

1. Textbook 3.1.14. Refer to the linear model for Newton's Law of cooling and heating on page 87.
2. Textbook 3.1.46
3. Textbook 3.2.6
4. Show that $y = C_1 \cos(x) + C_2 \sin(x) + x \sin(x) + \cos(x) \ln(\cos(x))$ is the general solution to $y'' + y = \sec(x)$ on the interval $(0, \pi/4)$.
5. Given that $y_1(t) = t$ is a solution to $y'' - y'/t + y/t^2 = 0$ for $t > 0$, find a second linearly independent solution $y_2(t)$ and state the general solution.
6. The differential equation $(\sin(t))y'' - 2(\cos(t))y' - (\sin(t))y = 0$ has a solutions of either $y = \sin(t)$ or $y = \cos(t)$ on the interval $(0, \pi)$. Figure out which, find a second linearly independent solution, and state the general solution. (In your simplifications it may help to recall that $1 + \cot^2(\theta) = \csc^2(\theta)$.)