Group 1

For each of the following differential equations:

- What is the independent variable?
- What is the dependent variable?
- List all parameters.
- Classify the differential equation.
- Reduce it to the equivalent first order system.

$$\frac{d^2x}{dt^2} + mx = 0$$

$$\frac{d^4y}{ds^4} - \sin\left(\frac{dy}{ds}\right) = m$$

For each problem that you do neatly write up a solution on the whiteboard that includes lots of words explaining what you are doing in each step and why it makes sense. We will be presenting these solutions to the class and they will be posted online to help with homework. Each member of the group (not the group leader) must participate in the presentation.

Group 2

For each of the following differential equations:

- What is the independent variable?
- What is the dependent variable?
- List all parameters.
- Classify the differential equation.
- Reduce it to the equivalent first order system.

$$\frac{d^2x}{dt^2} + \frac{g}{L}\sin(x) = 0$$

$$\frac{d^3z}{dt^3} + bz = e^t$$

For each problem that you do neatly write up a solution on the whiteboard that includes lots of words explaining what you are doing in each step and why it makes sense. We will be presenting these solutions to the class and they will be posted online to help with homework. Each member of the group (not the group leader) must participate in the presentation.

Group 3

For each of the following differential equations:

- What is the independent variable?
- What is the dependent variable?
- List all parameters.
- Classify the differential equation.
- Reduce it to the equivalent first order system.

$$\frac{d^2x}{dt^2} - x^2 = e^t$$

$$\frac{d^3p}{dx^3} + \frac{d^2p}{dx^2} - \frac{b}{a}x = 0$$

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Group 4

For each of the following differential equations:

- What is the independent variable?
- What is the dependent variable?
- List all parameters.
- Classify the differential equation.
- Reduce it to the equivalent first order system.

$$\frac{d^2x}{dt^2} + \frac{b}{m}\frac{dx}{dt} + kx = F\cos(t)$$

$$\frac{d^5y}{ds^5} - \frac{dy}{ds} = 0$$

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