

name : _____

section : 109

GSI : Charles Wang

(2 pts) Circle True or False. (+1 for correct, 0 for blank, -1 for incorrect)

1. (True False) When we increase the value of $y(0)$ towards 1 in the differential equation $\frac{dy}{dt} = ry(1 - y)$, the median and mean of the corresponding logistic distribution shifts to the left.
2. (True False) The normal distribution has no CDF because we cannot write an antiderivative for its PDF using elementary functions.

(10 pts) For the following, you must **justify** your answer to receive credit. (Showing your work counts as justification.)

3. (2pts each) Let X be a random variable following a normal distribution with mean 5 and standard deviation 3. For each of the following, draw a graph indicating the desired area, and express the probability in terms of a z -score, but do not compute the actual values.

(a) $P(5 \leq X \leq 8)$

(b) $P(2 \leq X \leq 8)$

(c) $P(8 \leq X)$

4. (4pts) Let X be a random variable with mean μ and standard deviation σ . What value of k will guarantee that $P(\mu - k\sigma \leq X \leq \mu + k\sigma) \geq 0.75$?