# Math 205, Differential Equations

## Quiz 1

**1.** Give the order of each differential equation. State whether the equation is linear or nonlinear in $y$.

**a.** $x\dfrac{d^2y}{dx^2} - \left(\dfrac{dy}{dx}\right)^4 + y = 0$

**b.** $\dfrac{d^2u}{dr^2} + \dfrac{du}{dr} + u = \cos(r+1)$

**c.** $(\sin\theta)y''' - (\cos\theta)y' = 2e^y$

**2.** Determine a region in the $xy$-plane for which the following differential equation would have a unique solution whose graph passes through a point $(x_0, y_0)$ in the region.

$$\frac{dy}{dx} = \sqrt{xy}$$

**3.** Find values of $m$ so the function $y = e^{mx}$ is a solution of the following differential equation

$$y'' - 5y' + 6y = 0$$