Statistics and Probability

1. Which of these is an example of a random sample?

- A. One of the three best basketball players on a team are randomly chosen for a basketball shoot-out.
- B. Three audience members are randomly chosen to participate in a halftime shoot-out at a basketball game.
- C. A sports store asks customers whether or not they enjoy basketball.
- D. At a team owners meeting, three people are surveyed to determine the percent of the population who enjoy basketball.

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2. The 7th grade class at Oaklawn Middle School is divided among 6 teachers for homeroom. Mrs. Stevenson has 17 students, Mr. Bullock has 21 students, Mrs. Taylor has 18 students, Mrs. Moon has 29 students, Mrs. Filcher has 24 students, and Mrs. Norris has 28 students. If a 7th grade student is selected at random, what is the probability that the student is not in a male teacher's homeroom?

- A. $\frac{21}{137}$
- B. $\frac{64}{137}$
- C. $\frac{88}{137}$
- D. $\frac{116}{137}$

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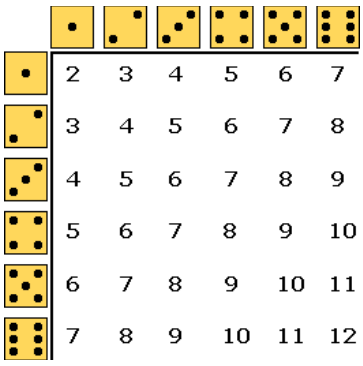
3. The possible outcomes for rolling a pair of fair dice are shown below.



	2	3	4	5	6	7
	3	4	5	6	7	8
	4	5	6	7	8	9
	5	6	7	8	9	10
	6	7	8	9	10	11
	7	8	9	10	11	12

What is the probability of rolling a sum of two?

- A. $\frac{1}{18}$
- B. $\frac{1}{9}$
- C. $\frac{1}{36}$
- D. $\frac{1}{3}$

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4. Belle is playing a game where the probability of drawing a card with a value greater than 12 is $\frac{1}{16}$. If she draws 112 cards throughout the game, which of the following is the best prediction of the number of cards she will draw with a value greater than 12?

- A. 7
- B. 5
- C. 9
- D. 11

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5. Fill in the blank.

The probability of a chance event is a number between 0 and ___ that expresses the likelihood of the event occurring.

- A. $\frac{1}{2}$
- B. 100
- C. 1
- D. $\frac{1}{10}$

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6. Which of these is an example of a non-random sample?

- A. Ten college students at a college, population 50,000, are chosen to taste test a new cereal.
- B. A cereal company surveys their employees about breakfast food preference.
- C. A farmer is choosing grains of wheat from a field to test for a new flavor of cereal.
- D. A cereal company puts a winning ticket in one box of cereal out of 100,000 boxes.

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7. Julio is trying to guess Amanda's birthday. He knows it is in January. What is the probability that her birthday is not the 30th?

- A. $\frac{29}{30}$
- B. $\frac{1}{30}$
- C. $\frac{30}{31}$
- D. $\frac{1}{31}$

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8. At a car dealership, the sales records of weekdays and weekends were examined. Ten of the days examined were weekdays and 10 of them were weekend days. The following statistical information was calculated from the number of sales made during weekdays and weekends.

	Weekday Sales	Weekend Sales
Mean	15	18
Median	13	19
Mode	14	21
Range	10	13

Based on these samples, what generalization can be made?

- A. More cars were sold on the weekdays than on the weekends.
- B. Not enough information is provided to draw any of these conclusions.
- C. The same number of cars were sold on the weekends as on the weekdays.
- D. Less cars were sold on the weekdays than on the weekends.

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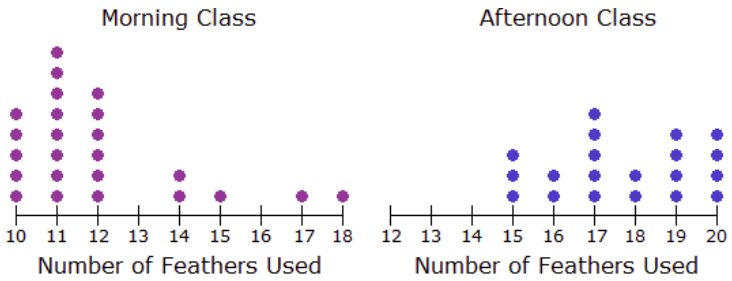
9. The morning and afternoon art classes made fans using peacock feathers. The dot plots below show the number of feathers used by students in the two classes.



