1.   Give numerical answers to each of the following questions:

      a)   Find the value of $z = 6 - j5 + -3 + j3$.

      b)   Find the magnitude of $z = 5 + j12$.

      c)   Find the conjugate of $z = \dfrac{2 + j2}{-j}$.

      d)   Find the value of $z = (6 - j5)(-3 + j3)$.

2.   Plot each of the following complex numbers as vectors in the complex plane:

      a) j

      b) $\dfrac{1 + j}{2} - \dfrac{1 - j}{2}$

      c) $\dfrac{1}{j^3}$

      d) $\dfrac{1 + j}{1 - j}$

3.   Give numerical answers to each of the following questions:

      a)   Rationalize $\dfrac{175 - j600}{-3 + j4}$. Express your answer in rectangular form.

      b)   Find the magnitude of $\dfrac{1}{2} + j\dfrac{\sqrt{3}}{2}$.

      c)   Find the real part of $\dfrac{(1 + j)^4}{1 + j\sqrt{3}}$.

4.   Use a Taylor series for e^x, $\cos(x)$, and $\sin(x)$ to shown the following equation is valid: (This is Euler's formula.)

$$e^{jx} = \cos x + j \sin x$$

5.   Differentiate both sides of Euler's formula to obtain an identity for the derivative of a complex exponential in terms of cosine and/or sine functions.