PROBLEM:

Circle the correct answer to each of these short answer questions:

1. A signal $x(t)$ is defined by: $x(t) = \Re\{e^{j12\pi t} + e^{j21\pi t}\}$. Its fundamental frequency is:

   (a) $f_0 = 1.5$ Hz

   (b) $f_0 = 3\pi$ Hz

   (c) $f_0 = 6$ Hz

   (d) $f_0 = 21$ Hz

   (e) none of the above

2. A sinusoidal signal $x(t)$ is defined by: $x(t) = \Re\{(1 + j)e^{j\pi t}\}$. When plotted versus time (t), a maximum value of $x(t)$ will be located at:

   (a) $t = 0$ sec.

   (b) $t = 1/4$ sec.

   (c) $t = 1$ sec.

   (d) $t = 7/4$ sec.

   (e) none of the above

3. Determine the amplitude (A) and phase (ϕ) of the sinusoid that is the sum of the following three sinusoids: $\cos(\pi t + \pi/2) + \cos(\pi t + \pi/4) + \cos(\pi t + 3\pi/4)$.

   (a) $A = 0$ and $\phi = 0$.

   (b) $A = 1$ and $\phi = \pi/2$.

   (c) $A = 1 + \sqrt{2}$ and $\phi = 0$.

   (d) $A = 1 + \sqrt{2}$ and $\phi = \pi/2$.

   (e) $A = 3$ and $\phi = \pi/2$.

4. Evaluate the complex number: $z = \sum_{k=0}^{4} e^{-j\pi k/2}$

   (a) $z = 0$

   (b) $z = j$

   (c) $z = -j$

   (d) $z = 1$

   (e) $z = -1$