R 1 Hw

NAME Answer Key

Chapter 1 AP Statistics Practice Test

Section I: Multiple Choice *Select the best answer for each question.*

T1.1. You record the age, marital status, and earned income of a sample of 1463 women. The number and type of variables you have recorded is

(a) 3 quantitative, 0 categorical

(b) 4 quantitative, 0 categorical

(c) 3 quantitative, 1 categorical

(d) 2 quantitative, 1 categorical

(e) 2 quantitative, 2 categorical

T1.2. Consumers Union measured the gas mileage in miles per gallon of 38 vehicles from the same model year on a special test track. The pie chart provides information about the country of manufacture of the model cars tested by Consumers Union. Based on the pie chart, we conclude

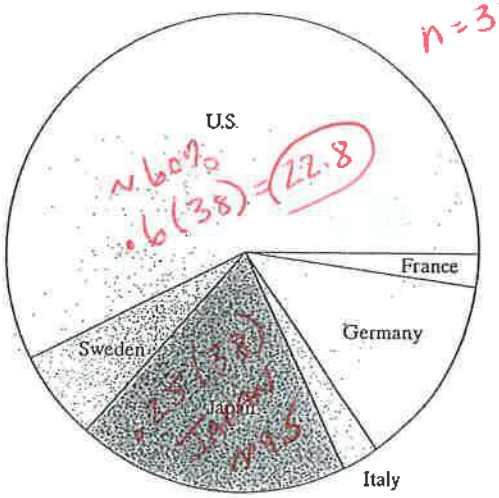
(a) Japanese cars get significantly lower gas mileage than cars from other countries.

(b) U.S. cars get significantly higher gas mileage than cars from other countries.

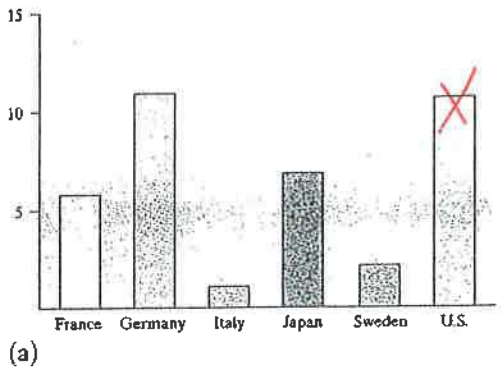
(c) Swedish cars get gas mileages that are between those of Japanese and U.S. cars.

(d) Mercedes, Audi, Porsche, and BMW represent approximately a quarter of the cars tested.

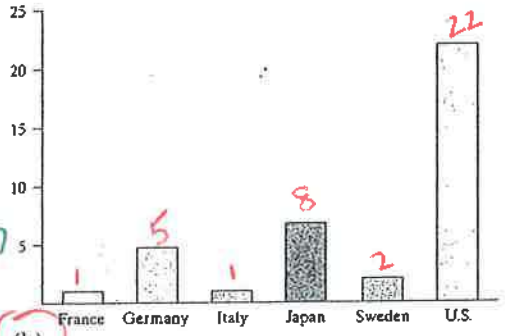
(e) More than half of the cars in the study were from the United States.



T1.3. Which of the following bar graphs is equivalent to the pie chart in Question T1.2?

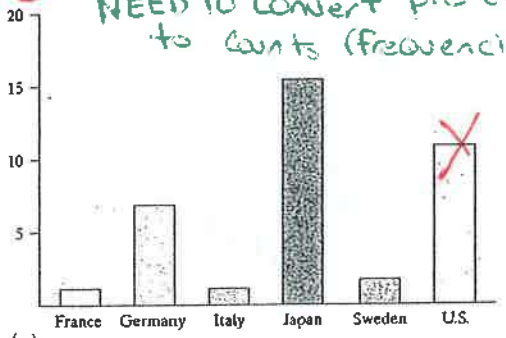


(a)

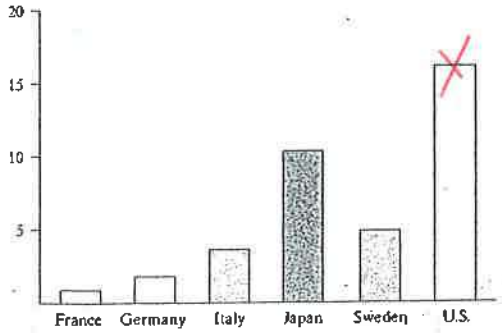


(b)

NEED TO Convert pie chart %'s to counts (frequencies)



(c)



(d)

(e) None of these.

