

1. [10 points] Prove the following:

(a) $s_1(t) * s_2(t) \leftrightarrow S_1(f)S_2(f)$

(b) $s_1(t)s_2(t) \leftrightarrow S_1(f) * S_2(f)$

2. [10 points] Prove Parseval's identity

$$\int_{-\infty}^{\infty} s_1(t)s_2^*(t) dt = \int_{-\infty}^{\infty} S_1(f)S_2^*(f) df$$