percents/prob/combinations

April 2017

2. The 35-member History Club is meeting to choose a student government representative. The members decide that the representative, who will be chosen at random, CANNOT be any of the 3 officers of the club. What is the probability that Hiroko, who is a member of the club but NOT an officer, will be chosen?

F. 0

G. 4/35

H. 1/35

J. ⅓

K. 1/32

5. A wallet containing 5 five-dollar bills, 7 ten-dollar bills, and 8 twenty-dollar bills is found and returned to its owner. The wallet’s owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

1. 1/20
2. 4/51
3. ⅛
4. ⅖
5. ⅔

23. 8% of 60 is ⅕ of what number?

1. 0.96
2. 12
3. 24
4. 240
5. 3,750

34. Mikea, and intern with the Parks and Recreation Department, is developing a proposal for the new trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and the radius of the merry-go-round given in inches. In Mikea’s scale drawing, 1 inch represents 1.5 feet.

\*\*\*picture\*\*\*

The length of the south side of the park is what percent of the length of the north side?

F. 112%

G. 124%

H. 142 6/7%

J. 175%

K. 250%

37. The Smith family is planning to build a 3-room cabin which consists of 2 bedrooms (BR) and 1 living room (LR). Shown below are the rectangular floor plan (left figure) and a side view of the cabin (right figure). In the side view, the roof forms an isosceles triangle (triangleABC), the walls are perpendicular to the level floor (lineED), (line)AC parallel (line)ED, F is the midpoint of (line)AC, and (line)BC perpendicular (line)AC.

\*\*picture\*\*

Mr and Mrs. Smith plan to roof the cabin on 2 consecutive days. Assuming that the chance of rain is independent of the day, what is the probability that it will rain both days?

1. 0.04
2. 0.08
3. 0.16
4. 0.20
5. 0.40

43. Mario plays basketball on a town league team. The table below gives Mario’s scoring statistics for last season. How many points did Mario score playing basketball last season? [PICTURE]

1. 129
2. 190
3. 213
4. 330
5. 380

56) At the school carnival, Mike will play a game in which he will toss a penny, a nickel, and a dime at the same time. He will be awarded 3 points for each coin that lands with heads faceup. Let the random variable *x* represents the total number of points awarded on any toss of the coins. What is the expected value of *x*?

F. 1

G. 3/2

H. 9/2

J. 6

K. 9

June 2017

2. A wallet containing 2 five-dollar bills, 9 ten-dollar bills, and 5 twenty-dollar bills is found and returned to its owner. The wallet’s owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

F. 1/16

G. 1/10

H. ⅕

J. 5/16

K. 5/11

3. In his costume supplies, Elmo the clown has 4 noses, 3 pairs of lips, and 2 wigs. A clown costume consists of 1 nose, 1 pair of lips, and 1 wig. How many different clown costumes can Elmo make?

1. 3
2. 9
3. 12
4. 14
5. 24

9. Dmitry bought a pair of pants at the discounted price of $30. The original price of the pants was $40. What was the percent of the discount?

1. 4%
2. 10%
3. 25%
4. 33 ⅓%
5. 75%

26. A bag contains 16 red marbles, 7 yellow marbles, and 19 green marbles. How many additional red marbles must be added to the 42 marbles already in the bag so that the probability of randomly drawing a red marble is ⅗?

F. 18

G. 23

H. 37

J. 42

K. 52

39. The Harrisburg Recreation Center recently changed its hours to open 1 hour later and close 3 hours later than it had previously. Residents of Harrisburg age 16 or older were given a survey, and 560 residents replied. The survey asked each resident his or her student status (high school, college, or nonstudent) and what he or she thought about the change in hours (approve, disapprove, or no opinion). The results are summarized in the table below.

\*\*picture\*\*

49. A professional baseball team will play 1 game Saturday and 1 game Sunday. A sportswriter estimates the team has a 60% chance of winning on Saturday but only a 35% chance of winning on Sunday. Using the sportswriter’s estimates, what is the probability that the team will *lose* both games? (Note: Neither game can result in a tie)

1. 14%
2. 21%
3. 25%
4. 26%
5. 39%

Suppose a person will be chosen at random from these 560 residents. Which of the following values is closest to the probability that the person chosen will NOT be a high school student and will NOT have replied with no opinion?

1. 0.06
2. 0.09
3. 0.44
4. 0.83
5. 0.98

51. Get-A-Great-Read Books is adding a new phone line. The phone company says that the first 3 digits of the phone number must be 555, but the remaining 4 digits, where each digit is a digit from 0 through 9, can be chosen by Get-A-Great-Read Books. How many phone numbers are possible?

