

name : \_\_\_\_\_

section : 105

GSI : Charles Wang

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

1. (True False) The standard deviation always exists for symmetric distributions.
2. (True False) PDFs for the logistic model are solutions to the differential equation  $\frac{dy}{dt} = ry(1 - y)$ .

(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 10 and standard deviation 2. 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)  $P(10 \leq X \leq 12)$

(b)  $P(8 \leq X \leq 12)$

(c)  $P(12 \leq X)$

4. (4pts) Let  $X$  be a random variable with mean  $\mu$  and standard deviation  $\sigma$ . What value of  $k$  will guarantee that  $P(\mu - k\sigma \leq X \leq \mu + k\sigma) \geq 0.84$ ?