Score:

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Period (circle one): 1 2 3 4 5 6
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SM286 – Quiz 1 – Section 1.1
Introduction to Differential Equations

1. Find the values of m so that the function $y = e^{mx}$ is the solution to the differential equation $y'' - 8y' + 7y = 0$.

$y = e^{mx}$

$y' = me^{mx}$

$y'' = m^2 e^{mx}$

$\Rightarrow m^2 e^{mx} - 8me^{mx} + 7e^{mx} = 0$

$\Rightarrow (m^2 - 8m + 7)e^{mx} = 0$

→ cancel

$(m-7)(m-1) = 0 \Rightarrow \boxed{m = 7, 1}$

2. Suppose the solution to $y'' - 8y + 7y = 0$ is given as $y = c_1 e^x + c_2 e^{7x}$. Find c_1 and c_2 if $y(0) = 3$, $y'(0) = 9$

$y(0) = c_1 + c_2 = 3$

$y'(0) = c_1 + 7c_2 = 9$

$y' = c_1 e^x + 7c_2 e^{7x}$

$-6c_2 = -6 \Rightarrow \boxed{c_2 = 1} \Rightarrow \boxed{c_1 = 2}$

$\therefore \boxed{y = 2e^x + e^{7x}}$