Math 45, Fall 2020
August 31, Quiz 01 Name: _____

Please show and explain your work where necessary. Good luck!!

1. (*5 points*) For each of the following,
Circle all of the following expression which are differential equations.

(i) $g'(x) + g(x) = 0$

(ii) $\left(\frac{d}{dt}\right)^5 f(t) + \frac{d}{dt} f(t) + f(t) = 0$

(iii) $\sin(x)\dfrac{d^2f}{dx^2} + \dfrac{df}{dx} + e^x = \dfrac{d^3f}{dx^3}$

(iv) $y''' + y' + x$

(v) $f'(x) = f(x)$

(vi) $y^2 x = x^2$

(vii) $\csc(y'') + \sin(x) - y = 0$

(viii) $x^2\dfrac{\partial^2 y}{\partial t^2} + y^2\dfrac{\partial x}{\partial s} = s + t$

(ix) $e^{y''} + e^x = 3y$

(x) $x\dfrac{\partial^2 y}{\partial t^2} = y\dfrac{\partial x}{\partial s}$

2. (*3 points*) For the following equations, provide the *dependent variable*.

a. (*1 pt*) $f'(x) - f(x) = 0$

b. (*1 pt*) $\dfrac{d^2g}{dt^2} - e^t g(t) = 3$

c. (*1 pt*) $\sin(x)y' + y = 0$

3. (*2 points*) Consider the function $y = x^3$.

a. (*1 pt*) Compute y' and y''.

b. (*1 pt*) Does y satisfy the differential equation $x^2y'' - 5y = 0$? Justify your answer.