1. [10 points] For each statement below, circle TRUE if the statement is *always* true; otherwise, circle FALSE. No partial credit on this page.

a. [2 points] The differential equation $\frac{dy}{dt} = y\sin(t+1) - y$ is separable.

[True] False

b. [2 points] If money is placed into a bank account with continuous interest rate k, then the amount of money, A, at time t years can be modeled with the differential equation $\frac{dA}{dt} = kt$.

True [False]

c. [2 points] Suppose the power series $\sum_{n=1}^{\infty} C_n(x+2)^n$ converges at $x = -5$, but diverges at $x = 5$. Then the series must diverge at $x = 3$.

True [False]

d. [2 points] The differential equation $\frac{dy}{dx} = \cos(y)$ has an infinite number of equilibrium solutions.

[True] False

e. [2 points] Consider the differential equation $\frac{dy}{dx} = x^2$, and the solution that satisfies $y(-1) = 1$. If Euler's method is used with step-size $\Delta x = 0.1$, then the Euler approximation for $y(-0.5)$ is an underestimate of the real solution.

True [False]