

Math 193 – Test 3: Version A

March 17, 2017

Name: _____

Instructor: Patricia Wrean

Total: 25 points

1. (4 points) Solve $y'' + 4y' + 4y = 0$ if $y(0) = 5$ and $y'(0) = 0$.

2. (5 points) Solve $y'' - 2y' + 10y = 5x$.

3. (5 points) Solve $y'' + 5y' + 4y = 6e^{-4x}$.

4. (3 points) State the form of the particular solution y_p for the following. Leave your answer with undetermined coefficients. (This means “Write down your initial guess for y_p but don't bother to solve for the constants.”) Please note that the complementary solution for the homogeneous equation is $y_c = C_1 + C_2e^{6x}$.

(a) $y'' - 6y' = -5e^{3x}$

(b) $y'' - 6y' = 5$

(c) $y'' - 6y' = -3e^x \cos 2x$

5. (3 points) Write down the DE and the initial conditions for the following system.

A 7 kg mass is attached to a spring with spring constant 2.5 N/m. There is a damping force equal to 2 times the velocity, as well as an external force $F(t) = 4 \cos 2t$. The mass is initially 0.15 m above the equilibrium position with a downwards velocity of 0.10 m/s.

DO NOT SOLVE THE DE!

6. (5 points) Consider the following population of starting salaries in a graduating class of 40 students:

salary	frequency
\$45,000	3
\$50,000	5
\$55,000	10
\$60,000	15
\$65,000	5
\$70,000	1
\$175,000	1

(a) Find the mean salary.

(b) Find the median salary.

(c) After 2 years, each person's salary is increased by \$10,000. How does the new standard deviation compare to the initial standard deviation?