sides of the equation, since that will give us *b* in one equation. Remember that the phase of a product is the sum of the phases,



Thus, we get

.

Now, we go back to the equation from before,



and take the magnitude of both sides of the equation,



Since we know b, we can plug it in and get a, as



.

Version 2: Solve the following equation for *a*. You should assume that *a* and *b* are real variables, and not complex.



We begin the solution by cross-multiplying. This will allow us to have the two variables on one side of the equation, and to evaluate the other side.



We evaluated the right hand side of this equation by plugging it into our calculator.

Next, we write real equations in the two real unknowns by taking either the real part, the imaginary part, the magnitude, or the phase of both sides of the equation, and setting them equal to each other. After some consideration of the equation, we choose to take the phase of both sides of the equation, since that will give us *b* in one equation. Remember that the phase of a product is the sum of the phases,



Thus, we get

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Since we know b, we can plug it in and get a, as



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Version 3: Solve the following equation for *a*. You should assume that *a* and *b* are real variables, and not complex.



We begin the solution by cross-multiplying. This will allow us to have the two variables on one side of the equation, and to evaluate the other side.



We evaluated the right hand side of this equation by plugging it into our calculator.

Next, we write real equations in the two real unknowns by taking either the real part, the imaginary part, the magnitude, or the phase of both sides of the equation, and setting them equal to each other. After some consideration of the equation, we choose to take the phase of both sides of the equation, since that will give us *b* in one equation. Remember that the phase of a product is the sum of the phases,



Thus, we get

.

Now, we go back to the equation from before,



and take the magnitude of both sides of the equation,



Since we know b, we can plug it in and get a, as



.

Version 4: Solve the following equation for *a*. You should assume that *a* and *b* are real variables, and not complex.



We begin the solution by cross-multiplying. This will allow us to have the two variables on one side of the equation, and to evaluate the other side.



We evaluated the right hand side of this equation by plugging it into our calculator.

Next, we write real equations in the two real unknowns by taking either the real part, the imaginary part, the magnitude, or the phase of both sides of the equation, and setting them equal to each other. After some consideration of the equation, we choose to take the phase of both sides of the equation, since that will give us *b* in one equation. Remember that the phase of a product is the sum of the phases,



Thus, we get

.

Now, we go back to the equation from before,



and take the magnitude of both sides of the equation,



Since we know b, we can plug it in and get a, as



.