Homework 4 - Chapters 11-12 ***Name*** _____

___ 1. A dot.com sponsoring a new browser wants to collect data on how intuitive it is to use it. What method will be chosen?

A) census B) sample survey C) observational study
D) experiment E) simulation

___ 2. A 2015 Teen Youth Survey interviewed by phone a random sample of 938 U.S. teens and asked them the title of their favorite book. *Harry Potter* was the number one with 8% of teens ranking it as their favorite book. Which is true?

I. The population of interest is all U.S. teens.
II. 8% is a statistic and not the actual percentage of all U.S. teens who would rank this book as their favorite.
III. This sampling design should provide a reasonably accurate estimate of the actual percentage of all U.S. teens who would rank this book as their favorite.

A) I only B) II only C) III only D) I and II E) I, II, and III

___ 3. The city of Bayonne decides to randomly test high school students for depression. There are three high schools in Bayonne, each with grades 9-12. The city pools all of the students together and randomly samples 250 students. Is this a simple random sample?

A) Yes, because the students were chosen at random.
B) Yes, because each student is equally likely to be chosen.
C) Yes, because they could have chosen any 250 students from throughout the district.
D) No, because we can't guarantee that there are students from each school in the sample.
E) No, because we can't guarantee that there are students from each grade in the sample.

___ 4. A student athlete has a 70% free throw percentage. How could you simulate the number of free throws she will make in her next five attempts?

I. Let 0,1 represent making the first shot, 2, 3 represent making the second shot,…, 8, 9 represent making the fifth shot. Generate five random numbers 0-9, ignoring repeats.
II. Let 0, 1, 2 represent missing a shot and 3, 4,…, 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9.
III. Let 0, 1, 2 represent missing a shot and 3, 4,…, 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9, ignoring repeats.

A) I only B) II only C) III only D) II and III E) I, II, and III

___ 5. More winter white hamsters are being diagnosed with diabetes than have been diagnosed in the past. A researcher identified 50 hamsters without diabetes and kept records of their diets for several months to see if any developed insulin resistance. This is a(n)

A) randomized experiment B) survey C) prospective study
D) retrospective study E) blocked experiment

___ 6. An english instructor teaching a large lecture class surveys *his students* about how he can make the lectures more interesting, hoping to get even more students to attend. This survey method suffers from

A) voluntary response bias
B) nonresponse bias
C) response bias
D) undercoverage
E) None of the above

___ 7. What are placebos useful for?

A) sampling B) blocking C) blinding D) control E) randomization

___ 8. Why do we use double-blinding?

I. The evaluators do not know which treatment group the participants are in.
II. The participants do not know which treatment group they are in.
III. No one knows which treatment any of the participants is getting.

A) I only B) II only C) III only D) I and II E) I, II, and III

___ 9. Which is <u>not</u> needed in a proper experimental design?

A) blocking
B) control
C) randomization
D) replication
E) All are needed in a proper experimental design.

___10. A biologist wants to compare the effect of a new type of soap on skin aging. The biologist believes that men and women may have different skin reactions to the soap.

Additionally, the researcher believes that the soap will react differently on skin that is dry. The subjects are split into four groups: men with dry skin; men without dry skin; women with dry skin; women without dry skin. Subjects in each group are randomly assigned to the new soap and the old generic soap. This experiment

A) is completely randomized.
B) has three factors (soap type, gender, whether skin is dry).
C) has two factors (gender and whether skin is dry) blocked by soap type.
D) has two factors (soap type and whether skin is dry) blocked by gender
E) has one factor (soap type), blocked by gender and whether skin is dry.

__11. An article in Elle magazine reported that cats kept as pets tend to be chubby. Experts propose two different diets (Diet A and Diet B) and two different exercise programs (Plan 1 and Plan 2). Diet A: owners control the portions of cat food and cat treats; Diet B: a mixture of fresh vegetables with the cat food and substitute regular cat treats with baby carrots. Plan 1: three 30-minute play times a week; Plan 2: 20-minute play times daily. Sixty cat owners volunteer to take part in an experiment to help their chubby cats lose weight.
Identify the following:

a. the subjects:
    A. experts
    B. cats
    C. cats owners
    D. diet and exercise

b. the factor(s):
    A. experts and owners
    B. diet and exercise
    C. chubby cats
    D. weight and food

c. the number of level(s) for each factor:
    A. 2 and 4
    B. 2 and 2
    C. 1 and 2
    D. 60

d. the number of treatments:

A. 4
B. 6
C. 2
D. 1

e. whether or not the experiment is blind (or double-blind):
   A. blind
   B. double blind
   C. neither
   D. both

f. the response variable:
   A. cats
   B. food
   C. weight loss
   D. exercise

Chapters 13-14

The SuperYummy company produces Dark Chocolate M&M's. In each package, they mix 10% each brown and red candies, and 20% each yellow, blue, and orange candies. The rest of the candies are green.

Show your work

12. If you pick a Dark Chocolate M&M at random, what is the probability that
    a. it is green?

    A) 0.7 B) 0.2 C) 0.4 D) 0.85

    b. it is a primary color (red, yellow, or blue)?

    A) 0.5 B) 0.32 C) 0.45 D) 0.2

    c. it is not orange?

    A) 0.48 B) 0.3 C) 0.65 D) 0.8

13. If you pick four M&M's in a row, what is the probability that

a. they are all blue?

A) 0.16 B) 0.0016 C) 0.016 D) 1.6

b. none are green?

A) 0.22 B) 0.3 C) 0.8 D) 0.41

c. at least one is red?

A) 0.34 B) 0.38 C) 0.41 D) 0.52

14. A questionnaire showed that 58% of all American households eat bacon for breakfast, 44% eat cereals, and 16% have both bacon and cereals.

Show your work

a. What is the probability that a household selected at random had neither bacon nor cereals for breakfast?

A) 0.14 B) 0.5 C) 0.34 D) 0.18

b. What is the probability that a household selected at random had only cereals without having bacon for breakfast?

A) 0.82 B) 0.74 C) 0.28 D) 0.38

c. What is the probability that a randomly selected household having bacon had cereals for breakfast?

A) 0.56 B) 0.10 C) 0.27 D) 0.18

d. Are having bacon and having cereals disjoint events?

i. Yes B) No