* Text Example 4.4

$$x(t) = \begin{cases} 1 & \text{if } |t| < T_1 \\ 0 & \text{otherwise} \end{cases}$$

Find $X(j\omega)$

Ans:

Q: How to plot $X(j\omega)$?

Ans:

Q: How high is the main lobe?

Ans:

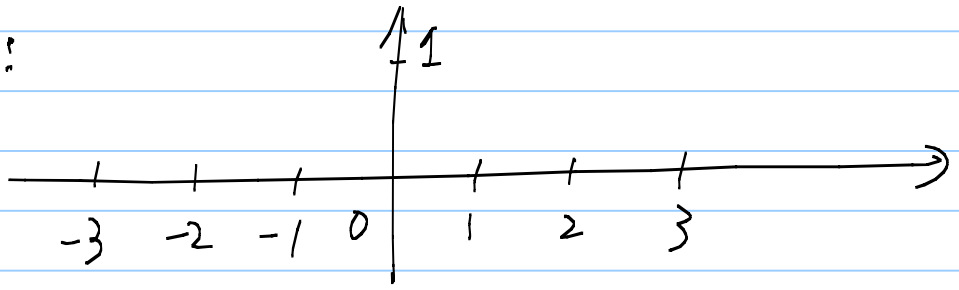
Note Title 3/1/2010

* In the textbook, a "sinc" function is introduced:

$$\text{sinc}(\theta) = \frac{\sin \pi\theta}{\pi\theta}$$

Q: Plot $\text{sinc}(\theta)$ vs. θ ?

Ans:



* Alternatively, we can write our previous answer as

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* Text Example 4.5

Given $X(jw) = \begin{cases} 1 & \text{if } |w| \le W \\ 0 & \text{if } |w| > W \end{cases}$

Find $x(t)$.

Ans: By direct computation

How to plot π? p. 294

Step 1: Find the crossing points ($\sin(\ ) = 0$)

Step 2: Find the height of the main lobe

using $\lim_{\theta \to 0} \frac{\sin(\theta)}{\theta} = 1$ $\qquad \frac{W}{\pi} \cdot \frac{\sin(Wt)}{Wt}$

* The main lobe is twice as wide as the side lobe.