The mean absolute deviation for each class is 1.5. The difference between the mode number of feathers used by students for each class is how many times the mean absolute deviation?

- A. 4
- B. 3
- C. 6
- D. 7

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10. Miss Nestor is randomly passing out books to her students for free reading time. In her book basket, she has 8 mysteries, 4 historical fiction novels, and 8 biographies. If there are 10 students in Miss Nestor's class for free reading time today, which of the following is the best prediction of the number of students who will receive historical fiction novels for free reading time?

- A. 2
- B. 4
- C. 8
- D. 5

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11. The school district designed a district wide end-of-course exam for math. Last year, 355 students took the exam. A random sample of exam scores, shown below, were chosen to represent the entire group.

86, 94, 65, 86, 65, 86, 74, 94, 94, 67, 74, 94, 74, 74, 65, 86

Assuming that the sample was representative of all of the exam scores, what was the mean exam score for all the end-of-course exams?

- A. 79.875
- B. 74
- C. 80
- D. 79

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12. Which of the following is a true statement?

A. A probability near $\frac{1}{2}$ indicates a likely event.

B. A probability near 1 indicates an unlikely event.

C. A probability near 0 indicates an unlikely event.

D. A probability near 0 indicates a likely event.

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13. Which of the following is a true statement?

A. With probability, smaller numbers indicate greater likelihood.

B. With probability, larger numbers indicate equal likelihood.

C. With probability, smaller numbers indicate equal likelihood.

D. With probability, larger numbers indicate greater likelihood.

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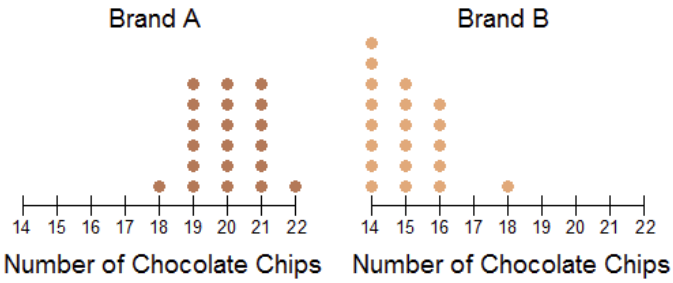
14. Mrs. Higgins' Home Economics class collected data on the number of chocolate chips in cookies for two different brands, as shown in the dot plots below.



The mean absolute deviation for each brand is 0.8. The difference between the mean number of chocolate chips for each brand is approximately how many times the mean absolute deviation?

A. 7

B. 3

C. 5

D. 6

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15. A forester measured the diameter of 20 randomly selected pine trees from two different forests in inches. He measured the diameter of 10 trees in Pebble Brook forest and 10 trees in Piney Woods forest. He then calculated the following statistical information.

	Pebble Brook	**Piney Woods**
First Quartile	33	25
Second Quartile (Median)	38	27.5
Third Quartile	50	30

Based on these samples, what generalization can be made?

A. The interquartile range of diameters is greater for the trees in Piney Woods than in Pebble Brook.

B. The third quartile of diameters is greater for the trees in Pebble Brook than in Piney Woods.

C. The first quartile of diameters is less for the trees in Pebble Brook than in Piney Woods.

D. The median of diameters is greater for the trees in Piney Woods than in Pebble Brook.

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16. A wildlife biologist captured and released 26 male whitetail deer from two different forests and weighed them to the nearest pound. She captured 13 deer from Big Rock forest and 13 deer from Red River forest. She then calculated the following statistical information.

	Big Rock	Red River
First Quartile	151.5	143
Second Quartile (Median)	160	155
Third Quartile	191	216

Based on these samples, what generalization can be made?