T1.4. Earthquake intensities are measured using a device called a seismograph, which is designed to be most sensitive to earthquakes with intensities between 4.0 and 9.0 on the Richter scale. Measurements of nine earthquakes gave the following readings:

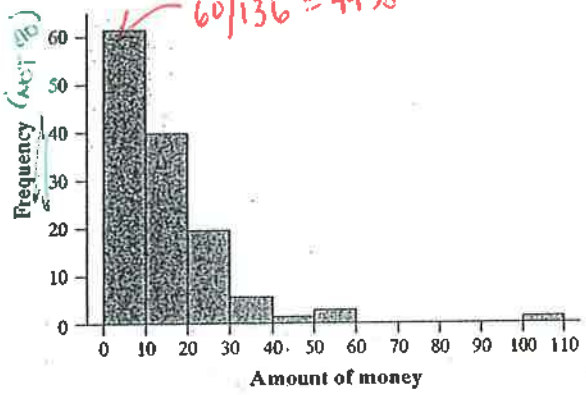
L 4.0
4.5
5.2
5.5
M 6.0
8.7
8.9
H 9
H 9

4.5	L	5.5	H	8.7	8.9	6.0	H	5.2

where L indicates that the earthquake had an intensity below 4.0 and an H indicates that the earthquake had an intensity above 9.0. The median earthquake intensity of the sample is

(a) 5.75. (b) 6.00. (c) 6.47. (d) 8.70. (e) Cannot be determined.

Questions T1.5 and T1.6 refer to the following setting. In a statistics class with 136 students, the professor records how much money (in dollars) each student has in his or her possession during the first class of the semester. The histogram shows the data that were collected.



T1.5. The percentage of students with less than \$10 in their possession is closest to 60/136 = 44%

(a) 30%. (b) 35%. (c) 50%. (d) 60%. (e) 70%.

Closest

T1.6. Which of the following statements about this distribution is *not* correct? Read Carefully for NOT's

(a) The histogram is right-skewed. T
(b) The median is less than \$20. T
(c) The *IQR* is \$35.
(d) The mean is greater than the median. T
(e) The histogram is unimodal T

T1.7. Forty students took a statistics examination having a maximum of 50 points. The score distribution is given in the following stem-and-leaf plot:

Q3 is halfway between median and the max.

0	28
1	2245
2	01333358889
3	001356679
4	22444666788
5	000

11th 10th

Q3 → 40/4 = 10 (between 10th & 11th Observation)

Q3 = 44 points

The third quartile of the score distribution is equal to
(a) 45. (b) 44. (c) 43. (d) 32. (e) 23.

T1.8. The mean salary of all female workers is $35,000. The mean salary of all male workers is $41,000. What must be true about the mean salary of all workers?

(a) It must be $38,000.
(b) It must be larger than the median salary.
(c) It could be any number between $35,000 and $41,000.
(d) It must be larger than $38,000.
(e) It cannot be larger than $40,000.

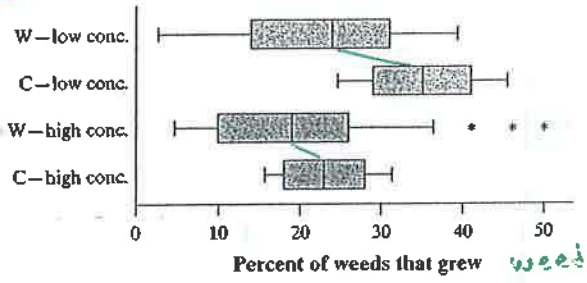
Questions T1.9 and T1.10 refer to the following setting. A survey was designed to study how business operations vary according to their size. Companies were classified as small, medium, or large. Questionnaires were sent to 200 randomly selected businesses of each size. Since not all questionnaires in a survey of this type are returned, researchers decided to investigate the relationship between the response rate and the size of the business. The data are given in the following two-way table:

Size	Response	No Response	Total
Small	125	75	200
Medium	81	119	200
Large	40	160	200
	246	354	600

T1.9. What percent of all small companies receiving questionnaires responded?
(a) 12.5% (c) 33.3% (e) 62.5%
(b) 20.8% (d) 50.8%

T1.10. Which of the following conclusions seems to be supported by the data?
(a) There are more small companies than large companies in the survey.
(b) Small companies appear to have a higher response rate than medium or big companies.
(c) Exactly the same number of companies responded as didn't respond.
(d) Small companies dislike larger companies.
(e) If we combined the medium and large companies, then their response rate would be equal to that of the small companies.

