2019-20 Q2 Review AP Stat

Name: _____ **Date:** _____

1. An inspector at Everunreddy Batteries records the number of defective batteries in batches of 1000 batteries produced. Describe the outcomes in the event that "no more than 4 batteries are defective."

   A. Either 0, 1, 2, or 3 batteries are defective.

   B. Either 0, 1, 2, 3, or 4 batteries are defective.

   C. 4 to 1000 batteries inclusive are not defective.

   D. 3 or 4 batteries are defective.

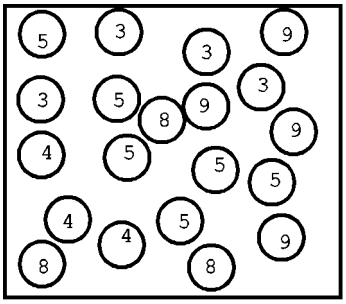
2. Jeff says that in 10 rolls of a die he can "roll a six at least three times". What is the complement of this event?

   A. rolling a six 3 times

   B. rolling a six once, or twice, or not at all

   C. rolling a six once or twice

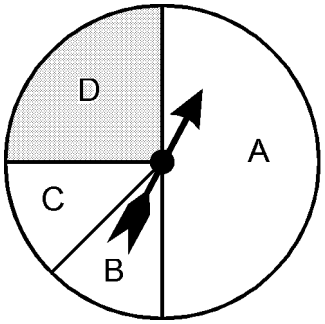
   D. rolling a number other than six three times

3. 

   If you take a number from this box without looking, which number would you *most likely* get?

   A. 3 B. 4 C. 5 D. 9

4.



An experiment is performed by spinning the spinner 25 times and recording the data in the table.

Experimental Probability

Region	Tally	Number	Percent
A	𝍸 𝍸 |		
B	||||		
C	𝍸		
D	𝍸		

What is the experimental probability of the spinner landing in region D?

A. 20% B. 75% C. 80% D. 40%

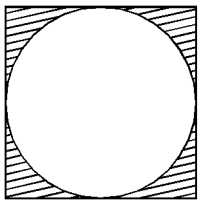
5. The library set up a special bookshelf for math-interest books. There are 2 math-history books, 3 books on statistics, 2 books on number theory and 2 books on geometry. If a student selects one book at random, what is the probability of choosing a math-history book?

A. $\frac{2}{9}$ B. $\frac{4}{9}$ C. $\frac{5}{9}$ D. $\frac{2}{3}$

6. The diagram shows a square whose sides are 1 unit in length. A dart randomly hits the square. What is the probability that it hits the shaded area?

A. ≈ 0.21 B. ≈ 0.57

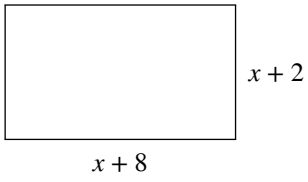
C. ≈ 0.33 D. ≈ 0.41



7. If a number is chosen at random from $\{1, 3, 5, 7, 9\}$ and substituted into x in the diagram, then what is the probability that the perimeter is greater than 38 units?

A. $\frac{3}{5}$ B. $\frac{2}{5}$

C. $\frac{3}{25}$ D. $\frac{1}{5}$



8. A student must choose two out of three electives: art, French, and mathematics. He chooses art with a probability of $\frac{5}{8}$, French with a probability of $\frac{5}{8}$, and art and French together with a probability of $\frac{1}{4}$.

a) What is the probability that he chooses mathematics?

b) What is the probability that he chooses either art or French?

9. What odds should a person give in favor of the following events?

   a) A card chosen at random from a 52-card deck is an ace.

   b) Two heads will turn up when a coin is tossed twice.

   c) Boxcars (two sixes) will turn up when two dice are rolled.

10. The following table shows the number of students enrolled in a 2- and 4-year college or university for a particular year. (The enrollment numbers are times 1000.)

Age	2-yr full-time	2-yr part-time	4-yr full-time	4-yr part-time	Total
15–17	44	4	79	0	
18–21	1345	456	3869	159	
22–29	489	690	1358	494	
30–44	287	704	289	627	
≥ 45	49	209	62	160	
Total					GT( )

   a) Fill in the totals in the table above. What is the grand total (GT) of students who were enrolled in colleges and universities that year?

   b) Based on the data, what percent of all undergraduate students were 18–21 years old?

   c) Find the percent of the undergraduates enrolled in each of the four types of programs who were 18–21 years old. Make a bar chart to compare these percents.

   d) The 18–21 group is the "traditional" age group for college enrollment. Using the data, briefly summarize the extent to which this group predominates in 2- and 4-year programs.