1. 5(94)
2. 53 (94)
3. 53 (104)
4. 94
5. 104

April 2016

19. A batch of 100 defective computer chips consisting of 2 types (I and II) and made by 2 companies (A and B) was selected, and it was determined how many of each type of chip was made by each company. The results are displayed in the table below.

[PICTURE]

What is the probability that a randomly selected chip from this batch of 100 is Type I and manufactured by Company B?

1. 30/100
2. 30/50
3. 30/44
4. 14/100
5. 14/44

23. Keanu bought a new laptop computer and paid a discount price that was 20% less than the $1,000 list price. He also paid tax on the laptop equal to 6% of the discount price. What is the total amount Keanu paid for the laptop computer?

1. $752
2. $806
3. $848
4. $860
5. $986

25. Of the 900 students enrolled at Sierra Elementary School, 45% live south of Highway R. Of the students who live south of Highway R, 20% do NOT ride the bus to school. How many students who live south of Highway R ride the bus to school.

1. 81
2. 180
3. 324
4. 585
5. 720

June 2016

2. A motel manager’s costs are 24% higher this year than they had been when the room rate was $60.00. If the room rate had increased by the same percent as the manager’s costs, what would the room rate be this year?

F. $68.40

G. $70.00

H. $72.00

J. $74.40

K. $78.95

21. A family plans to remodel their kitchen. They have a total budget of $45,000 to cover expenses in 6 categories. Not all the budget has been assigned. The budget amounts that have been assigned are shown in the table below.

\*\*picture\*\*

Which of the following percents is closest to the percent of the total budget that remains to be assigned?

1. 21%
2. 24%
3. 40%
4. 47%
5. 53%

29. Shown below, a circular dartboard has 4 sectors (red, white, blue, and green) whose areas are in the ratio of 1 : 2 : 3 : 4, respectively. Brad will throw 1 dart at the dartboard, and it will hit the dartboard at a random point contained in 1 of the sectors. What is the probability that the sector the dart hits is NOT the blue sector?

\*\*picture\*\*

1. 3/10
2. 4/10
3. 5/10
4. 6/10
5. 7/10

59. Suppose that *a* will be randomly selected from the set {-3, -2, -1, 0, 1} and that *b* will be randomly selected from the set {-2, -1, 0, 1}. What is the probability that *ab* > 0?

1. 3/200
2. 1/20
3. 3/10
4. 7/20
5. 3/5

December 2016

1. The 32-member French Club is meeting to choose a student government representative. The members decide that the representative, who will be chosen at random, CANNOT be any of the 5 officers of the club. What is the probability that Luis, who is a member of the club but NOT an officer, will be chosen?

A. 0

B. 1/32

C. 1/27

D. 6/32

E. 1/5

10. Tammy will draft 1 player at random from a list of 20 players for her fantasy football team. Each player in the list plays only 1 position. The number of players who play a particular position is given in the table below. What is the probability that the player Tammy drafts will be a kicker or a receiver?

[PICTURE]

F. 2/25

G. 1/5

H. 2/5

J. 1/2

K. 3/5

30. A committee will be selected from a group of 12 women and 18 men. The committee will consist of 5 women and 5 men. Which of the following expressions gives the number of different committees that could be selected from these 30 people?

F. 30P10

G. (12P5)(18P5)

H. 30C10

J. (30C5)(30C5)

K. (12C5)(18C5)

40. The figure below shows the top view of the Santana family’s house and yard. The Santana’s rectangular house is 40 feet wide and 30 feet long, and their rectangular yard is 75 feet wide and 100 feet long. The Santanas have a rectangular garden in the back corner of their yard that is 30 feet wide and 25 feet long. The garden currently contains 48 flower bulbs: 10 tulip bulbs, 18 daffodil bulbs, and 20 crocus bulbs.

\*\*picture\*\*

The area of the garden is what percent of the area of the yard?

F. 9%

G. 10%

H. 11%

J. 25%

K. 40%

53. The employees at a hotel reservation center assign an 8-digit confirmation number (CN) to each customer making a reservation. The first digit in each CN is 8. The other 7 digits can be any digit 0 through 9, and digits may repeat. How many possible 8-digit CNs are there?

1. 87
2. 97
3. 107
4. 88
5. 108

56. At Wafer Technologies, identification codes each consist of the following sequence: 1 digit, 4 letters, 1 digit. For any 1 code, the digits (0-9) may be the same, but the letters, each from the English alphabet, must all be different. Which of the following expressions gives the probability that a randomly selected identification code contains the word MATH, spelled correctly?

