From the Textbook (80%)

Chapter 1: 9, 16, 22, 64

Supplemental Problem (20%)

A vector has Cartesian coordinates of (4, 5), as shown.

\[ \vec{A} = (x, y) = (4, 5) \]

The same vector can be completely specified in terms of its polar coordinates \( r \) and \( \theta \) where \( r \) is the magnitude of the vector and \( \theta \) is the angle it makes with the x axis.

\[ \vec{A} = (r, \theta) = (6.40, 51.3^\circ) \]

Of course, the relation between these two coordinate system's representation of the vector is:

\[
\begin{align*}
  r &= \sqrt{x^2 + y^2} \\
  \theta &= \tan^{-1}\left(\frac{y}{x}\right)
\end{align*}
\]

A second vector \( \mathbf{B} \) has Cartesian coordinates (4, 2).

1. Express \( \mathbf{B} \) in polar coordinates.
2. Find \( \mathbf{A} + \mathbf{B} \) by adding the Cartesian coordinates. Express the answer in polar coordinates.
3. Add the polar coordinates of \( \mathbf{A} \) and \( \mathbf{B} \). Compare to answer 2.