Midterm Study Guide

Name: _____

Unit 1 Review

Date: _____ Period: _____

Individuals, Variables, Populations, and Statistics (ISN pgs. 3-8)

A forester surveys a sample of trees in a certain state forest and records the following information about each tree: species, height, diameter of trunk 4 feet above the ground, and type of leaves (needle or broadleaf).

1. The quantitative variables he recorded are:
   - (a) height only.
   - (b) species only.
   - (c) diameter of trunk only.
   - (d) (a) and (c)
   - (e) all four variables are quantitative.

Your school has 1000 students. You ask 80 of them, "Have you had a cold in the last three months?" Fifty-six percent of them answered "yes."

2. This is an example of
   - (a) an experiment.
   - (b) a census.
   - (c) an observational study.
   - (d) both (b) and (c).
   - (e) none of these.

You measure the age (years), weight (pounds), and marital status (single, married, divorced, or widowed) of 1400 women.

3. How many variables did you measure?
   - (a) 1400
   - (b) one
   - (c) two
   - (d) three
   - (e) 1403

A company database contains the following information about each employee: age, date hired, sex (male or female), ethnic group (Asian, black, Hispanic, etc.), job category (clerical, management, technical, etc.), yearly salary.

4. Which of the following lists of variables are *all* categorical?
   - (a) age, sex, ethnic group.
   - (b) sex, ethnic group, job category.
   - (c) ethnic group, job category, yearly salary.
   - (d) yearly salary, age.
   - (e) age, date hired.

A recent Gallup poll asked "Do you consider pro wrestling to be a sport, or not?" Of the people asked, 81% said "No." The results were based on telephone interviews with a randomly selected national sample of 1,028 adults, 18 years and older, conducted August 16-18, 1999.

5. The population for this poll appears to be:
   - (a) all professional wrestlers.
   - (b) all adults, 18 years or older.
   - (c) all adults, 18 years or older, who were interviewed.
   - (d) all adults who answered "no."
   - (e) all fans of professional wrestling who are 18 years or older.

6. The sample for this poll is:
   - (f) all professional wrestlers.
   - (g) all adults, 18 years or older.
   - (h) all adults, 18 years or older, who were interviewed.
   - (i) all adults who answered "no."
   - (j) all fans of professional wrestling who are 18 years or older.

Categorical vs. Quantitative Data (ISN pgs. 3-4)

For the following exercises, classify as categorical or quantitative data.

7. The present year
8. A woman's age
9. The height of a man
10. Number of students
11. A house number
12. Favorite colors
13. Jersey number
14. The 12th of March
15. The time of day
16. Favorite foods
17. # of Book pages
18. Favorite movie

Types of Sampling (ISN pgs. 9-10)

Tell whether the samples are simple random, cluster stratified, voluntary response, systematic or convenience.

19. Corwin has a project due tomorrow. He was supposed to survey family and friends to find out what their favorite type of ice cream is. Corwin is running out of time, so he walks up to the local supermarket and does his survey with shoppers as they walk out of the store. _____

20. Charlie wanted to find out whether his fellow students would prefer pizza or burgers for the new Wednesday lunch so he decides to survey every twelfth student that walks by him. _____

21. Jared has a baseball card collection with over 500 cards. His friend believes that Jared has more baseball cards with New York Yankee players than any other team. Jared tries to prove him wrong. Jared has his friend randomly select 125 baseball cards to see. _____

22. The eleventh grade class complains constantly about how much homework they have. They believe that they get more homework than any of the other grades. Just to satisfy the 11th graders, the principal surveys a percentage of each of the grade levels and asks how many hours a week they spend on homework. _____

23. The local news station asks viewers to go to their web page and answer the following survey poll, "Do you like the rainy weather that we are having?" _____

24. How much sleep do high school students get on a typical school night? An interested student designed a survey to find out. To make data collection easier, the student surveyed the first 100 students to arrive at school on a particular morning. _____

Types of Experimentation(ISN pgs. 11-12)

25. If an experiment is conducted in such a way that neither the subjects nor the investigators working with them know which treatment each subject is receiving, then the experiment is
     (a) Random Comparative   (b) Blinded Design   (c) Block Design

26. A group of individuals that are chosen before the experiment and are known to be similar in some way that is expected to affect the response to the treatments, is an example of:
     (a) Random Comparative   (b) Blinded Design   (c) Block Design

27. Experiments that should compare treatments rather than attempt to assess the effect of a single treatment in isolation and the treatments should be randomly assigned would be considered a,
     (a) Random Comparative   (b) Blinded Design   (c) Block Design

Basics of Experimentation (ISN pgs. 11-12)

28. You are planning an experiment to study the effect of gasoline brand and engine size on the gas mileage (miles per gallon) of sport utility vehicles. In this study, gas mileage is
     a. The response variable.   b. The explanatory variable.

