

Assignment 1

Question 1

Find the following Fourier transforms

(a) $x(t) = [3\cos(2\pi 100t) - 6\sin(2\pi 200t)]\cos(2\pi 1000t)$

(b) $y(t) = 5\Pi((t-15)/30)\sin(2\pi 300t)$

(c) $z(t) = e^{-8t}u(t)$

(d) $w(t) = e^{-8t}u(t-1)$ (hint $w(t) \neq z(t-1)$)

(e) $p(t) = \text{sinc}^3(t)$

Question 2

Using only the Fourier transform as well as its multiplication property and the inverse Fourier transform, simplify the following trigonometric functions (for example $\sin(A)\sin(B) = \frac{1}{2}\cos(A-B) - \frac{1}{2}\cos(A+B)$)

(a) $A\cos(2\pi f_c t)\sin(2\pi f_c t)$

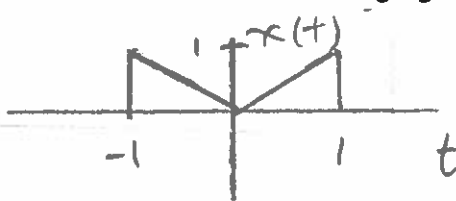
(b) $A\cos(2\pi f_c t)\cos(2\pi f_c t)$

(c) $A\cos(2\pi f_1 t)\cos(2\pi f_2 t)$, $f_2 \neq f_1$.

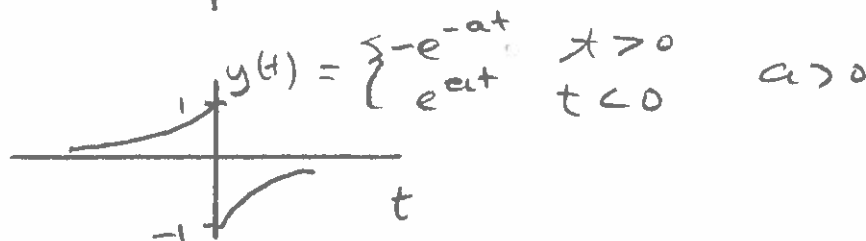
Question 3

Find the Fourier transform of the following signals:

(a)



(b)



(c)

