## Unit 7.5 Mathematical Functions and Converting Between Polar and Rectangular

1. Perform the requested operation and simplify as much as possible. Leave answers in polar form

   a. $(5.12 + 7.2i) \cdot (3.15 - 5.38i)$

   b. $(2 - 4i) \cdot (3 + 8i)$

   c. $[(5 + i) \cdot (4 - 3i)] \cdot (1 + 5i)$

   d. $(2.86 \angle 38.2°)(1.55 \angle 21.1°)$

   e. $(34\angle -45°) \cdot (59\angle -45°)$

f. $(28.4 \angle 56°)(75.3 \angle -35°)$

g. $(24 \angle 50°) \div (12 \angle 30°)$

h. $(20.2 \angle -48°) \div (2.6 \angle 155°)$

i. $(16.5 \angle -235°) \div (24.6 \angle -135°)$

j. $(24 \angle 50° + 10 \angle 37°)(12 \angle -45° + 6 \angle 67°)$

2. Find the magnitude and direction with respect to the positive x-axis, of the vectors shown below. (Hint: Convert to rectangular, add and convert back to polar)
   A= $150\angle 60°$, B= $100\angle 135°$, C= $150\angle 260°$

3. Given an electronic circuit with an inductor and a resistor in series. The inductor has a value of XL= 100 Ω and the resistor is R = 120 Ω what would the total opposition be in the circuit in polar form if the total opposition is 120 Ω + j100 Ω?

4. If a rotor has run counterclockwise to the rectangular coordinates $(-4, -4)$. Through how many degrees has it passed if it started at 0°?

5. A crank 189mm long, starting $20^0$ from the origin (lead) turns in a counterclockwise direction $75^0$. What is the **horizontal** projection of the line at the end point?

6. You have a circuit with a combined R value of 1.2 kΩ + j3.1kΩ. The voltage you are supplying has a value of 16 V ∠ 0°. Find the current in mA in the circuit using ohms law (V=I*R). Be sure to include the angle