HW#4 Exploring Sinc functions.

#1 $\sin(x)$

(a) Fill the blanks by using a calculator.

x in Deg	sin(x)	x in Rad	sin(x)
1		1	
0.5		0.5	
0.01		0.01	
0.02		0.02	
0.04		0.04	
0.08		0.08	
0.09		0.09	

(b) What can you say about the values of x and $\sin(x)$ when x is much less than 1?

(c) Write down the Taylor series expansion of $\sin(x)$.

(d) Write down the x intercepts of $\sin(x)$, $\sin(\pi x)$.

#2 $sinc(x)=\frac{\sin(x)}{x}$

(a) Plot the functions $\sin(x)$ and $\frac{1}{x}$

(b) Write your idea when $x \leftarrow 0$

(If $x \ll 0$ then higher order terms x^2, x^3, x^4 ------?)

(c) Write your opinion when $x > 0$ and $x < 0$.

(d) Explain that $sinc(x)$ is the even function.

(e) Plot the functions $sinc(x)$, $sinc(\pi x)$ .and write down the x intercepts

(f) Find the Fourier Transform of $sinc(\pi x)$