Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.

- The test has four (4) pages, including this one.

- Write the answers in the boxes provided, where applicable.

- Show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.

- Credit for each problem is given at the right of each problem number.

- No books, notes or calculators may be used on this test.

Page	Max	Points
2	30	
3	30	
4	40	
Total	100	

Problem 1 (30 pts)**.** Use the method of **variation of parameters** to solve the initial value problem $y'' + 3y' + 2y = x$ that satisfies $y(0) = 0, y'(0) = \frac{1}{2}$.

$$y(x) = \boxed{}$$

Problem 2 (30 pts)**.** Use exclusively the technique of **undetermined coefficients** to find a general solution of the differential equation $y'' + 3y' + 2y = x$.

$y(x) = $

Problem 3 (20 pts). Find the solution to the differential equation $y'' - 4y' + 5y = 0$ that satisfies $y(0) = 1$ and $y'(0) = 5$.

$$y(x) = \boxed{}$$

Problem 4 (20). Find a particular solution $Y(x)$ for the differential equation $y'' + y = \cos x$.

$$Y(x) = \boxed{}$$