11. What is the formula used for each of the following probabilities?

   a) Addition Rule

   b) Multiplication Rule

   c) Conditional Probability

12. Here are the counts, in thousands, of earned degrees in the United States in a recent year, classified by level and by the sex of the degree recipient:

	Bachelor's	Master's	Professional	Doctorate	Total
Female	616	194	30	16	
Male	529	171	44	26	
Total					

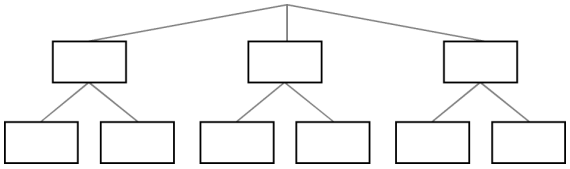
   a) If you choose a degree recipient at random, what is the probability that the person you choose is a woman?

   b) What is the conditional probability that you choose a woman, given that that person chosen received a professional degree?

   c) Are the events "choose a woman" and "choose a professional degree recipient" independent? How do you know?

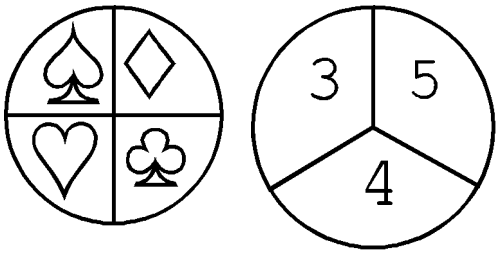
13. A jar contains three disks lettered ‘o’, ‘s’ and ‘t’. Two of the disks are pulled out at random, and they are placed next to each other in the same order as they are pulled out.

Fill in the tree diagram and use it to find the probability that the letters on the disks form an actual word.



A. $\frac{1}{12}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$

14.



In the diagrams, the first circle is divided into four equal parts and the second circle is divided into three equal parts. The first spinner is spun followed by the second. A character is formed consisting of a symbol and a number. Use the table to find to find the probability that the character formed has a heart or a diamond in it.

	3	4	5
Diamond			
Club			
Heart			
Spade			

A. $\frac{1}{12}$ B. $\frac{1}{6}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$

15. On a test on decimals, not multiple-choice, there are 30 questions. All that is being marked is whether the answer is right or wrong. A student reasons that since the question is either right or wrong they might as well guess the answer. They feel that the probability of getting a question correct is 0.5. What is wrong with their reasoning?

16. If Mike Piazza has a batting average of 0.348, what is the probability that he will hit safely 3 times out of the next 10 times at bat?

A. 0.283 B. 0.020 C. 0.253 D. 0.103

17. The Oilers have won 40% of the games played against the Blues over the past few seasons. What is the probability that the Oilers will win exactly 2 of the next 5 games against the Blues this season?

A. 0.346 B. 0.102 C. 0.16 D. 1.6

18. In a binomial distribution, if $p = 0.70$, what is the value of $p + q$?

A. 0.20 B. 0.90 C. 0.10 D. 1.00

19. In the expression $\binom{7}{2}(0.4)^2(0.6)^5$, which value represents the probability of failure?

A. 0.6 B. $(0.4)^2$ C. 0.4 D. 2

20. The Lakeview University's records indicate 57% of the students have student loans. If 9 students are chosen at random, calculate the probability that 7 of the 9 have student loans.

21. Using the normal approximation to the binomial, find the probability of at most 23 successes if $n = 50$ and $p = 0.5$.

A. 0.3374 B. 0.3357

C. 0.3333 D. 0.3363

22. How could you use a die to simulate an experiment with 3 equally likely outcomes?

A. let 1 represent the first outcome, 2 represent the second, and 3, 4, 5, and 6 represent the third outcome.

B. let 1 and 2 represent the first outcome, 3 represent the second, and 4, 5, and 6 represent the third outcome.

C. let 3 and 6 represent the first outcome, 2 and 5 represent the second outcome, and 1 and 4 represent the third outcome.

