WRITE YOUR NAME:

MAP 2302 Quiz 7
Thursday September 26th

Solve the initial value problem.

$$y'' - 5y' + 6y = 0, \qquad y(0) = 9, \qquad y'(0) = 23$$

Auxiliary equation is $r^2 - 5r + 6 = 0$

$(r-2)(r-3) = 0$

$r = 2, \; r = 3$

General solution is $y = c_1 e^{2t} + c_2 e^{3t}$

$\Rightarrow y' = 2c_1 e^{2t} + 3c_2 e^{3t}$

$9 = y(0) = c_1 e^0 + c_2 e^0 = c_1 + c_2$

$23 = y'(0) = 2c_1 e^0 + 3c_2 e^0 = 2c_1 + 3c_2$

(i) $c_1 + c_2 = 9 \xrightarrow{\times 2} 2c_1 + 2c_2 = 18$

(ii) $2c_1 + 3c_2 = 23 \qquad 2c_1 + 3c_2 = 23$

Row 2 minus Row 1

$\Rightarrow c_2 = 5$

$\Rightarrow c_1 = 4$

Solution to initial value problem is

$$y = 4e^{2t} + 5e^{3t}$$