

# SAMPLE SOLUTION WRITEUPS FOR ECE 307

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Your solution writeups to the problems in the investigations need to make clear

1. What each problem is - without simply recopying it
2. What is given
3. How you're solving the problem
4. What your answer is

In addition every circuit being analyzed must be drawn with its reference directions. Here are some examples.

## SAMPLE SOLUTION WRITEUPS FOR INVESTIGATION 1

1. Using Euler's Relation to show that  $re^{j\theta}$  and  $re^{-j\theta}$  are complex conjugates:

By Euler's Relation

$$re^{j\theta} =$$

$$re^{-j\theta} =$$

And so . . . .

3. Expressing each of the following sums of complex exponentials as sinusoids:

a.  $x(t) = 3e^{j\pi/3}e^{-j1000t} + 3e^{-j\pi/3}e^{j1000t}$   
 $= 3e^{-j(1000t-\pi/3)} + 3e^{j(1000t-\pi/3)}$   
 $=$

## SAMPLE SOLUTION WRITEUPS FOR INVESTIGATION 2

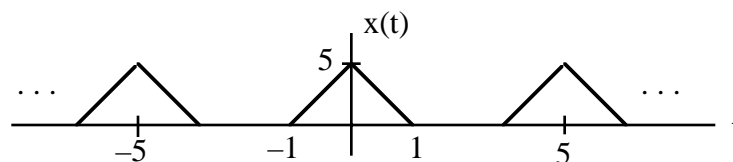
2. Demonstrating that the integral of a complex exponential over an integer number of cycles is equal to zero:

- a. Beginning with the integral over one cycle we have

$$\int_T e^{j100t} dt =$$

- b. Now for m cycles we have . . .

5. Finding the Fourier Coefficient  $X_0$  of the following periodic signal



- a. From Problem (3) we have that

$$X_o = \frac{1}{T} \int_T x(t) dt =$$

b. The physical meaning of  $X_o$  is . . .

### SAMPLE SOLUTION WRITEUPS FOR INVESTIGATION 3

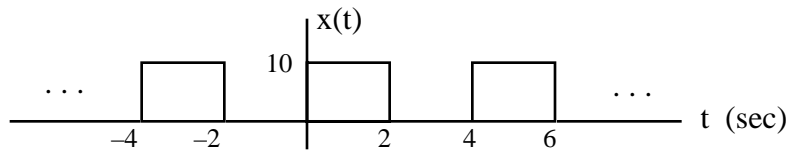
1. Finding the frequency, period and complex Fourier Coefficients of  $x(t)$  given by

$$x(t) = 2e^{-j\pi/4} e^{-j200t} + 3e^{j\pi/3} e^{-j100t} + 4 + 3e^{-j\pi/3} e^{j100t} + 2e^{j\pi/4} e^{j200t}$$

a.  $T =$        $f_o = 1/T =$        $\omega_o = 2\pi f_o =$

b.  $X_o =$  . . . .

2. Finding the Fourier Coefficients  $X_o$  and  $X_n$  of the following pulse train



a.  $X_o = \frac{area}{T} =$

b.  $X_n = \frac{1}{T} \int_T e^{-j2\pi n f_o t} x(t) dt =$