Exam 3 Review

Note: This is not a complete list of topics – you should study your lecture notes and homework in addition to reviewing the items listed here.

1. terms to know:
   a. sample space
   b. event
   c. Venn diagram
   d. mutually exclusive
   e. random variable
2. probability of an event = $\frac{f}{N} = \frac{\text{number of ways the event can occur}}{\text{total number of possible outcomes}}$
3. special events
   a. $(\text{not } E)$ = the complement of E = everything not in event E
   b. $(A \,\&\, B)$ = every outcome in **both** A **and** B
   c. $(A \text{ or } B)$ = every outcome in **either** A **or** B

4. probability rules
   a. $P(A \text{ or } B) = P(A) + P(B)$ if A and B are mutually exclusive.
   b. $P(E) = 1 - P(\text{not } E)$
   c. $P(A \text{ or } B) = P(A) + P(B) - P(A \,\&\, B)$

5. probability distributions – list the values for x and their corresponding probabilities

x	$P(X = x)$

6. probability histogram – graph the values for x on the horizontal axis and probabilities on the vertical
7. mean and standard deviation of a random variable
   a. mean (or expected value): $\mu = \sum xP(X = x)$
   b. standard deviation: $\sigma = \sqrt{\sum (x - \mu)^2 P(X = x)} = \sqrt{\sum x^2 P(X = x) - \mu^2}$
      (This formula will be given.)
8. factorials
   a. $k! = k \cdot (k-1) \cdot (k-2) \cdots 3 \cdot 2 \cdot 1$
   b. $1! = 1$
   c. $0! = 1$
9. Bernoulli trials (know the three conditions)
   a. Each trial has exactly two possible outcomes – success or failure
   b. The trials are independent.
   c. The probability of success (p) remains constant.
10. binomial probability (All of this will be given.)
    a. $P(X = x) = \binom{n}{x} p^x (1-p)^{n-x}, \quad x = 0, 1, 2, \ldots, n$
    b. $\mu = np, \sigma = \sqrt{np(1-p)}$