Quiz 8, Math 246, Professor David Levermore
Thursday, 5 November 2020

This formative assessment helps you see how well you understand the material.
To get an accurate assessment please do not use books, notes, or electronic aids.
Show your reasoning for full credit. Good luck!

Short Table: $\mathcal{L}[t^n e^{at}](s) = \dfrac{n!}{(s-a)^{n+1}}$ for $s > a$, $\qquad \mathcal{L}[u(t-c)j(t-c)](s) = e^{-cs}\mathcal{L}[j](s)$.

(1) [3] Find $x(t) = \mathcal{L}^{-1}[X](t)$ where $X(s) = e^{-2s}\dfrac{21}{(s-3)(s+4)}$.

(2) [3] Find the Green function $g(t)$ for the operator $\mathrm{L} = \mathrm{D}^2 + 8\mathrm{D} + 16$, where $\mathrm{D} = \dfrac{\mathrm{d}}{\mathrm{d}t}$.

(3) [4] Find $F(s) = \mathcal{L}[f](s)$ for

$$f(t) = \begin{cases} 3t & \text{for } 0 \leq t < 2\,, \\ 6e^{2-t} & \text{for } 2 \leq t\,. \end{cases}$$