

Quiz 3 **MAP 2302/3305 – Ordinary Differential Equations**

Student's Name: _____

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This is a 50 minute quiz.

1 Use variation of parameters to find the general solution to

$$y'' - y' - 2y = 2e^{-t}$$

given that $y_1(t) = e^{2t}$ and $y_2(t) = e^{-t}$ is a fundamental set of solutions.

2. A mass weighing 1 lb stretches a spring 2ft. Assume there is no damping and that the mass is pulled down an additional $a > 0$ feet and released.

(a) Give a formula for the position of the mass as a function (of t) that depends on a .

(b) Find the frequency and period. Do they depend on a ?

3. Find the recurrence relation and the first four terms in each of the linearly independent solutions to

$$y'' + y = 0$$

where y is the Taylor series expansion around $x_0 = 0$.

Bonus. Find the Taylor series for

$$\frac{1}{2-x}$$

around $x_0 = 3$.