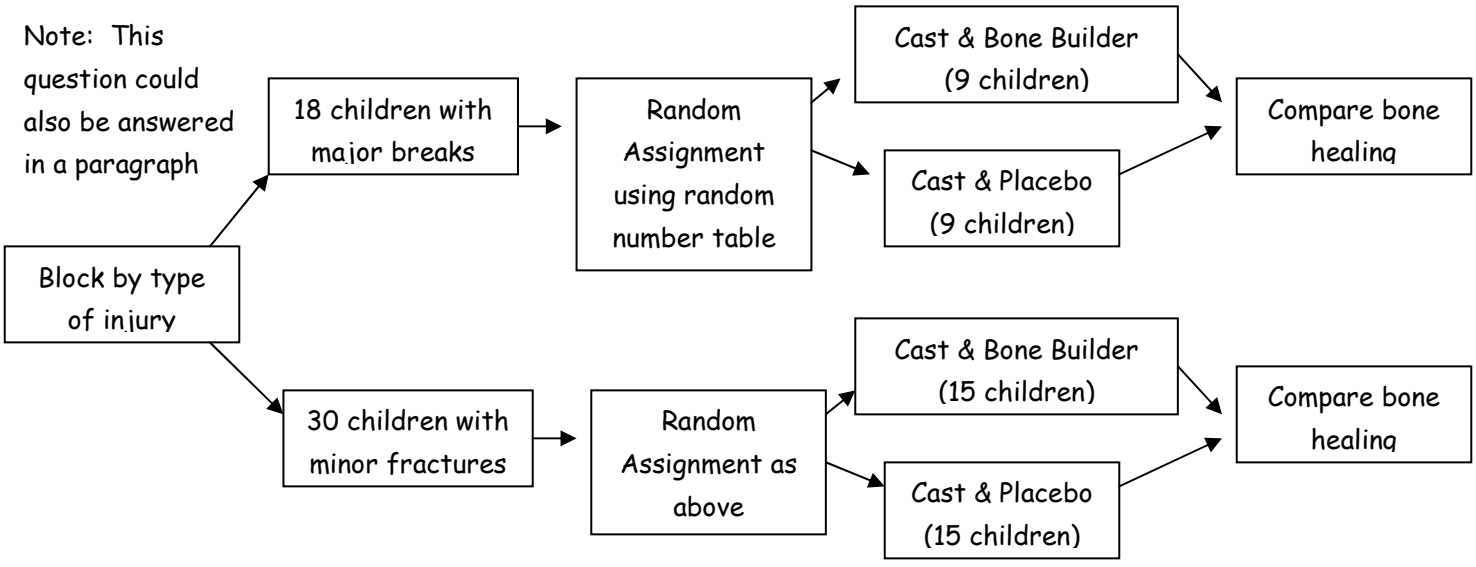
AP Statistics
Part III Review #2

Name _____
Per _____

1. **College students' spending.** A consumer group wants to see if a new education program will improve the spending habits of college students. Students in an economics class are randomly assigned to three different types of courses on spending habits.
   a. What are the experimental units? ___**economics students**_____
   b. How many factors are there? ___**1 (type of course)**____
   c. How many treatments are there? ___**3**_____
   d. What is the response variable? ____**improvement in spending habits**____

2. **Video games.** A headline in a local newspaper announced "Video game playing leads to better spatial reasoning abilities." The article reported that a study found "statistically significant differences" between teens who play video games and teens who do not, with those who play video games testing better in spatial reasoning.
   a. What does "statistically significant" mean in this context?
      The difference in spatial reasoning between the two groups is too big to be attributed to natural variation or random chance. There must be something different about teens who play video games compared to those who don't.
   b. Do you think the headline was appropriate? Explain.
      No – this was not a controlled experiment, so we cannot determine that the games are causing the better spatial reasoning. It could be that teens with better spatial reasoning find video games easier and therefore play more (other possible explanations are acceptable here).

3. **Bone Builder.** Researchers believe that a new drug called Bone Builder will help bones heal after children have broken or fractured a bone. The researchers believe that Bone Builder will work differently on major breaks than on minor fractures. Bone Builder will be used in conjunction with traditional casts. To test the impact of Bone Builder on bone healing, the researchers recruit 18 children with major bone breaks and 30 children with minor bone fractures. Design an appropriate experiment to determine if Bone Builder will help bones heal.



4. **Cloning.** A polling organization is investigating public opinion about cloning. They phone a random sample of 1,200 adults, asking one of the following two questions (randomly chosen):

A: *"Do you favor allowing doctors to used cloned cells in attempts to find cures for such terrible diseases as Alzheimer's, diabetes and Parkinson's?"*
B: *"Should research scientists be allowed to use cloned human embryos in their experiments?"*

Which question do you expect will elicit greater support for cloning? Explain. What kind of bias is this?
Question A will elicit greater support since it talks about doctors instead of scientists, does not mention embryos, and lists the diseases cloning could cure. This is called response bias.

5. **Sweet potato pie**. Sam is preparing sweet potato pies as his dessert for Thanksgiving. The store he shops at sells six sweet potatoes in a bag. He has found that each bag will contain 0, 1 or 2 bad sweet potatoes. Based on experience he estimates that there will be no bad sweet potatoes in 40% of the bags, one bad sweet potato in 30% of the bags, and two bad sweet potatoes in the rest. Conduct a simulation to estimate how many bags Sam will have to purchase to have three dozen *good* sweet potatoes.
   a. Describe how you will use the random number table to conduct this simulation.

Each 1-digit number selected from the table will represent a bag. The numbers 0-3 will represent bags with no bad potatoes (6 good ones), 4-6 for bags with one bad potato (5 good ones), and 7-9 for bags with two bad potatoes (4 good ones). For each trial I will select numbers from the table and record how many good potatoes are in each bag, stopping when I have at least 36 good potatoes. I will allow repeated numbers within a trial. My response variable is how many bags it takes to get to this point.

   b. Show two trials, clearly labeling the random number table below. State the outcome for each trial.

Trial	Simulation	Outcome
#1 (numbers written below = # of good potatoes)	57821 76309 *5 4 4 6 6 4 5 6 = 40 good* 63508 29418	8 bags
#2	13026 34993 6 6 6 6 5 6 5 = 40 good 54636 17877	7 bags

   c. State your conclusion. According to my simulation, he will have to purchase an average of 7.5 bags to get 3 dozen good potatoes.

6. **Public opinion**. A member of the City Council has proposed a resolution opposing construction of a new state prison there. The council members decide they want to assess public opinion before they vote on this resolution. Below are some of the methods that are proposed to sample local residents to determine the level of public support for the resolution. Match each with one of the listed sampling techniques.

__7__ a) Place an announcement in the newspaper asking people to call their council representatives to register their opinions. Council members will tally the calls they receive.

__2__ b) Have each council member survey 50 friends, neighbors or co-workers.

__4__ c) Have the Board of Elections assign each voter a number, then select 400 of them using a random number table.

__5__ d) Randomly select 50 voters from each election district.

__6__ e) Call every 500th person in the phone book

__1__ f) Randomly select several city blocks; interview all the adults living on each block.

__3__ g) Randomly select several city blocks; then randomly pick 10 residents from each block.

1	Cluster
2	Convenience
3	Multistage
4	Simple random (SRS)
5	Stratified
6	Systematic
7	Voluntary response