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## MATH 213 - Tutorial 6: Systems

1. (Common midterm error) Use the definition of a linear system to formally prove that the system modelled by the DE

$$y''(t) + 9y'(t) + 8y(t) = f(t)$$

is linear.

2. (Common midterm error) Use the definition of a linear system to formally show that the system modelled by the DE

$$y''(t) + 3y'(t) + 2y(t) = f(t) + 1$$

is nonlinear.

3. (Common midterm error) Use the convolution theorem to compute

$$t^2 e^t * \sin(t)$$

where both functions are one sided.

4. Find the system impulse response of the system modelled by the DE

$$y'''(t) + 3y''(t) + 2y'(t) = f(t)$$

- 5.