F. 102 / 102(264)

G. 102 / 102(26)(25)(24)(23)

H. 102 / 10(9)(26)(25)(24)(23)

J. 102(4)(3)(2)(1) / 102(264)

K. 102(4)(3)(2)(1) / 10(26)(25)(24)(23)

April 2015

5. Hai has $100 available to buy USB drives to backup data for his business computers. Each USB drive has a price of $8, and Hai will pay a sales tax of 7% of the total price of the USB drives. What is the maximum number of USB drives Hai can buy?

1. 11
2. 12
3. 13
4. 14
5. 15

14. A bowl contains 6 red beads, 8 black beads, and a number of green beads. There are no other beads in the bowl. The probability of randomly choosing a black bead from the bowl is ⅓. How many green beads are in the bowl?

F. 4

G. 7

H. 10

J. 24

K. 28

21. A set of numbers consists of all the odd integers that are greater than 1 and less than 21. What is the probability that a number picked at random from the set will be divisible by 3?

1. ⅓
2. ⅔
3. 2/9
4. 4/9
5. 5/9

25. Audrey will take biology, algebra, and Spanish next year. Audrey will have 1 of the 3 teachers who teach biology, 1 of the 4 teachers who teach algebra, and 1 of the 2 teachers who teach Spanish. From among these 9 teachers, how many possibilities are there for Audrey’s 3 teachers for the 3 classes?

1. 9
2. 18
3. 24
4. 72
5. 84

54) A storage facility is currently offering a special rate to customers who sign contracts for 6 months or more. According to this special rate, the first month’s rent is $1, and for each month after the first month, customers pay the regular monthly rental rate. The table below shows the storage unit sizes available, the floor dimensions, and the regular monthly rental rate. All the units have the same height.

[PICTURE]

Daria will sign a contract to rent a Size 3 unit for 12 months at the current special rate. The amount Daria will pay for 12 months at the current special rate represents what percent decrease from the regular rental rate for 12 months?

F. 8.25%

G. 8.33%

H. 8.42%

J. 9.00%

K. 9.09%

June 2015

7. A bag contains 10 pieces of flavored candy: 4 lemon, 3 strawberry, 2 grape, and 1 cherry. One piece of candy will be randomly picked from the bag. What is the probability the candy picked is NOT flavored?

1. ⅕
2. ¼
3. ½
4. ¾
5. ⅘

33. In the figure shown below, ABCD is a rectangle, EFGH is a square, and (line)CD is the diameter of a semicircle. Point K is the midpoint of (line)CD. Point J is the midpoint of both (line)AB and (line)EF. Points E and F lie on (line)AB. The 3 given lengths are in meters.

[PICTURES]

The length of (line)EH is what percent of the length of (line)AD?

1. 15.6%
2. 30%
3. 36%
4. 43.2%
5. 50%

December 2015

6. Damon and 4 of his coworkers are having lunch. Each of the 5 people will pay for his or her own lunch, but they agree to divide the tip equally among themselves. The total for the 5 lunches is $80.00, and the group will add a tip of 15% of the total. Each person’s portion of the tip will be how much?

F. $1.50

G. $2.40

H. $3.00

J. $5.00

K. $5.33

18. The Tully family and the Quan family ate dinner together at Eugenio’s Pasta Restaurant. An *order of pasta* comes in 1 of 2 sizes, large or small, and consists of 1 of 6 types of pasta and 1 of 5 types of sauce. The table below gives the number of large and small orders of pasta bought by each family, and the price each family paid for their orders of pasta (without tax and tip).

[PICTURE]

How many different possible orders of pasta can a person get?

F. 2

G. 10

H. 12

J. 30

K. 60

22. An experiment consisted of rolling a 6-sided cube with the digits 1 through 6 on its faces, 1 digit per face. The cube was rolled 50 times, and after each roll, the number appearing on the top face was recorded. The number of times each digit was recorded is represented in the bar graph shown below. In what percent of the total number of rolls did a 5 appear on the top face of the cube?

[PICTURE]

F. 2%

G. 4%

H. 9%

J. 16 ⅔%

K. 18%

53. A box contains 6 identically sized, solid-colored balls. One ball is green, 2 are yellow, and 3 are red. A ball is drawn at random and returned to the box, then a second ball is drawn at random. What is the probability that the first ball is red and the second ball is green?

1. 1/12
2. 1/10
3. ⅓
4. ⅔
5. 7/10

59. What is ⅓% of 6/7?

1. 1/350
2. 9/350
3. 99/3,500
4. 1/35
5. 2/7