1. For each of the following sinusoidal waves, find:
   1) Peak-to-peak voltage or current, \( V_{pp} \) or \( I_{pp} \)
   2) Amplitude, \( A \) (\( V_p \) or \( I_p \))
   3) Period, \( T \)
   4) Frequency \( f \) in cycles/sec or Hz
   5) An expression for \( v(t) \) or \( i(t) \) in terms of \( A\cos \omega t + \phi \)
      (The frequency \( \omega \) is in radians/sec
      the phase angle \( \phi \) is in rad/sec or degrees)

   ![Graph of a sinusoidal wave](image1)

   ![Graph of a sinusoidal wave](image2)

2. For each of the following waveforms, find:
   1) Peak-to-peak voltage or current, \( V_{pp} \) or \( I_{pp} \)
   2) Average, \( (V_{DC}, I_{DC}, V_{ave}, \text{ or } I_{ave}) \)
   3) Period, \( T \)
   4) Frequency \( f \) in cycles/sec or Hz

   ![Graph of a waveform](image3)

   ![Graph of a waveform](image4)

3. For problem 2a above, write a full expression for \( v(t) \) in terms of \( v(t) = A\cos \omega t + \phi + V_{DC} \)

   **Answers**

   1. a) \( 0.2\cdot V \quad 0.1\cdot V \quad 12\cdot ms \quad 83.3\cdot Hz \quad 0.1\cdot V\cdot\cos(523.6\cdot t) \)

      b) \( 24\cdot V \quad 12\cdot V \quad 0.018\cdot ms \quad 55.6\cdot kHz \)

      \( v(t) := 12\cdot V\cdot\cos(349100\cdot t - 90\cdot \text{deg}) \)

      c) \( 16\cdot mA \quad 8\cdot mA \quad 0.3\cdot ms \quad 3333\cdot Hz \)

      \( 8\cdot mA\cdot\cos(20940\cdot t + 150\cdot \text{deg}) \)

   2. a) \( 12\cdot V \quad 3\cdot V \quad 6\cdot ms \quad 167\cdot Hz \)

      b) \( 12\cdot V \quad 6\cdot V \quad 4\cdot ms \quad 250\cdot Hz \)

      c) \( 250\cdot mA \quad 25\cdot mA \quad 0.6\cdot ms \quad 1.667\cdot kHz \)

   3. \( v(t) := 6\cdot V\cdot\cos(1047\cdot t - 90\cdot \text{deg}) + 3\cdot V \)