**Suggested reading:** OpenIntro Statistics, 3rd edition, Chapter 3, Sections 3.4

**LO 1.** Determine if a random variable is binomial using the four conditions.

- The trials are independent.
- The number of trials, n, is fixed.
- Each trial outcome can be classified as a success or failure.
- The probability of a success, p, is the same for each trial.

**LO 2.** Calculate the number of possible scenarios for obtaining k successes in n trials using the choose function: (nk)=n!k!(n−k)!.

**LO 3.** Calculate probability of a given number of successes in a given number of trials using the binomial distribution: $P(k = K) = \binom{n}{k} p^k (1-p)^{(n-k)}$.

**LO 4.** Calculate the expected number of successes in a given number of binomial trials ($\mu = np$) and its standard deviation ($\sigma = \sqrt{np(1-p)}$).

**LO 5.** When number of trials is sufficiently large (np ≥ 10 and n(1−p) ≥ 10), use the normal approximation to calculate binomial probabilities, and explain why this approach works.

***Test yourself:***

1. *True/False: We can use the binomial distribution to determine the probability that in 10 rolls of a die the first 6 occurs on the 8th roll.*
2. *True / False: If a family has 3 kids, there are 8 possible combinations of gender order.*
3. *True/ False: When n = 100 and p = 0.92 we can use the normal approximation to the binomial to calculate the probability of 90 or more successes.*