

Math 1B Discussion Section Problems

Rob Bayer

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1. For each of the following possibilities for $G(x)$, decide if you would use variation of parameters or undetermined coefficients. For those where you choose undetermined coefficients, write the form of your guess:

(a) e^{-3x}

(b) e^{x^2}

(c) $\sin 3x$

(d) $\cos x - \sin 5x$

(e) $\frac{\sin x}{x}$

(f) $x^3 e^{-7x} \sin 6x + 7 - x^3 \cos 4x$

(g) $\frac{e^x}{x^2+1}$

(h) $x + 3 + e^x$

(i) $\ln x$

2. Find the general solution to each of the following:

(a) $y'' + 2y' - 3y = e^x$

(b) $y'' + 2y' + y = e^x \cos x$

(c) $y'' + 2y' + y = x e^{-x}$

3. Solve the initial value problem $y'' + y' - 2y = e^{2x}$; $y(0) = 0, y'(0) = 1$

4. Sometimes, even multiplying your guess by x will not be enough, but luckily you can always just multiply by x and try again. Use this technique to find the general solution to $y'' - 8y' + 16y = e^{4x}$