A. Big Rock forest has more deer that weigh 155 pounds or less compared to Red River forest.

B. Red River forest has more deer that weigh 160 pounds or more compared to Big Rock forest.

C. The interquartile range for Red River forest is greater than the interquartile range for Big Rock forest.

D. The median is higher for Red River forest than for Big Rock forest.

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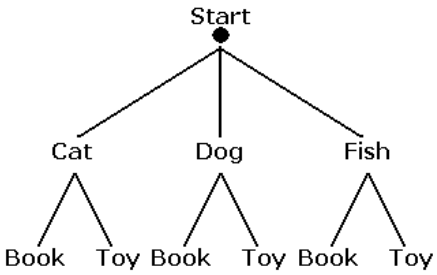
17. Tabitha and her mother went to the pet store. Her mother told her she could either choose a cat, dog, or fish, and either get a toy for the pet or a book about the pet.

What is the probability that she chooses a four-legged pet and a toy for it?



A. $\frac{5}{6}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$

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18. A city council conducted a survey on speed bumps to see what residents preferred. The council asked every resident in one particular neighborhood what his or her preferences were. Were the results of the city council's survey valid?

A. No, because the sample was not random.

B. Yes, because every resident in a neighborhood was surveyed.

C. Yes, because the neighborhood surveyed wanted speed bumps.

D. No, because neighborhoods do not have speed bumps.

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19. A survey was conducted on the salaries of 20 randomly selected college graduates with degrees in the same subject area. Each person surveyed graduated within the same 5-year period. Ten of the people surveyed attended a private university, while the other 10 people surveyed attended a public university of roughly the same size.

	Private	Public
First Quartile	$58,000	$35,000
Second Quartile (Median)	$71,000	$42,000
Third Quartile	$85,000	$54,000

Based on the samples, what generalization can be made?

A. The interquartile range for private universities is $27,000 more than for public universities.

B. The top ten percent of both the private and public university graduates surveyed earned more than $60,000 annually.

C. The interquartile range for public universities is $19,000 more than for private universities.

D. The top twenty-five percent of both the private and public university graduates surveyed earned more than $50,000 annually.

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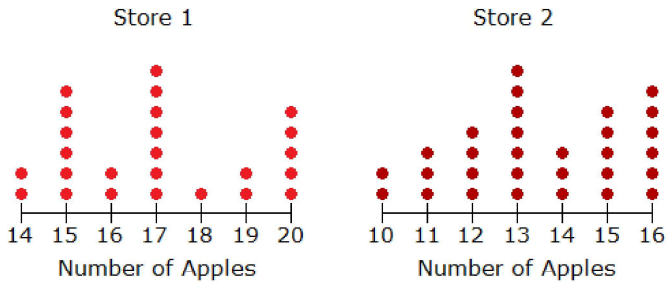
20. The dot plots below show the number of apples in 5-pound bags at two different stores.



The variability at each store is 1.6. The difference between the mean number of apples per bag at each store is approximately how many times the variability?

A. 2

B. 3

C. 5

D. 4

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21. A survey was conducted on the salaries of 30 randomly selected households in two different cities. Fifteen of the people surveyed resided in Cartisia, while the other 15 resided in Pascalville.

	Cartisia	Pascalville
First Quartile	$38,000	$45,000
Second Quartile (Median)	$50,000	$68,000
Third Quartile	$68,000	$77,000

Based on the samples, what generalization can be made?

- A. Not enough information is provided to draw any of these conclusions.
- B. At least half of the household incomes in both towns are $50,000 or greater.
- C. The median in Cartisia is $18,000 more than in Pascalville.
- D. At least half of the household incomes in both towns are $50,000 or less.

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22. A restaurant has 38 main dishes on their menu and lists the calorie count for each. The calories for the dishes that five friends randomly choose from the menu are listed below.

Menu Items	
Dish	**Number of Calories**
Fish Burger	1,364
Chicken Blaze	1,420
Dessert for Dinner	1,205
Beef Lasagna	1,364
Cheese Bliss	1,501

Assuming that the sample is representative of the entire menu, what is the mean number of calories per main dish?

- A. 1,364.5
- B. 1,392
- C. 1,370.8
- D. 1,420

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23. Fred has a spinner that is split into four equal sections: red, blue, green, and yellow. Fred spun the spinner 960 times. Which of the following would be a good estimate of the number of times the spinner lands on the green section?

