General Reduction of Order

The idea of Reduction of Order works for any second (or higher) order linear differential equation. Assume we have one solution $y_1(t)$ to the differential equation

$$y'' + p(t)y' + q(t)y = 0.$$

To use reduction of order, we search for a solution $y_2(t)$ as $v(t)y_1(t)$.

Example. Consider the differential equation

$$t^2y'' + 2ty' - 6y = 0$$

(a) Verify that $y_1(t) = t^2$ is a solution to this differential equation.

(b) Use reduction of order to find a second solution.