

## MATH 54 – HINTS TO HOMEWORK 24

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Here are a couple of hints to Homework 24. Enjoy!

### SECTION 10.2: METHOD OF SEPARATION OF VARIABLES

**10.2.1, 10.2.3, 10.2.5.** Just solve your equation the way you would usually do (for 5, use undetermined coefficients) and plug in the initial conditions. You may or may not find a contradiction! If you find  $0 = 0$ , that usually means there are infinitely many solutions, depending on your constant  $A$  or  $B$ .

**10.2.9, 10.2.12.** You have to split up your analysis into three cases:

**Case 1:**  $\lambda > 0$ . Then let  $\lambda = \omega^2$ , where  $\omega > 0$ . This helps you get rid of square roots.

**Case 2:**  $\lambda = 0$ .

**Case 3:**  $\lambda < 0$ . Then  $\lambda = -\omega^2$ , where  $\omega < 0$ .

In each case, solve the equation and plug in your initial condition. You may or may not get a contradiction. Also, remember that  $y$  has to be nonzero!

**10.2.21, 10.2.23.** Follow the outline given in the sections ‘Heat equation’ and ‘Wave equation’ in my Partial Differential Equations-Handouts. You don’t need to worry about Fourier series, as you can just compare the coefficients.