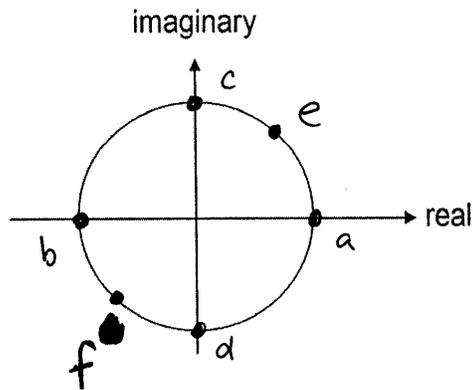


Name: Key

**EE322 Fall 2008 Quiz 06**

1. On the plot of the real/imaginary plane below, plot the following points. Label the points when you plot them. Note that the unit circle is drawn on the plot.

- a. 1
- b. -1
- c. j
- d. -j
- e.  $e^{j\frac{\pi}{4}}$
- f.  $e^{-j\frac{3\pi}{4}}$



For the following two questions, make sure your answer does NOT have a  $j$  in any denominator.

2. Write  $\cos(2\pi 15t)$  as a sum of complex exponentials.

$$\frac{1}{2} e^{j2\pi 15t} + \frac{1}{2} e^{-j2\pi 15t}$$

3. Write  $-2 \sin(40\pi t)$  as a sum of complex exponentials.

$$\begin{aligned} & -2 \frac{1}{2j} e^{j40\pi t} - 2 \left(-\frac{1}{2j}\right) e^{-j40\pi t} \\ & = j e^{j40\pi t} - j e^{-j40\pi t} \end{aligned}$$

Given:  $x(t) = 3 \cos(2\pi 500t)$ ,  $= 3 \frac{1}{2} e^{j2\pi(1)500t} + 3 \frac{1}{2} e^{j2\pi(-1)500t}$

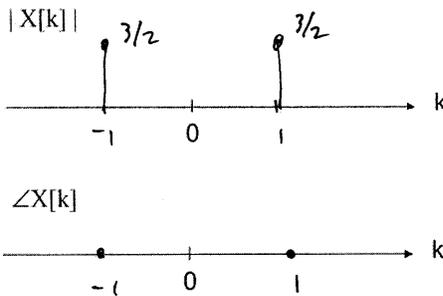
3. What is the fundamental frequency of this signal?

500 Hz

4. What is the continuous-time Fourier series Harmonic function  $X[k]$ . Write your answer in terms of delta functions.

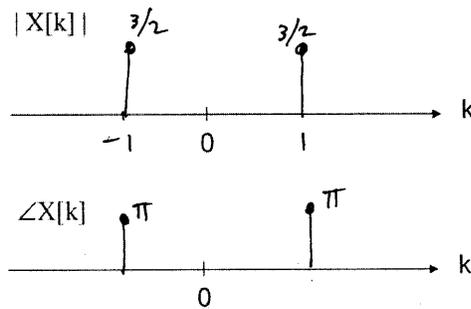
$$X[k] = \frac{3}{2} \delta[k+1] + \frac{3}{2} \delta[k-1]$$

5. Plot the magnitude and phase of  $X[k]$  below.



Given:  $x(t) = -3 \cos(2\pi 500t)$ ,

6. Plot the magnitude and phase of  $X[k]$  below.



Bonus: Which two countries fought in the Falklands war? (you must name both).

UK, Argentina