D. all of the above

23. A die is rolled and a coin is flipped at the same time. How many possible events can be simulated using this method?

A. 12 B. 36 C. 52 D. 6

24. The number of defective chips in a box of 10 is 3. Chips are drawn one at a time and tested. They are not replaced after they are tested. This process is continued until a non-defective chip is found. Use a random number table to estimate the probability that the number of chips tested is 3.

A. ≈ 0.06 B. ≈ 0.02

C. ≈ 0.49 D. ≈ 0.33

25. Erwin hypothesizes that the proportion of students who eat breakfast at school the first week is 80%. The student population in the school each semester is 1600 students. He hopes to obtain a sample of 100 students for the study. If the rate is really 80%, he want to figure out how unusual obtaining 72% is for a sample of size 100, using a randomization approach. In a few sentences, describe how to set up a randomization simulation, and what should be looked at to determine how unusual 72% is given Erwin's hypothesis.

26. Poll of 500 voters

Choice of candidate	Number of Voters
Clark (incumbent)	200
Klein	132
Cortez	168

According to the chart, out of 200,000 voters, how many do you predict will vote for the incumbent?

A. about 50,000 B. about 80,000

C. about 143,000 D. about 250,000

27. The table shows the percent of the population having different blood types.

Blood type	O	A	B	AB
Percent	45%	40%	11%	4%

If 500 people were randomly sampled, which of the following is the best estimate for the number who would have blood type A or type AB?

A. 20 B. 44 C. 200 D. 220

28. A telephone marketing service employee completes 80 calls per day with 25% of the calls resulting in a sale. What happens to both the mean and standard deviation of the number of sales when the number of calls is decreased to less than 80? (Assume a binomial distribution.)

A. the mean is increased and the standard deviation is decreased

B. both the mean and standard deviation are decreased

C. both the mean and standard deviation are increased

D. the mean is increased but the standard deviation remains unchanged

29. A computer component is manufactured in lots of 225. If 1.5% of the components are defective, what is the mean and standard deviation for the number of defects per lot?

A. 3.375; 1.82 B. 3.375; 1.81

C. 33.75; 1.81 D. 1.5; 1.82

30. David is using a questionnaire to determine the attitudes of students at his school toward the teachers commitment to teaching. What is the one disadvantage of using a questionnaire to collect data on this topic?

A. misinterpretation of questions

B. anonymous

C. quick and easy

D. personal contact required

31. What is one strength of using interviewing as the method of data collection?

A. gives accurate information

B. results are facts

C. time consuming

D. no personal contact required

32. What is one weakness of using interviewing as the method of data collection?

A. can sample large group

B. answers might be done carelessly

C. gives accurate results

D. time consuming

33. What is one weakness of using an experiment as the method of data collection?

A. gives accurate results

B. quick and easy

C. can be expensive

D. results are observed

34. What is one strength of using an experiment as the method of data collection?

A. time consuming

B. results are observed

C. quick an easy

D. can sample a large group

35. What would be the best method of collecting data about the world's fastest runner?

A. questionnaire B. experiment

C. research D. census

36. What is the key difference between an observational study and an experiment?

A. Experiments always provide unbiased results.

B. In observational studies, subjects do not receive any intervention designed to influence their responses.

C. Placebos can not be used in observational studies.

D. Observational studies always occur more frequently than experimental studies.

37. A survey is done at a dog boarding facility. The following data is collected about the dogs they house. Which data is categorical?

A. weight

B. number of days housed

C. veterinary costs

D. breed

38. How could the survey question "Have you ever had a drink of alcohol?" be revised to obtain a valid inference about the percent of drinkers in the population?

A. How often do you have an alcoholic beverage?

B. Do you drink alcohol when you go to a party?

C. What do you think of alcohol use?

D. Do your parents drink?

39. Topic: Amount of clothes made and purchased in the U.S., in comparison to the amount of clothes made in other countries that are purchased in the U.S.

What is the most appropriate question for the survey topic?

