1. Solve $y' = e^{x-y}$.
2. Solve $y' + xy = x$.
3. Solve
   (a) $y'' - 6y - 9 = 0$,
   (b) $y'' + y' + 2y = 0$,
   (c) $y'' - 7y' + 5y = 0$.
4. Solve
   (a) $x^2y'' - 6xy' - 9y = 0$,
   (b) $x^2y'' - 5xy' - 9y = 0$.
5. Construct an exact equation of second order by differentiating the linear equation $y' + p(x)y = q(x)$ in $x$. Use this to solve $y'' + (\tan x)y' + (\sec^2 x)y = 0$.
6. Construct an exact equation of second order by differentiating the separable equation $f(y)y' = g(x)$ in $x$. Use this to solve $yy'' + (y')^2 = 1$.
7. Solve $y'' - 3y' + 2y = x$ by variation of parameters.
8. Find the Green’s function for
   \begin{align*}
   y'' - y &= f & 0 < x < 1 \\
   y(0) &= y(1) = 0
   \end{align*}
9. Solve $2x^2y' = (x - 1)(y^2 - x^2) + 2xy$.
10. Solve $x^2y' + 2xy - y^2 = A$ for any $A$.
11. Solve $yy'' = 2(y')^2$. 