29. In this study, the explanatory variable(s) is(are)
     a. Miles per gallon   d. Engine size
     b. Sport utility vehicles   e. (C) and (D)
     c. Gasoline brand

30. Suppose the experiment consists of 3 gasoline brands and 2 engine sizes. How many treatments are there?
     a. 2   b. 3   c. 5   d. 6

31. What are the subjects in this experiment?
     a. Gasoline Brand   c. Sport Utility Vehicles
     b. Engine Size   d. Drivers of Sport Utility Vehicles

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Unit 2 Review

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Central Tendency (ISN pgs. 21-24, 27-28)

The next four questions are related to this situation.

The stock market did well during the 1990s. Here are the percent total returns (change in price plus dividends paid) for the Standard & Poor's 500 stock index:

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Return	31.7	−3.1	30.5	7.6	10.1	1.3	37.6	23.0	33.4	28.6

1. The median is _____
2. The third quartile is _____
3. The mean is _____
4. The standard deviation is _____

The calorie counts for the 17 poultry brands are: 129 132 102 106 94 102 87 99 170 113 135 142 86 143 152 146 144

5. The median of these values is _____
6. The first quartile is _____

The next six questions use these data.

Here are the number of hours that each of a group of students studied for this exam: 2 4 22 6 1 4 1 5 7 4

7. The median is _____

8. The mean is _____

9. The first quartile is _____

10. The standard deviation is _____

11. The IQR is _____

12. The outlier is _____

13. The five numbers in the five-number summary are:
   _____, _____, _____, _____, _____,

14. What is the first quartile of the observations 2, -2, 1, -1, 1, 0, 0, 3, 0, 2, 3? _____

15. Find the mean, median, mode, and standard deviation of the following:

   (a) 0, 1, 2, 3, 4 _____

   (b) 4, 5, 5, 5, 4_____

   (c) 4, 15, 25, 30, 8, 95, 4 _____

CONSTRUCTIONS (ISN pgs. 13-20, 23-26)

16. The heights of 20 basketball players, in inches, are given below. Make a dot plot on a separate sheet of paper. Describe the S, C, S, O of the distribution.   68, 70, 70, 71, 75, 80, 81, 82, 84, 75
   75, 80, 75, 77, 75, 80, 83, 80, 71, 70

17. A particular company was recording the age of all of their workers. Make a stem-and-leaf plot on a separate sheet of paper. Describe the S, C, S, O of the distribution.

48	63	42	51	65	56	53	41
47	73	79	58	62	78	40	63

18. The following data is the number of car accidents (in millions) each year. Draw a time series graph on a separate sheet of paper. Label everything correctly.

Year	1990	1995	2000	2004	2005	2006	2007	2008	2009
# Accidents	11.5	10.7	13.4	10.9	10.7	10.4	9.4	12.5	10.6

19. The amount of protein for certain sandwiches in the food court is reported here. Construct a frequency table using 7 classes. Draw a histogram on a separate sheet of paper. Describe the S, C, S, O of the distribution. Label everything correctly.

23	30	20	27	44	26	35	20	29
25	15	18	27	19	22	12	26	34
27	35	26	43	35	14	24	12	23
40	35	38	57	22	42	24	21	27

20. All 3rd grade students were asked to answer the following question, "What is your favorite color?" The results are below. Draw a bar graph on a separate sheet of paper. Label everything correctly.

Color	Red	Blue	Yellow	Orange	Pink	Purple	Black	Green	Brown
# of kids	24	36	10	9	27	13	6	18	5

21. Find the five-number summary. Draw a box plot of the following data set. Make sure to check for outliers. Describe the S, C, S, O of the distribution.   {78, 70, 71, 25, 115, 60, 65, 64, 68, 84, 12, 50, 90, 120, 47, 88}.

22. The ages of 22 students in a karate class are given below. Construct a dot plot on a separate sheet of paper. Describe the S, C, S, O of the distribution.   11, 5, 9, 13, 8, 9, 9, 11, 10, 8, 6, 7, 12, 11, 13, 12, 7, 6, 11, 12, 10, 8

23. A survey of 350 local families asked the question, "Where are you planning to vacation this summer?" Construct a bar graph on a separate sheet of paper from the following results. Label everything correctly.

Area	Tennessee	New York	California	Florida	Hawaii
# Vacationing	32	85	125	46	62

24. The following is a list of prices of items sold at a garage sale. Construct a frequency distribution using 5 classes. Draw a histogram on a separate sheet of paper. Describe the S, C, S, O of the distribution. Label everything correctly.