- A. 480
- B. 875
- C. 257
- D. 405

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24. On a tray there are 14 sugar cookies, 11 chocolate chip cookies, 13 oatmeal raisin cookies, and 18 peanut butter cookies. If Shaina picks one cookie at random, what is the probability that it is not a sugar cookie?

- A. $\frac{14}{56}$
- B. $\frac{29}{56}$
- C. $\frac{46}{56}$
- D. $\frac{42}{56}$

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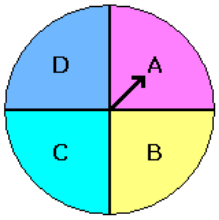
25. On the opening day of a new movie, 240 people attended the premier. The manager surveyed 8 random people as they left the theater. He asked them to rate the movie on a scale of 1 to 10. Their ratings are below.

10, 2, 3, 10, 3, 6, 10, 6

Assuming that the sample was representative of the entire audience, what was the mean rating of the movie for the entire audience?

- A. 4.75
- B. 5.25
- C. 6.5
- D. 6.25

26.



If the spinner above is spun 120 times, predict the number of times the spinner would land on Section A.

- A. The spinner would land on Section A roughly 12 times, but probably not exactly 12 times.
- B. The spinner would land on Section A exactly 30 times.
- C. The spinner would land on Section A roughly 30 times, but probably not exactly 30 times.
- D. The spinner would land on Section A roughly 15 times.

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27. Three students from Milton Middle School are running for class president. A preliminary poll was taken in three homeroom classes, each with the same number of students. The results are shown in the table below.

Poll Results

Students	Class A %	Class B %	Class C %
Ian	46	37	45
Jessie	27	29	9
Jeremy	27	34	46

Based on these preliminary results, who could be predicted to win class president?

- A. cannot predict from these results
- B. Jessie
- C. Ian
- D. Jeremy

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28. As a promotion, a clothing company sent out an email with a link where the recipients have a $\frac{1}{20}$ probability of receiving a 40% off coupon. Otherwise, they receive a 5% off coupon. If 260 of the recipients click the link, which of the following is the best prediction of the number of recipients that received a 40% off coupon?

- A. 7
- B. 26
- C. 2
- D. 13

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29. Suruchi has $1.64 worth of change in the bottom of her purse.

If she reaches into her purse and randomly picks one of the coins, what is the probability Suruchi will pick a penny?

- A. $\frac{5}{12}$
- B. $\frac{4}{5}$
- C. $\frac{1}{2}$
- D. $\frac{1}{3}$

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30. Jordan flipped a coin 422 times. Which of the following would be a good estimate of the number of times the coin landed on heads?

- A. 136
- B. 311
- C. 372
- D. 196

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31. The probability of randomly selecting a green marble from a bag of 20 marbles is $\frac{1}{10}$. Which of the following describes the likelihood of selecting a green marble?

- A. unlikely
- B. neither unlikely nor likely
- C. likely

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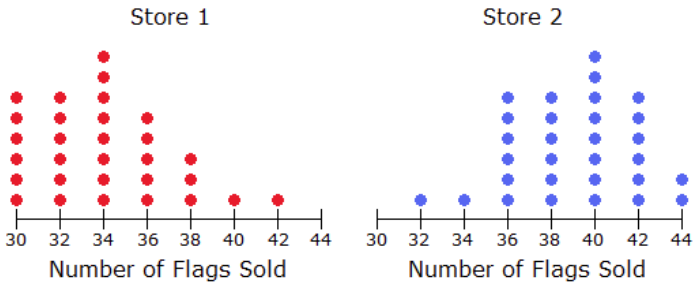
32. The dot plots below show the number of flags sold each day at two stores last month.



The variability at each store is 2.4. The difference between the mean number of flags sold at each store is approximately how many times the variability?

- A. 4
- B. 3
- C. 2

D. 5

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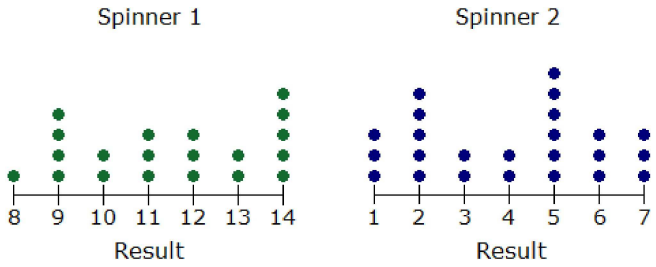
33. Sammy conducted an experiment which consisted of spinning two spinners. Spinner 1 had sections numbered 8 to 14, and spinner 2 had sections numbered 1 to 7. The results are recorded in the dot plots below.



