Project #2: Solutions to 2nd Order Linear Homogeneous DEs.
Pre-Work

PW 1 Consider the following DE

$$y'' + y' - 6y = 0$$

(a) Guess and check to find two (or more?) *different* solutions to the DE. Call the first solution $y_1(t)$ and the second solution $y_2(t)$.

(b) Show that if you multiply your first solution y_1 by any scalar, say α, that $\alpha y_1(t)$ will also be a solution to the DE.

(c) Show that the sum of your two solutions, $g(t) = y_1(t) + y_2(t)$, is also a solution to the DE.

(d) How many solutions can you find that satisfy the initial condition $y(0) = 1$?

(e) How many solutions can you find that satisfy the initial conditions $y(0) = 1$ AND $y'(0) = 5$?

PW 2 Now consider the DE

$$y'' + 4y = 0$$

(a) Guess and check to find two (or more?) *different* solutions to the DE. Call the first solution $y_1(t)$ and the second solution $y_2(t)$.

(b) Show that if you multiply your first solution y_1 by any scalar, say α, that $\alpha y_1(t)$ will also be a solution to the DE.

(c) Show that the sum of your two solutions, $g(t) = y_1(t) + y_2(t)$, is also a solution to the DE.

(d) How many solutions can you find that satisfy the initial condition $y(0) = 1$?

(e) How many solutions can you find that satisfy the initial conditions $y(0) = 1$ AND $y'(0) = 5$?