



1. If sample points A, B, C, and D are the only possible outcomes of an experiment, find the probability of D using the table below<sup>1</sup>.

Sample Point	A	B	C	D
Probability	$1/8$	$1/8$	$1/8$	?

- a.  $1/8$   
b.  $1/4$   
c.  $5/8$   
d.  $3/8$   
e. None of the above
2. The outcome of an experiment is the number of resulting heads when a nickel and a dime are flipped simultaneously. What is the sample space for this experiment?
- a.  $S=\{HH, HT, TH, TT\}$   
b.  $S=\{\text{nickel, dime}\}$   
c.  $S=\{HH, HT, TT\}$   
d.  $S=\{0, 1, 2\}$   
e. None of the above
3. To survey the opinions of its customers, a supermarket grouped its customers by the days when they did most of their shopping. The supermarket randomly selected two such groups, and asked all customers in those two groups to complete a survey. This method of sampling is called<sup>2</sup>:
- a. Stratified random sampling.  
b. Clustered random sampling.  
c. Simple Random sampling  
d. Systematic random sampling.  
e. Non-representative
4. If a data set has a bell-shaped symmetric distribution with no outliers then:
- a. The mean is smaller than the median or the mode.  
b. The mean is larger than the median but not larger than the mode.  
c. The mean, median and mode are the same.  
d. None of the above.

<sup>1</sup> MSU-K. Makagon

<sup>2</sup> PSU – D. Hunter

<sup>3</sup> OpenIntro S. Pilegg



5. A sample of 28 temperature measurements in  $^{\circ}\text{F}$ , all taken at 12:00 p.m., was collected in a coastal town in NC. The five-number summary is: 32, 68, 79, 88, 98

The interquartile range is:

- a.  $84 - 66 = 18$
  - b.  $88 - 68 = 20$**
  - c.  $84.5 - 66 = 18.5$
  - d.  $95 - 55 = 40$
  - e. None of the above
6. A second sample of 28 temperature readings in a GA coastal town was also collected. Each GA measurement was recorded at the same time and date as the NC data value, and turned out to be exactly  $5^{\circ}\text{F}$  higher than the corresponding NC measurement. We calculate the standard deviation (S.D.) of the two data sets and conclude that<sup>2</sup>:

- a. The two data sets have the same standard deviations.**
- b. The S.D. of the NC data exceeds the S.D. of the GA data by  $5^{\circ}\text{F}$ .
- c. The S.D. of the GA data exceeds the S.D. of the NC data by  $5^{\circ}\text{F}$ .
- d. None of the above; there is no relationship between the two S.D.'s

7. The peak shopping time at a pet store is between 8-11:00 am on Saturday mornings. Management at the pet store randomly selected 130 customers last Saturday morning and decided to observe their shopping habits. They recorded the number of items that a sample of the customers purchased as well as the total time the customers spent in the store. Identify the types of variables recorded by the pet store.

- a. number of items - discrete; total time – discrete.
- b. number of items - continuous; total time – continuous.
- c. number of items - discrete; total time – continuous.**
- d. number of items - continuous; total time – discrete
- e. None of the above

8. A comprehensive survey released by a college reports that the true proportion of all students at the college who use drugs is 0.3. You survey 100 students in your dorm and record that the proportion of students who use drugs is 0.15. The proportion of all students at this college who use drugs is a \_\_\_\_\_ and the proportion of students who use drugs in your dorm is \_\_\_\_\_:

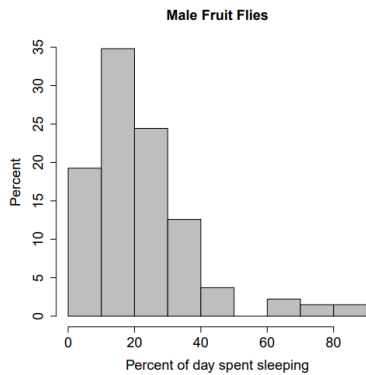
- a. statistic; parameter
- b. parameter; statistic**
- c. population; sample
- d. measure of central tendency, measure of variability
- e. none of the above

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9. The plot below displays the distribution of the percent of days spent sleeping by male fruit flies. Which of the following are valid estimates of the mean and median of this distribution<sup>3</sup>?



- a. mean = 24, median = 18
- b. mean = 18, median = 24
- c. mean = 18, median = 18
- d. mean = 20, median = 40
- e. mean = 25, median = 35

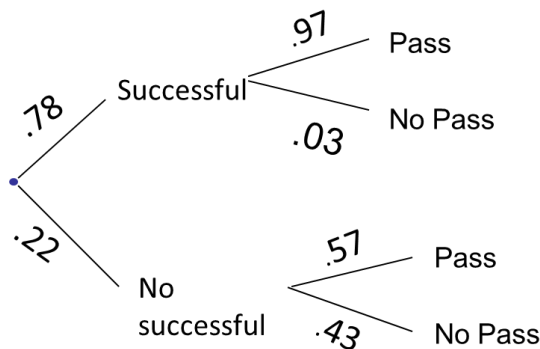
10. When a statistic, like the median, is said to be resistant to outliers, this means that

- a. it is impossible for the data to have any outliers.
- b. the statistic is greatly influenced by the value of the outliers.
- c. the statistic is not greatly influenced by the value of the outliers.
- d. the statistic itself is an outlier.
- e. the statistic itself cannot be an outlier

Answer the next THREE questions based on the following information.

After an introductory statistics course, 78% of students can successfully construct tree diagrams. Of those who can construct tree diagrams, 97% passed, while only 57% of those students who could not construct tree diagrams passed.

11. Organize this information into a tree diagram.



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12. What is the probability that a randomly selected student passed?

$$P(\text{Pass}) = P(\text{Successful AND Pass}) + P(\text{No Successful AND Pass}) = 0.78 \times 0.97 + 0.22 \times 0.57$$

**(An application of the Theorem of Total Probability)**

13. Compute the probability of student know how to construct a diagram given that she passes?

$$P(\text{Successful} \mid \text{Pass}) = P(\text{Successful AND Pass}) / P(\text{Pass}) = 0.78 \times 0.97 / [0.78 \times 0.97 + 0.22 \times 0.57]$$

**(An application of Bayes' Theorem)**

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