University of California, Los Angeles
Department of Statistics

Statistics 13 **Instructor: Nicolas Christou**

Binomial and normal distribution

Problem 1
Use R to draw the probability distribution of $X \sim b(10, 0.5)$.

Problem 2
Use `R` to compute the following probabilities:

a. Let $X \sim b(20, 0.3)$. Compute

1. $P(X \leq 4)$.
2. $P(X \geq 8)$.
3. $P(X > 5)$.
4. $P(X < 3)$.
5. $P(2 < X < 7)$.

b. Let $X \sim N(13, 2.5)$. Compute

1. $P(X \geq 16.5)$.
2. $P(X > 16.1)$.
3. $P(X \leq 13.5)$.
4. $P(12 < X < 15)$.
5. Find b such that $P(X > b) = 0.61$.

Problem 3
The admissions office of a small, selective liberal-arts college will only offer admission to applicants who have a certain mix of accomplishments, including a high SAT score. Based on past records, the head of the admissions feels that the probability is 0.58 that an admitted applicant will come to the college. Based on financial considerations, the college would like a class of size 310 or more. Find the smallest n, number of people to admit, for which the probability of getting 310 or more to come to the college is at least 0.95. Use `R` to find the answer.

Problem 4
The diameters of apples from the Milo Farm have diameters that follow the normal distribution with mean 3 inches and standard deviation 0.3 inch. Apples can be size-sorted by being made to roll over a mesh screens. First the apples are rolled over a screen with mesh size 2.5 inches. This separates out all the apples with diameters < 2.5 inches. Second, the remaining apples are rolled over a screen with mash size 3.2 inches. Use `R` to find the proportion of apples with diameters < 2.5 inches, between 2.5 and 3.2 inches, and greater than 3.2 inches.