University of Rochester

Department of Electrical & Computer Engineering

ECE113 Homework #0

Due: Jan 22nd

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1) Convert the following complex numbers as indicated:

(a) Exponential to both polar & Cartesian forms:

e –j2π/3 ; e +j3π ; 5e -1+j2

(b) Polar to both exponential & Cartesian:

10∠-270º ; 10∠180º ; 1.41∠135º ; 100∠-45º

(c) Cartesian to exponential & polar:

0.02 ; 141+j141 ; j ; 10 - j10

*For polar form, express all angles in degrees. For exponential form, use radians.*

2) Perform the arithmetic operations indicated, expressing all answers in the simplest Cartesian form:

(a) [2e -jπ /2 + j] / j = ?

(b) [14.1∠135º - 10 – j10] [1 + j] = ?

(c) e 2-jπ ×1∠180º = ?

(d) [10 + j5]2.5 = ?

*Express all answers to #2 in Cartesian form.*

3) Express the following sinusoidal current functions as phasors & carefully sketch them in a single complex plane plot:

(a) i(t) = 10 cos (377t)

(b) i(t) = 7.07 cos (377t – π/4)

(c) i(t) = 5 cos (377t - π )