

Math 2080: Differential Equations

Worksheet 5.6: Convolution

NAME:

1. Let $f(t) = \sin t$ and $g(t) = t$. In this problem, you will compute the convolution $f * g$ two ways.

(a) Compute $f * g$ directly from the definition: $(f * g)(t) = \int_0^t f(u) g(t - u) du$.

(b) Compute $F(t) = \mathcal{L}(f)$ and $G = \mathcal{L}(g)$ and then compute $f * g = \mathcal{L}^{-1}\{\mathcal{L}(f)\mathcal{L}(g)\}$.

2. Suppose you have an investment that grows at a constant 5% rate, compounded continuously, and you are depositing money into the account at a rate of $d(t)$. How much will the investment be worth at time $t = x$?