T1.11. An experiment was conducted to investigate the effect of a new weed killer to prevent weed growth in onion crops. Two chemicals were used: the standard weed killer (C) and the new chemical (W). Both chemicals were tested at high and low concentrations on a total of 50 test plots. The percent of weeds that grew in each plot was recorded. Here are some boxplots of the results. Which of the following is *not* a correct statement about the results of this experiment?



(a) At both high and low concentrations, the new chemical (W) gives better weed control than the standard weed killer (C).
(b) Fewer weeds grew at higher concentrations of both chemicals.
(c) The results for the standard weed killer are less variable than those for the new chemical.
(d) High and low concentrations of either chemical have approximately the same effects on weed growth.
(e) Some of the results for the low concentration of weed killer W show fewer weeds growing than some of the results for the high concentration of W.

Section II: Free Response *Show all your work. Indicate clearly the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.*

T1.12. You are interested in how much time students spend on the Internet each day. Here are data on the time spent on the Internet (in minutes) for a particular day reported by a random sample of 30 students at a large high school:

7	20	24	25	25	28	28	30	32	35
42	43	44	45	46	47	48	48	50	51
72	75	77	78	79	83	87	88	135	151

(a) Construct a histogram of these data.

(b) Are there any outliers? Justify your answer.

(c) Would it be better to use the mean and standard deviation or the median and IQR to describe the center and spread of this distribution? Why?

TIP: KNOW HOW TO USE YOUR CALCULATOR

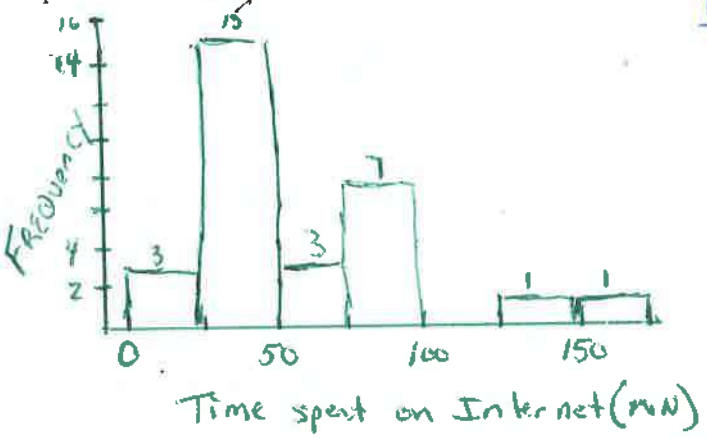
(1) ENTER DATA IN L1 (always check twice you entered correctly)

(2) STAT PLOT - MAKE HISTOGRAM USE WINDOW TO SET BAR WIDTHS

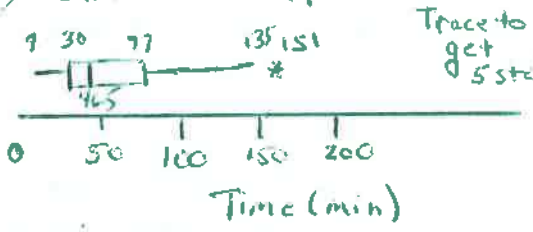
(3) USE STAT PLOT - BOX PLOT TO CHECK FOR OUTLIERS (Then do calculations to support)

(4) 5-NUMBER SUMMARY STATS > CALC > 1-VAR STATS

(A)



(B) Sketch a box plot - use Trace to get 5 stats



OUTLIER IS 151:

IQR = 77 - 30 = 47

Q3 + 1.5 IQR = 77 + 1.5 (47) = 147.5

SINCE 151 is larger than 147.5 It is an outlier

(C) It would be better to use the median and IQR to describe the center and spread of this distribution since it is skewed to the right

Could add (OR SAY INSTEAD) → The mean and standard deviation are influenced by the outliers and would not be appropriate for this right skewed distribution

Rounding Rules: typically 1 more decimal place than given data.
For %'s, one or two places so they sum to 100%.

T1.13. A study among the Pima Indians of Arizona investigated the relationship between a mother's diabetic status and the appearance of birth defects in her children. The results appear in the two-way table below.

