1. A model of a ‘struck string’ of length $L$ has $u(x, 0) = 0$ for $0 < x < L$ and

$$u_t(x, 0) = g(x) = \begin{cases} 
0 : & 0 < x < L/4 \\
g_0 : & L/4 < x < 3L/4 \\
0 : & 3L/4 < x < L 
\end{cases}$$

where $g_0$ is a constant. Find the first few terms in the Fourier series for $u(x, t)$, $t > 0$.

2. Show that the function

$$u(x, t) = \frac{1}{\sqrt{t}} e^{-x^2/4e^{2t}}$$

satisfies the 1-dimensional heat equation.


Solutions to two starred problems to be handed in at end of tutorial on Thursday, October 7 or Friday, October 8, or in box on Level 4, Bldg 67, by 10am on Monday, October 11.