The mean absolute deviation for each spinner is 1.75. The difference between the median result for each spinner is how many times the mean absolute deviation?

A. 5
B. 3
C. 2
D. 4

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34. A ticket brokering company is randomly distributing tickets to customers who pre-ordered tickets for an upcoming concert. Out of the first batch of tickets sent to pre-order customers, 25 are in row 7, 22 are in row 8, and 8 are in row 9. Which of the following is the best prediction of the number of tickets in row 7 in the next 33 tickets sent out?

A. 9
B. 5
C. 15
D. 13

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35. A company was trying to decide how to buy health care for their employees. They surveyed a random sample of 10 employees and asked them to select the monthly premium they would pay for a select set of benefits. The amounts they were willing to pay are listed below.

$157, $113, $143, $204, $157, $143, $113, $113, $187, $113

If the sample was representative of the entire company, and the company has 137 employees, what was the mode of the amount that all of the employees were willing to pay?

A. $143
B. $187
C. $113
D. $157

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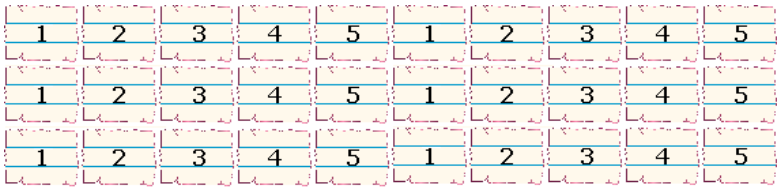
36. Thirty slips of paper, numbered 1 to 5, are placed in a paper bag. One slip of paper is drawn at random.



What is the probability of drawing a two?

- A. $\frac{2}{5}$
- B. 0
- C. $\frac{1}{30}$
- D. $\frac{1}{5}$

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37. In Mrs. Henaway's class, there are 9 students with brown eyes, 5 students with green eyes, 9 students with hazel eyes, and 2 students with blue eyes. If a student is chosen at random, what is the probability that the student does not have blue eyes?

- A. $\frac{23}{25}$
- B. $\frac{21}{23}$
- C. $\frac{2}{23}$
- D. $\frac{2}{25}$

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38. The possible outcomes for tossing a coin four times are shown below.

1. T-T-T-T	5. T-H-T-T	9. H-T-T-T	13. H-H-T-T
2. T-T-T-H	6. T-H-T-H	10. H-T-T-H	14. H-H-T-H
3. T-T-H-T	7. T-H-H-T	11. H-T-H-T	15. H-H-H-T
4. T-T-H-H	8. T-H-H-H	12. H-T-H-H	16. H-H-H-H

Tails = T Heads = H

If a coin is tossed four times, what is the probability of getting exactly one head?

- A. $\frac{1}{8}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{1}{4}$

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39. Which of these is an example of a non-random sample?

- A. Airline passengers to Orlando, Florida, are asked about vacation plans.
- B. Registered voters in Arizona are surveyed to determine if they have relatives in Florida.
- C. At a school assembly, five students are randomly chosen to receive free admission to a theme park.
- D. Out of all the seventh grade students in a public school district, fifteen are chosen to win a trip to a vacation destination.

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40. Which of these is an example of a random sample?

- A. Henry asks five of his friends to fill out a survey to find out their favorite musicians.
- B. Five employees out of 2,000 are chosen randomly to complete an anonymous survey.
- C. The five people seated on the first row at the circus are asked their opinion about the animal acts.
- D. The five employees who work the late shift answer questions about management.

Answers

1. B
2. D
3. C
4. A
5. C
6. B
7. C
8. D
9. A
10. A
11. A
12. C
13. D
14. D
15. B
16. C
17. C
18. A
19. D
20. A
21. B
22. C
23. C
24. D
25. D
26. C
27. C
28. D
29. D
30. D
31. A
32. C
33. D
34. C
35. C
36. D
37. A
38. D
39. A
40. B