34	2	11	30	4	29	5	24	8	10	5	10
2	12	5	15	20	23	25	10	25	29	1	30
8	6	30	15	5	26	32	17				

25. The ages of the teachers at a local public school are listed below. Draw a stem-and-leaf plot on a separate sheet of paper. Describe the S, C, S, O of the distribution.

28	39	41	24	39	57	43	49
39	46	41	32	34	29	51	45

26. The following data is temperature measurements for the following dates. Draw a time series graph on a separate sheet of paper. Label everything correctly.

Date	Dec 4th	Jan 12th	Feb 8th	Mar 1st	Apr 19th	May 2nd	June 27th	July 30th	Aug 16th
Temperature	24	36	10	29	57	63	76	88	75

27. Draw a scatterplot of the following data. Label everything correctly.

Amount Tyler Earns Babysitting

Hours	1	2	3	4	5	6	7	8
Amount	$4	$8	$12	$16	$20	$24	$28	$32

28. Find the five-number summary. Draw a box plot of the following data set. Make sure to check for outliers. Describe the S, C, S, O of the distribution.   {35, 45, 42, 41, 25, 36, 27, 41, 34, 73, 26, 58, 29, 20, 28, 35, 48, 43, 42, 45}.

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Unit 3 Review

Basic Probabilities (ISN pgs. 29-30)

If one die is rolled, find the probability of…

1. a number less than 3: _____

2. an even number: _____

3. a number greater than 1: _____

If one card is drawn, find the probability of…

4. a King: _____

5. a black Ace: _____

6. a number between 2 and 5: _____

Tree Diagram (ISN pgs. 29-30)

7. Draw a tree diagram to illustrate a penny flipped, a nickel flipped, and then a quarter flipped.

Complements (ISN pgs. 29-30)

8. At a local clinic there are eight men, five women, and three children in the waiting room. If a patient is randomly selected, find the probability that it is a child.

9. At a local clinic there are eight men, five women, and three children in the waiting room. If a patient is randomly selected, find the probability that it is NOT a child.

Mutually Exclusive/Addition Rule (ISN pgs. 31-32)

10. If one card is drawn from a standard deck of 52 cards, what is the probability that it is a club or a red jack?
    a. Is the event mutually exclusive or not mutually exclusive? _____

    b. Find the probability.

11. Rolling a die once, what is the probability that it is either greater than 2 or less than 4?
    a. Is the event mutually exclusive or not mutually exclusive? _____

    b. Find the probability.

Independence & Dependence/Multiplication Rule (ISN pgs. 33-34)

12. A package of M & M's contains 8 brown candies, 7 yellow candies, 4 green candies, 3 red candies, 3 orange candies, and 1 blue candy. Four candies are selected without replacement. Find the probability of:
    a. selecting all 4 yellow candies
    b. selecting 3 browns and 1 red

Two-Way Tables (ISN pgs. 35-36)

The two-way table shows the number of students with each hair color and eye color. Suppose that any one of these students is randomly selected.

13. What is probability that the student has green eyes?

14. What is probability that the student does not have red hair?

	Hair Color			
Eye Color	**Black**	**Brown**	**Red**	**Blonde**
Brown	7	12	3	1
Blue	2	8	2	9
Hazel	2	5	1	1
Green	1	3	1	2

15. Given that the student has blue eyes, what is the probability that the student has black hair?

16. Given that the student has brown hair, what is the probability that the student has brown eyes?

17. Given that the student has hazel eyes, what is the probability that the student does not have black hair?

Counting Principle (ISN pgs. 35-36)

18. The lockers at a gym have four-digit codes on the locks. The first digit must be odd and the second digit must be even. How many possible outcomes are possible if repetition is possible? Use numbers 0,1,2,3,4,5,6,7,8,9 (and 0 as an even number).

19. How many ways can 8 paintings be line up on a wall?

20. A coin is tossed nine times. How many different outcomes are possible?

Permutation / Combination (ISN pgs. 37-38)

21. In a classroom of 25 students, how many different ways can a group of 6 students be selected to take a survey?

22. There is a debate club with 17 members. They are to select a board consisting of a president, vice president, treasurer, and a secretary. How many different ways can this board be organized?

23. The volleyball team has 9 players, but only 6 can be on the court at one time. How many different ways can the team fill the court?

24. Eight people are running for the school board. The person with the highest number of votes is the chair of the board, the second highest will be vice-chair, and the third highest vote-getter will serve as the secretary. In how many ways can the positions be filled?