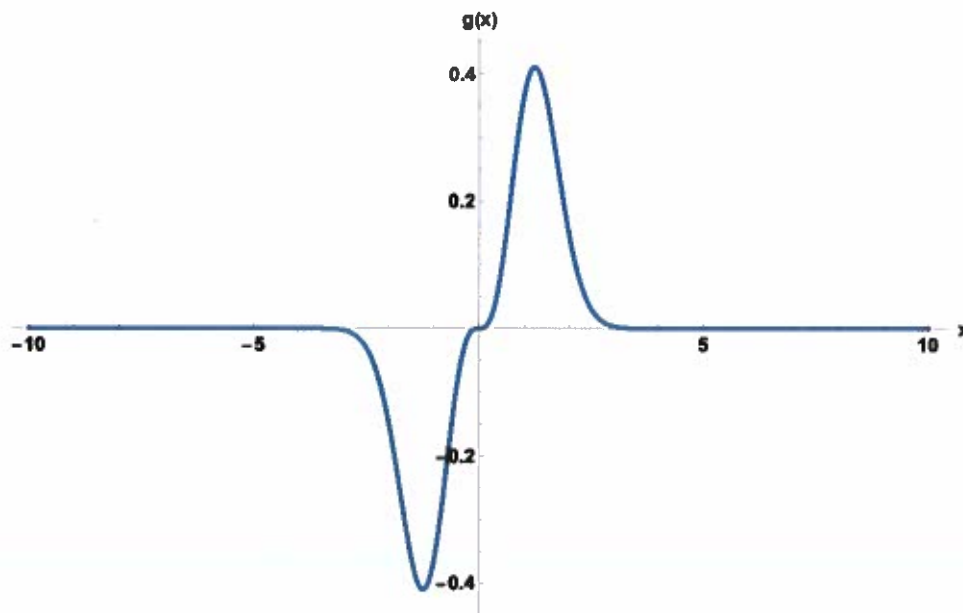


MTH 352  
Quiz #5

1. Suppose  $u(x, t)$  is a solution to the wave equation on  $\mathbb{R}$ :

$$\begin{aligned}u_{tt} &= c^2 u_{xx}, \\u(x, 0) &= 0, \\u_t(x, 0) &= g(x),\end{aligned}$$

where  $g(x)$  is the odd function plotted below.



Short Answer: Compute

$$u^*(x) = \lim_{t \rightarrow \infty} u(x, t).$$

$$\lim_{t \rightarrow \infty} u(x, t) = \lim_{t \rightarrow \infty} \frac{1}{2c} \int_{x-ct}^{x+ct} g(s) ds = \frac{1}{2c} \int_{-\infty}^{\infty} g(s) ds = 0.$$