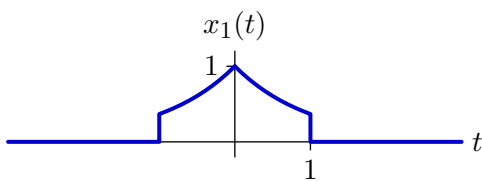


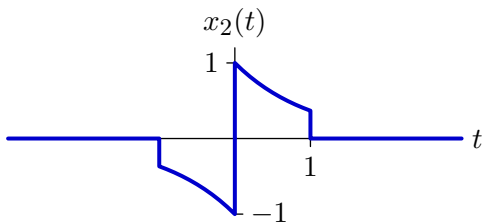
Homework 2

1. Let $X(f)$ represent the Fourier transform of $x(t) = \begin{cases} e^{-t}, & 0 \leq t \leq 1 \\ 0, & \text{elsewhere.} \end{cases}$

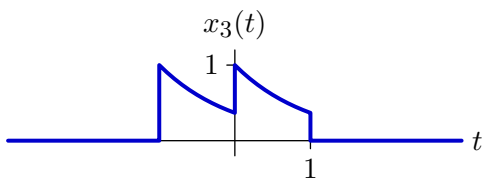
Express the Fourier Transforms of each of the following signals in terms of $X(f)$



(a)



(b)

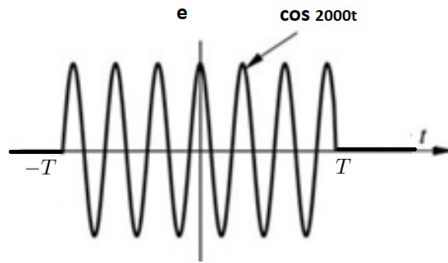
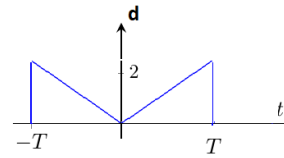
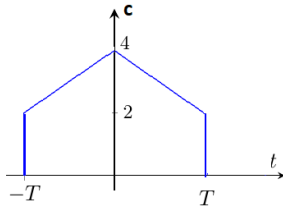
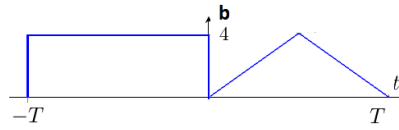
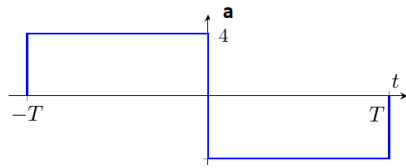


(c)

2. The triangular pulse of duration $2T$ is defined as

$$\Lambda\left(\frac{t}{T}\right) = \begin{cases} 1 - \frac{|t|}{T}, & |t| \leq T \\ 0, & |t| \geq T \end{cases}$$

Use the convolution property of the Fourier transform to find the Fourier transform of the triangle for $T = 1$, given that the convolution of two pulses gives a triangle.



3. Find the Fourier transform of each of the above pulses (a,b,c, d, and e). Assume $T = 6$. Part (e) is a truncated cosine (also known as a cosine pulse). Use tables of pairs and properties.

4. Calculating signal power

Find the average power of the signals shown below.

