

Your Name

Student ID #

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In these problems, **check all that apply**.

1. Consider the differential equation

$$\frac{1}{2}y'' + y' + y = 1.$$

This equation...

- is linear** is non-linear
 is first order **is second order**
 is homogeneous **is non-homogeneous**
 has constant coefficients has non-constant coefficients
 is an initial value problem

The characteristic equation...

- has distinct real roots has repeated roots
 has complex roots does not make sense

The **general solution** to this equation can be found using...

- reduction of order, with** $y_1 = \underline{e^{(1\pm i)t}}$
 variation of parameters, with $y_1 = \underline{e^{(1\pm i)t}}$, $y_2 = \underline{e^{(1\mp i)t}}$
 undetermined coefficients, with $Y = \underline{A = Ae^{0t}}$
 none of the above

2. Consider

$$y'' - \frac{2}{t^2}y = 0, \quad y(1) = 1, y'(1) = 2, \quad t > 0.$$

This equation...

- is linear** is non-linear
 is first order **is second order**
 is homogeneous is non-homogeneous
 has constant coefficients **has non-constant coefficients**
 is an initial value problem

The characteristic equation...

- has distinct real roots has repeated roots
 has complex roots **does not make sense**

The solution to this problem can be found using...

- reduction of order, with** $y_1 = t^2$
 variation of parameters, with $y_1 = t^3$, $y_2 = t^4$
 undetermined coefficients, with $Y(t) = At^2$
 none of the above