Matthew Mendoza **Math-45-Krauel-F20**
Assignment Math45-Homework-WEEK-01 due 09/05/2020 at 11:59pm PDT

Which of the following is NOT a differential equation.

- A. $\frac{d^2y}{dx^2} + e^x \frac{dy}{dx} = x$
- B. $\frac{\partial}{\partial x}g - \frac{\partial}{\partial y}g = g$
- C. $y^3 - 2y^2 + y = 0$
- D. $y'y = 7x$

Which of the following IS a differential equation.

- A. $y^{(3)} - 2y^{(2)} + y = 0$
- B. $y^2 - y + 5 = 0$
- C. $\frac{d^2y}{dx^2} - e^x \frac{dy}{dx}$
- D. $\frac{\partial}{\partial x}g - \frac{\partial}{\partial y}g$

Which of the following IS an ordinary differential equation (ODE)?

- A. $y^2 - y + 5 = 0$
- B. $y^{(3)} - 2y^{(2)} + y$
- C. $\frac{d^2y}{dt^2} - \frac{dx}{dt} = 0$
- D. $\frac{\partial}{\partial x}g - \frac{\partial}{\partial y}g = g$

Which of the following IS a partial differential equation (PDE)?

- A. $\frac{d^2y}{dt^2} - \frac{dx}{dt}$
- B. $\frac{d^2y}{dt^2} - \frac{dx}{dt} = 0$
- C. $y^{(3)} - 2y^{(2)} + y = 0$
- D. $\frac{\partial}{\partial x}g - \frac{\partial}{\partial y}g = g$

Which of the following IS a linear differential equation?

- A. $\frac{d^2y}{dt^2} - \frac{dx}{dt} = 0$
- B. $y^{(3)} - 2y^{(2)} + y^2 = 0$
- C. $\left(\frac{\partial}{\partial x}g\right)^2 - \frac{\partial}{\partial y}g = g$
- D. $y''y - y' = 0$

Which of the following IS a nonlinear differential equation?

- A. $y^{(3)} - 2y^{(2)} + y = 0$
- B. $\frac{\partial}{\partial x}g - \frac{\partial}{\partial y}g = g$

- C. $y''y - y' = 3$
- D. $\dfrac{d^2y}{dt^2} - \dfrac{dx}{dt} = 0$

---

7. (1 point) Select all conditions that the equation $x'' - xx' = 3$ satsifies. There may be more than one correct box that needs to be checked.

- A. It is a differential equation
- B. It is a linear differential equation
- C. It is a nonlinear differential equation
- D. It is an ODE
- E. It is a PDE
- F. None of the above

---

8. (1 point) Select all conditions that the equation $\dfrac{\partial g}{\partial y} + \dfrac{\partial^2 g}{\partial x^2} = 0$ satsifies. There may be more than one correct box that needs to be checked.

- A. It is an ODE
- B. It is a PDE
- C. It is a differential equation
- D. It is a linear differential equation
- E. It is a nonlinear differential equation
- F. None of the above

---

9. (1 point)

[?] 1. Which equation below is a linear ODE?
[?] 2. Which equation below is a linear PDE?
[?] 3. Which equation below is a nonlinear ODE?

A. $e^{\theta}y'' + \theta\cos(\theta)y' = y$

B. $y'' = \sqrt{1 - y'}$

C. $g_x + g_y = 0$

Is the differential equation $\sin(y') = y$ linear?

- A. Yes
- B. No

---

11. (1 point)

[?] 1. Which differential equation below has order two?
[?] 2. Which differential equation below has order four?
[?] 3. Which differential equation below has order three?

A. $(1 + \sin(\theta))\dfrac{d^2f}{d\theta} = \sqrt{3 + f}$

B. $y^{(2)} - y^{(4)} + y' = y$

C. $ty''' - t^3y' + y = t^4$