A. Do Americans buy more made-in-America clothes than foreign-made clothes?

B. What countries do Americans buy clothes from?

C. Which country sells the most clothes in the U.S.?

D. Do Americans prefer to shop in the U.S. or elsewhere for their clothes?

40. Which segments of the school population would you sample for an opinion on a new pop machine in the cafeteria?

A. students who eat lunch in the cafeteria

B. students who like Coke

C. students who bring money to school on a regular basis

D. students who bring their lunch to school

41. For their math project, two students conducted a survey on whether their school should expand the parking lot. During their presentation to the class, they explained that their data was obtained by going around the school and handing out surveys randomly. The teacher pointed out that the students really had a *convenience* sample rather than a *random* sample. What should the students have done to obtain a random sample?

42. Identify the segment of the population who would be strongly biased in a survey about marijuana use.

A. police officers
B. Inuit
C. racing car drivers
D. airline pilots

43. Which of the following is a biased survey question about the rating of a book?

A. Is this an enjoyable book?
B. On a five-point scale, how would you rate this book?
C. Would you recommend this book to a friend?
D. Is this boring book too long?

44. A question on a survey asks: Is red your favorite color?

What is the best way to eliminate the bias in this question?

A. change the color choice to blue
B. change the wording of the question
C. ask both girls and boys this question
D. only ask people wearing red this question

45. A question on a survey asks: Do you prefer to live in beautiful Miami or Santa Fe?

What is a way to eliminate the bias in this question?

A. do not give a choice of provinces
B. remove the adjective describing Miami
C. use an adjective to describe Santa Fe, too
D. give more provinces as choices

46. Stan is working on a class project for which he must interview ten of his classmates. He places the names of everyone in his class into a hat and selects 10 names. What kind of sampling is this?

A. simple random sample
B. multi-stage sampling
C. systematic sampling
D. convenience sampling

47. A political action group wants to poll voters. They decide to select 25 voting constituencies, and then survey 40 people from each of these chosen precincts. What sampling method is this?

A. clustered sampling
B. convenience sampling
C. simple random sampling
D. systematic sampling

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1.
Answer: B
Points: 1

2.
Answer: B
Points: 1

3.
Answer: C
Points: 1

4.
Answer: A
Points: 1

5.
Answer: A
Points: 1

6.
Answer: A
Points: 1

7.
Answer: A
Points: 1

8.
Answer:
Points: 1

9.
Answer: 0.0769; 0.25; 0.028
Points: 1

10.
Answer: 11,374,000; 51.2%; 60.7%, 22.1%, 68.4%, 11.0%; d. the 18–21 year old group comprises 60.7% and 68.4% of the 2 yr full or 4 yr full time students which is what we would expect, they are the majority of the students, they make up only 22.1% and 11.05 of the part-time students, part-time students are usually adults who have a family or are also working so don't have time to be a full-time student.
Points: 1

11.
Answer: P(A or B) = P(A) + P(B) − P(A and B); P(A and B) = P(A) × P(B) or P(A and B) = P(A) × P(B|A); $P(B|A)=\frac{P(A \cap B)}{P(B)}$
Points: 1

12.
Answer: .5264; .4054; not independent
Points: 1

13.
Answer: B
Points: 1

14.
Answer: C
Points: 1

15.
Answer: answers will vary
Points: 1

16.
Answer: C
Points: 1

17.
Answer: A
Points: 1

18.
Answer: D
Points: 1

19.
Answer: A
Points: 1

20.
Answer: 0.13
Points: 1

21.
Answer: B
Points: 1

22.
Answer: C
Points: 1

23.
Answer: A
Points: 1

24.
Answer: A
Points: 1

25.
Answer:
Points: 1

26.
Answer: B
Points: 1

27.
Answer: D
Points: 1

28.
Answer: B
Points: 1

29.
Answer: A
Points: 1

30.
Answer: A
Points: 1

31.
Answer: A
Points: 1

32.
Answer: D
Points: 1

33.
Answer: C
Points: 1

34.
Answer: B
Points: 1

35.
Answer: C
Points: 1

36.
Answer: B
Points: 1

37.
Answer: D
Points: 1

38.
Answer: A
Points: 1

39.
Answer: A
Points: 1

40.
Answer: A
Points: 1

41.
Answer: Selection by a chance mechanism
Points: 1

42.
Answer: A
Points: 1

43.
Answer: D
Points: 1

44.
Answer: B
Points: 1

45.
Answer: B
Points: 1

46.
Answer: A
Points: 1

47.
Answer: A
Points: 1