Math 571

Homework 4

Write Matlab programs to numerically solve the following equations. Also use Maple to find exact solution to compute the error between exact and numerical solution.

Q1. $y'' = -(m\pi)^2 \sin(m\pi\ x), \quad y(-1) = y(1) = 0.$

Q2. $x^2 y'' + 2xy' - 6y = |x|, \quad y(-1) = y(1) = 1.$

Q3. $x^2 y'' + xy' + (x^2 - v^2)y = \frac{x-v}{\pi} \sin(v\pi), \quad y(0) = 0,\ y(2\pi) = 2\ for\ v = 1.$

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Exact=4*besselj(1, x)*pi/(2*besselj(0, 2*pi)*pi-besselj(1,
    2*pi));
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Q4. $y'' - 2xy' + \lambda y = 0, \quad y(0) = 0,\ y(1) = 1\ for\ \lambda = 3$