AM 33: Homework # 5

Due date: Oct 22 for students in section 1 (E) and Oct 23 for students in section 2 (J).

The book we refer to is Boyce & DiPrima, *Elementary Differential Equations and Boundary Value Problems* (7th Edition).

- Section 3.1, solve problems 3, 15 (no need to draw the graph).
- Section 3.2, problems 5, 13, 14, 16, 19, 21, 25.
- Suppose that (y_1, y_2) is a fundamental set of solutions to homogeneous equation

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

Show that (ϕ_1, ϕ_2) is also a fundamental set of solutions where

$$\phi_1 = ay_1 + by_2, \qquad \phi_2 = cy_1 + dy_2$$

for some constants a, b, c, d satisfying $ad - bc \neq 0$. (*Hint:* Express $W(\phi_1, \phi_2)$ in terms of $W(y_1, y_2)$. Observe that a pair of solutions are a fundamental set if and only if its Wronskian is nonzero)