

Chapter 1 Multiple Choice Practice

ANSWER KEY

Directions. Identify the choice that best completes the statement or answers the question. Check your answers and note your performance when you are finished.

1. You measure the age (years), weight (pounds), and breed (beagle, golden retriever, pug, or terrier) of 200 dogs. How many variables did you measure?

(A) 1
(B) 2
(C) 3
(D) 200
(E) 203

2. You open a package of Lucky Charms cereal and count how many there are of each marshmallow shape. The distribution of the variable "marshmallow" is:

(A) The shape: star, heart, moon, clover, diamond, horseshoe, balloon.
(B) The total number of marshmallows in the package.
(C) Seven—the number of different shapes that are in the package.
(D) The seven different shapes and how many there are of each.
(E) Since "shape" is a categorical variable, it doesn't have a distribution.

3. A review of voter registration records in a small town yielded the following table of the number of males and females registered as Democrat, Republican, or some other affiliation.

	Male	Female	
Democrat	300	600	900
Republican	500	300	800
Other	200	100	300
	1000	1000	

The proportion of males that are registered as Democrats is

(A) 300
(B) 30
(C) 0.33
(D) 0.30
(E) 0.15

$$300/1000$$

4. For a physics course containing 10 students, the maximum point total for the quarter was 200. The point totals for the 10 students are given in the stemplot below.

11		68
12		148
13		37
14		26
15		
16		
17		9

Which of the following statements is NOT true?

- (A) In a symmetric distribution, the mean and the median are equal.
(B) About fifty percent of the scores in a distribution are between the first and third quartiles.
(C) In a symmetric distribution, the median is halfway between the first and third quartiles.
(D) The median is always greater than the mean.
(E) The range is the difference between the largest and the smallest observation in the data set.

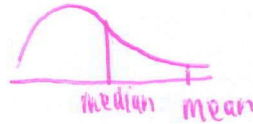
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5. When drawing a histogram it is important to

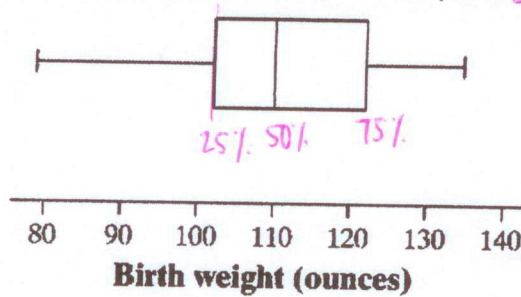
- (A) have a separate class interval for each observation to get the most informative plot.
- (B) make sure the heights of the bars exceed the widths of the class intervals so that the bars are true rectangles.
- (C) label the vertical axis so the reader can determine the counts or percent in each class interval.
- (D) leave large gaps between bars. This allows room for comments.
- (E) scale the vertical axis according to the variable whose distribution you are displaying.

6. A set of data has a mean that is much larger than the median. Which of the following statements is most consistent with this information?

- (A) The distribution is symmetric.
- (B) The distribution is skewed left.
- (C) The distribution is skewed right.
- (D) The distribution is bimodal.
- (E) The data set probably has a few low outliers.



7. The following is a boxplot of the birth weights (in ounces) of a sample of 160 infants born in a local hospital.



About 40 of the birth weights were below

- (A) 92 ounces.
- (B) 102 ounces.
- (C) 112 ounces.
- (D) 122 ounces.
- (E) 132 ounces.

8. A sample of production records for an automobile manufacturer shows the following figures for production per shift:

705 700 690 705

The variance of the sample is approximately

- (A) 8.66.
- (B) 7.07.
- (C) 75.00.
- (D) 50.00.
- (E) 20.00.

standard deviation²

* put them in L₁ and do 1-Var Stats

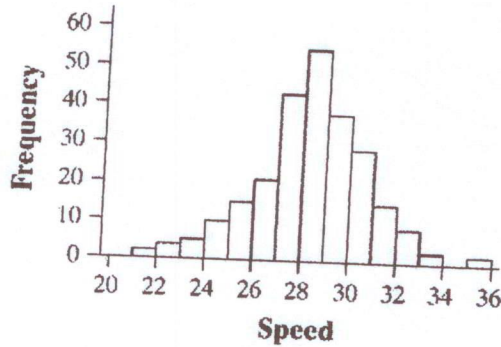
$$S_x = 7.07$$

$$\text{so } 7.07^2 \approx 50$$

9. You catch 10 cockroaches in your bedroom and measure their lengths in centimeters. Which of these sets of numerical descriptions are *all* measured in centimeters?
- (A) median length, variance of lengths, largest length
 - (B) median length, first and third quartiles of lengths
 - (C) mean length, standard deviation of lengths, median length
 - (D) mean length, median length, variance of lengths.
 - (E) both (B) and (C)

variance is cm^2
everything else is cm

10. A policeman records the speeds of cars on a certain section of roadway with a radar gun. The histogram below shows the distribution of speeds for 251 cars.



Which of the following measures of center and spread would be the best ones to use when summarizing these data?

- (A) Mean and interquartile range.
- (B) Mean and standard deviation.
- (C) Median and range.
- (D) Median and standard deviation.
- (E) Median and interquartile range.

← because the data is roughly symmetric

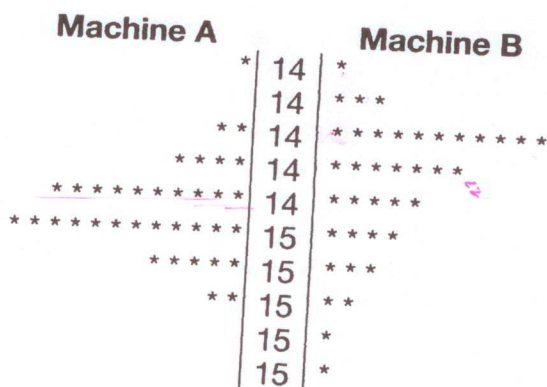
*if it were really skewed or had an outlier, we would want to use median and IQR.

- 1. C
- 2. D
- 3. D
- 4. D
- 5. C
- 6. C
- 7. B
- 8. D
- 9. E
- 10. B

FRAPPY! Free Response AP[®] Problem, Yay!

The following problem is modeled after actual Advanced Placement Statistics free response questions. Your task is to generate a complete, concise response in 15 minutes. After you generate your response, view two example solutions and determine whether you feel they are "complete", "substantial", "developing" or "minimal". If they are not "complete", what would you suggest to the student who wrote them to increase their score? Finally, you will be provided with a rubric. Score your response and note what, if anything, you would do differently to increase your own score.

SugarBitz candies are packaged in 15 oz. snack-size bags. The back-to-back plot below displays the weights (in ounces) of two samples of SugarBitz bags filled by different filling machines. The weights ranged from 14.1 oz. to 15.9 oz.



- (a) Compare the distributions of weights of bags packaged by the two machines.

The shape of Machine A is roughly symmetric while machine B is right skewed. Neither has an outlier. The center of machine A (15) is slightly higher than machine B (14). The biggest difference is the spread - machine B has more variability than A.

- (b) The company wishes to be as consistent as possible when packing its snack bags. Which machine would be least likely to produce snack bags of SugarBitz that have a consistent weight? Explain.

Machine B has more variability and would likely be much less consistent.

- (c) Suppose the company filled its bags using the machine you chose in part (b). Which measure of center, mean or median, would be closer to the advertised 15oz.? Explain why you chose this measure.

Since Machine B is right skewed, the mean is going to be pulled higher, toward the tail and be a better estimate of a center of 15.

Median would be a worse choice because it is more resistant to skewness and is around 14 oz.