

Section 3.3

1. From $4m^2 + m = 0$ we obtain $m = 0$ and $m = -1/4$ so that $y = c_1 + c_2e^{-x/4}$.
2. From $m^2 - 36 = 0$ we obtain $m = 6$ and $m = -6$ so that $y = c_1e^{6x} + c_2e^{-6x}$.
4. From $m^2 - 3m + 2 = 0$ we obtain $m = 1$ and $m = 2$ so that $y = c_1e^x + c_2e^{2x}$.
29. From $m^2 + 16 = 0$ we obtain $m = \pm 4i$ so that $y = c_1 \cos 4x + c_2 \sin 4x$. If $y(0) = 2$ and $y'(0) = -2$ then $c_1 = 2$, $c_2 = -1/2$, and $y = 2 \cos 4x - \frac{1}{2} \sin 4x$.
31. From $m^2 - 4m - 5 = 0$ we obtain $m = -1$ and $m = 5$, so that $y = c_1e^{-x} + c_2e^{5x}$. If $y(1) = 0$ and $y'(1) = 2$, then $c_1e^{-1} + c_2e^5 = 0$, $-c_1e^{-1} + 5c_2e^5 = 2$, so $c_1 = -e/3$, $c_2 = e^{-5}/3$, and $y = -\frac{1}{3}e^{1-x} + \frac{1}{3}e^{5x-5}$.
34. From $m^2 - 2m + 1 = 0$ we obtain $m = 1$ and $m = 1$ so that $y = c_1e^x + c_2xe^x$. If $y(0) = 5$ and $y'(0) = 10$ then $c_1 = 5$, $c_1 + c_2 = 10$ so $c_1 = 5$, $c_2 = 5$, and $y = 5e^x + 5xe^x$.
38. From $m^2 + 4 = 0$ we obtain $m = \pm 2i$ so that $y = c_1 \cos 2x + c_2 \sin 2x$. If $y(0) = 0$ and $y(\pi) = 0$ then $c_1 = 0$ and $y = c_2 \sin 2x$.
41. The auxiliary equation is $m^2 - 3 = 0$ which has roots $-\sqrt{3}$ and $\sqrt{3}$. By (10) the general solution is $y = c_1e^{\sqrt{3}x} + c_2e^{-\sqrt{3}x}$. By (11) the general solution is $y = c_1 \cosh \sqrt{3}x + c_2 \sinh \sqrt{3}x$. For $y = c_1e^{\sqrt{3}x} + c_2e^{-\sqrt{3}x}$ the