Real, Distinct Roots

1. Find the general solution to : $4y'' + y' - 11y = 0$

For problems 2 and 3 solve the IVP.

2. $2y'' - 17y' + 21y = 0 \qquad y(0) = -4,\ y'(0) = 1$

3. $y'' + 3y' = 0 \qquad y(-2) = -11,\ y'(-2) = 1$

4. Solve the following IVP (in terms of β) and determine the value of β which the solution will stay finite as $t \to \infty$.

$$y'' + 10y' - 39y = 0 \qquad y(0) = 1 - 8\beta,\ y'(0) = 4\beta^2$$

Complex Roots

For problems 5 and 6 solve the IVP.

5. $16y'' - 96y' + 145y = 0 \qquad y(8\pi) = 0,\ y'(8\pi) = 5$

6. $y'' + 4y' + 68y = 0 \qquad y(0) = 3,\ y'(0) = 0$

Double Roots

For problems 7 and 8 solve the IVP.

7. $25y'' + 10y' + y = 0 \qquad y(1) = 2,\ y'(1) = -3$

8. $y'' + 20y' + 100y = 0 \qquad y(0) = -5,\ y'(0) = 7$