(A)

	Diabetic Status			
Birth Defects	Nondiabetic	Prediabetic	Diabetic	Total
None	754	362	38	1154
One or more	31	13	9	53
Total	785	375	47	1207

(a) Fill in the row and column totals in the margins of the table.

(b) Compute (in percents) the conditional distributions of birth defects for each diabetic status.

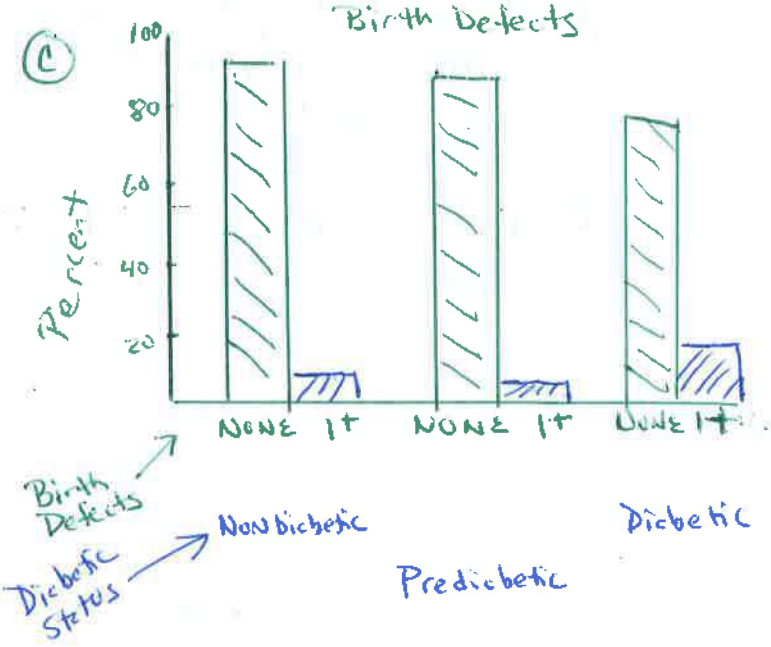
(c) Display the conditional distributions in a graph. Don't forget to label your graph completely.

(d) Comment on any clear associations you see.

(B) Diabetic Status

	NONDIABETIC	PREDIABETIC	Diabetic
NONE	96.1%	95.5%	80.9%
1 or more	3.9%	3.5%	19.1%
Total	100%	100%	100%

(C)



(D) There does appear to be an association between diabetic status and the number of birth defects. Non diabetic and prediabetic appear to have birth defects at the same rate. Diabetic mothers have a much higher rate of birth defects.

T1.14 The back-to-back stemplot shows the lifetimes of several Brand X and Brand Y batteries.

Brand X		Brand Y
	1	
	1	7
	2	2
	2	6
2110	3	
99775	3	
3221	4	223334
	4	56889
4	5	0
5	5	

Key: 4|2 represents 420–429 hours.

(a) What is the longest that any battery lasted? 515 which is 550 to 559 hours

(b) Give a reason someone might prefer a Brand X battery.

(c) Give a reason someone might prefer a Brand Y battery.

(b) Brand X might be preferred since it has a higher minimum value (about 300 hrs) and the bulk of the batteries have a lifetime between 300 and 439 hours

(c) Brand Y might be preferred since it has a higher median (about 430 hrs)

T1.15 During the early part of the 1994 baseball season, many fans and players noticed that the number of home runs being hit seemed unusually large. Here are the data on the number of home runs hit by American League and National League teams in the early part of the 1994 season:

American League: 35 40 43 49 51 54 57 58 58 64 68 68 75 77 — 42
National League: 29 31 42 46 47 48 48 53 55 55 55 63 63 67 — 38

Compare the distributions of home runs for the two leagues graphically and numerically. Write a few sentences summarizing your findings. CUSS and BS

A STEM LEAF or box plot could graphically answer this Question

Natn'L League		American League
9	2	
1	3	5
88762	4	039
5553	5	1488
733	6	488
	7	57

Key 6|3=63

The number of Homeruns hit by National teams (m = 50.5 HR's) is less than American league teams (m = 57.5 HR's). Both distributions appear to be symmetric and the National League appears to have an outlier. The American league appears to have more variability and a larger spread than the National League with ranges 42 and 38 respectively

NOTE: The text book gives a box plot instead