**1, $y'' - 4y = 0$ ; $y(0) = 1$, $y'(0) = 0$ $y_1(x) = \cosh(2x)$, $y_2(x) = \sinh(2x)$**
**(a) verify that $y_1$ and $y_2$ are solution of the differential equation**
**(b) show that their Wronskian is not zero**

**2, Verify that the given function is a solution of the differential,**
**find a second solution by reduction of order, and finally write the general solution**
$$y'' - \frac{1}{x} y' - \frac{8}{x^2} y = 0 \text{ ; } y_1(x) = x^4 \text{ for } x > 0$$

**3, Solve the initial value problem**
$$y'' + y' - 12y = 0 \text{ ; } y(2) = 0 \text{ , } y'(2) = 1$$

**4, Find a second - order differential equation having the function as general solution**
$$c_1 e^{-3x} \cos(2x) + c_2 e^{-3x} \sin(2x)$$

**5, Solve the initial value problem**
**(a)** $x^2 y'' + 5x y'' + 20y = 0$ ; $y(-1) = 3$ , $y'(-1) = 2$
**(b)** $x^2 y'' + x y'' - 4y = 0$ ; $y(1) = 7$ , $y'(1) = -3$