## HW#28

Please work these out on seperate paper. (Ignore the originally assigned problems on the calendar)

Note Title 10/10/2016

- **12.** Colorblindness. About 7% of males are colorblind. A researcher needs some colorblind subjects for an experiment and begins checking potential subjects.
  - a) On average, how many men should the researcher expect to check to find one who is colorblind?
  - b) What's the probability that she won't find anyone colorblind among the first 5 men she checks?
  - c) What's the probability that the first colorblind man found will be the sixth person checked?
  - d) What's the probability that she finds someone who is colorblind before checking the 11 th man?
- 14. Arrows. An Olympic archer is able to hit the bull's-eye **35** % of the time. Assume each shot is independent of the others. If she shoots 7 arrows, what's the probability of each result described below.
  - a) Her first bull's-eye comes on the third arrow.
  - b) She misses the bull's-eye at least once.
  - c) Her first bull's-eye comes on the fourth or fifth arrow.
  - d) She gets exactly 4 bull's-eyes.
  - e) She gets at least 4 bull's-eyes.
  - f) She gets at most 4 bull's-eyes.
- 23. M&M's. The Masterfoods company says that before the introduction of purple, yellow candies made up 20% of their plain M&M's, red another 20%, and orange, blue, and green each made up 10%. The rest were brown.
  - a) If you pick an M&M at random, what is the probability that
    - 1. it is brown?
    - 2. it is yellow or orange?
    - 3. it is not green?
    - 4. it is striped?
  - b) If you pick three M&M's in a row, what is the probability that
    - 1. they are all brown?
    - 2. the third one is the first one that's red?
    - 3. none are yellow?
    - 4. at least one is green?
- 24. Blood. The American Red Cross says that about 43% of the U.S. population has Type O blood, 38% Type A, 12% Type B, and the rest Type AB.
  - a) Someone volunteers to give blood. What is the probability that this donor
    - has Type AB blood?
    - 2. has Type A or Type B?
    - 3. is not Type O?
  - b) Among four potential donors, what is the probability that
    - 1. all are Type O?
    - 2. no one is Type AB?
    - 3. they are not all Type A?
    - 4. at least one person is Type B?
- 29. Champion bowler. A certain bowler can bowl a strike
  - **77**% of the time. What is the probability that she
  - a) goes three consecutive frames without a strike? b) makes her first strike in the third frame?
  - c) has at least one strike in the first three frames?
  - d) bowls a perfect game (12 consecutive strikes)?

- **30.** The train. To get to work, a commuter must cross train tracks. The time the train arrives varies slightly from day to day, but the commuter estimates he'll get stopped on about 18% of work days. During a certain 5-day work week, what is the probability that he
  - a) gets stopped on Monday and again on Tuesday?
  - b) gets stopped for the first time on Thursday?
  - c) gets stopped every day?
  - d) gets stopped at least once during the week?
- **34.** Pepsi. For a sales promotion, the manufacturer places winning symbols under the caps of 15% of all Pepsi bottles. You buy a six-pack. What is the probability that you win something?
- **38.** Bikes. Bicycles arrive at a bike shop in boxes. Before they can be sold, they must be unpacked, assembled, and tuned (lubricated, adjusted, etc.). Based on past experience, the shop manager makes the following assumptions about how long this may take:
  - The times for each setup phase are independent.
  - The times for each phase follow a Normal model.
  - The means and standard deviations of the times (in minutes) are as shown:

Phase	Mean	SD
Unpacking	3.5	0.7
Assembly	22.1	3.1
Tuning	12.3	2.7

- a) What are the mean and standard deviation for the total bicycle setup time?
- b) A customer decides to buy a bike like one of the display models but wants a different color. The shop has one, still in the box. The manager says they can have it ready in half an hour. Do you think the bike will be set up and ready to go as promised? Explain.
- 40. Lungs and smoke. Suppose that 18% of adults smoke cigarettes. It's known that 60% of smokers and 16% of nonsmokers develop a certain lung condition by age 60.
  - a) Explain how these statistics indicate that lung condition and smoking are not independent.
  - b) What's the probability that a randomly selected 60year-old has this lung condition?
- 42. Lungs and smoke, again. Based on the statistics in Exercise 40, what's the probability that someone with the lung condition was a smoker?

## a selected answers a

- (12 a) 14.29... b) 0.696... c) 0.049... d) 0.516...
- (H) c) 0.0033 e) 0.988...
  (23) b) 1) 0.027 2) 0.128 3) 0.512 4) 0.271
  (29) b) 0.0407 c) 0.988... d) 0.0434
- d) 0.629...
- b) about 0.029