EE 261

Answer Key for Practice Problems on Complex-Number Arithmetic

(Aziz Inan)

1. Which of the following polar-form complex numbers equals 1 – j?

a. $2^{0.5}e^{j\pi/4}$ b. $2^{0.5}e^{-j\pi/4}$ c. $2^{0.5}e^{-j\pi/2}$ d. $2^{0.5}\,e^{-j3\pi/4}$ e. $2e^{j\pi/2}$

2. Which of the following is equal to –4 + j4 in polar form?

a. $4(2^{0.5})e^{j\pi/4}$ b. $4(2^{0.5})e^{-j\pi/4}$ c. $4e^{-j\pi/4}$ d. $32e^{-j3\pi/4}$ e. $4(2^{0.5})e^{j3\pi/4}$

3. Which of the following polar-form complex numbers is equal to j2?

a. $2e^{j\pi/2}$ b. $2e^{-j\pi/2}$ c. $3e^{-j\pi/2}$ d. $2e^{j3\pi/2}$ e. $2e^{-j3\pi/4}$

4. Which of the following polar-form complex numbers equal –3?

a. $3e^{-j\pi/2}$ b. $3e^{-j2\pi}$ c. $3e^{j\pi/3}$ d. $3e^{j\pi}$ e. $3e^{-j3\pi/4}$

5. Which of the following is equal to j^{2015}?

a. 1 b. j c. –j d. $e^{j\pi/2}$ e. –1

6. Which of the following is equal to ($j+e^{-j\pi/2}$)?

a. 2j b. –2j c. e^{j0} d. $j(1-e^{-\pi/2})$ e. 0

7. Which of the following is equal to $je^{-j\pi/2}$?

a. –1 b. –j c. j d. 1 e. 0

8. Which of the following is equal to 2/(–1+j)?

a. $2^{0.5}e^{j3\pi/4}$ b. $2(2^{0.5})e^{j3\pi/4}$ c. $2^{0.5}e^{-j3\pi/4}$ d. $2^{0.5}e^{j\pi/4}$ e. $2e^{-j\pi/4}$

9. Which of the following is equal to (1–j)(–1+j)?

a. –2+j2 b. 0 c. $2e^{-j\pi/2}$ d. –2j e. 2j

10. Which of the following is equal to (1 – j)/(–1+j)?

a. 0 b. 1 c. –1 d. j e. –2j

11. What is the simplified version of $j2^{0.5}e^{j3\pi/4}/(1-j)$?

a. 1 b. 2–j2 c. –1 d. j2 e. –j

12. What is the simplified version of 2(1+j)/[j(1–j)]?

a. j2 b. 2 c. –1 d. –j2 e. –j

Euler's formula:

$e^{j\pi}+1=0$