

Homework Assignment 6

Due Friday May 11

1. Find the Laplace transform of

$$H(x - a) = \begin{cases} 1 & x \geq a \\ 0 & x < a \end{cases}$$

2. verify

$$\mathcal{L}\{\operatorname{erfc}(x^{-\frac{1}{2}}); t\} = \frac{1}{t}e^{-2\sqrt{t}}$$

3. verify

$$\mathcal{L}\left\{\frac{1}{\sqrt{x+a}}; t\right\} = \sqrt{\frac{\pi}{t}}e^{at}\operatorname{erfc}(\sqrt{at})$$

4. If $\mathcal{L}\{f(x); t\} = F(t)$ show that:

$$\mathcal{L}\{f(ax); t\} = \frac{1}{a}F\left(\frac{t}{a}\right)$$

5. Find the laplace transform of

(a) $f(x) = x^2 \sin(x)$

(b) $f(x) = 3e^{-4x}(\cos(4x) - x \sin(4x))$

6. From the book page 1055 ex 3