

- 1.) You have 2 hours to spend at an amusement park which is enough time to go on 4 rides. The park has 50 rides to choose from, how many possible ways are there to ride at most 3 rides?
- 2.) When rolling two six-sided dice, what is the probability of rolling a sum that is less than or equal to eight?
- 3.) A gumball machine contains 100 gumballs, 20 of each of the colors red, blue, green, white, and yellow. What is the probability of you and your friend both getting red gumballs?
- 4.) You recently created an account on a website where you needed to create a password.
 - a.) If the password must contain seven characters where the first three are letters and the last four are digits, how many different passwords are possible?
 - b.) What if the digits and letters cannot be repeated?
- 5.) If you roll two six-sided dice, what is the probability that the sum is less than 13?
- 6.) How many different ways are there to arrange 12 books on a shelf?
- 7.) Of 3,510 drivers surveyed, 1,950 were male and 103 were color-blind. If 97 were both male and color-blind, what is the probability that a driver was male or color-blind?
- 8.) A high school needs 3 additional faculty members: two math teachers and a chemistry teacher. How many different ways can these positions be filled if there are 8 applicants for the math position and 4 for chemistry?
- 9.) How many different outfits can be made out of 6 pairs of pants, 4 shirts, and 12 belts?
- 10.) There are 6 green marbles, 11 red marbles, and 18 white marbles in a bag. What is the probability of drawing a white marble, then a red marble, then another white marble...
 - a. ... with replacement?
 - b. ...without replacement?
- 11.) How many different ways are there to permute the letters in the word PEPPERMINT?
- 12.) If you roll two six-sided dice, what is the probability that the sum is not four?
- 13.) In a group of 120 students receiving awards for academic subjects, 57 of the students are receiving an award for science and 32 students are receiving an award for math. If 77 students are receiving the awards for math OR science, what is the probability a student who is randomly selected for an interview got an award in math AND science?
- 14.) There are 40 students in another class. Three names will be selected. Those students will each get a HW pass. How many different ways can the prizes be given away?
- 15.) If you draw two cards from a standard 52-card deck, what is the probability that you draw a diamond, then a club...
 - a.) ...with replacement?
 - b.) ...without replacement?
- 16.) Expand $(2x^2 - 3y)^5$.
- 17.) If two six-sided dice are rolled, then what is the probability that the sum is either 5 or 8?

18.) What is the probability of drawing an ace or a club when one card is randomly drawn from a 52-card deck?

19.) The names of 40 students are put into a drawing. Three of the names are selected at random. One student will receive a flat screen TV, another will get an iPad, and the other will get a Homework Pass. How many different ways can the prizes be given away?

20.) Find the coefficient of x^3 in the expansion of $(5 - 3x)^9$.

21.) If a six-sided die is rolled 100 times and lands on 3 a total of 15 times, what is the experimental probability of rolling a 3? How does this compare to the theoretical probability of rolling a 3?

22.) How many ways are there to arrange (permute) the letters in the word MATH?

23.) Simplify $\frac{{}_n P_3}{{}_{n-1} C_2}$

24.) Two six-sided dice are rolled. What is the probability that the sum is either a multiple of 5 or an odd number?

25.) There are 18 green, 13 red, and 4 blue marbles in a bag. If the marble is replaced after each draw, what is the probability of drawing a green, then a red, and then a blue marble?

26.) How many ways are there for 10 people to shake hands?

27.) 3 marbles are picked at random without replacement from a bag containing 4 red marbles and 5 white marbles. Find the probability that exactly 2 marbles are red.

28.) 5 cards are drawn at random from a standard deck. Find the probability that exactly 4 diamonds are chosen

29.) 10 cards are drawn from a standard deck. Find the probability that

- all clubs are chosen
- no clubs are chosen
- At least 1 club is chosen

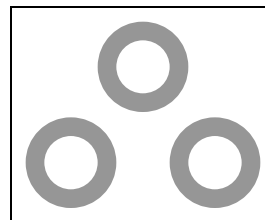
30. The probability of picking a green marble is $\frac{9}{19}$ and the probability of picking a blue marble is $\frac{3}{19}$. What is the probability of NOT picking a green marble given that it is not a blue marble?

31. A fish bowl contains slips of paper numbered 1 through 9. Two slips are drawn, one after the other without replacement. Find the probability of each of the following events:

- Both numbers are odd
- The first number drawn is a 6
- The first number drawn is greater than 6 and the second is less than 4
- One of the numbers drawn is a 6.

32. 5 cards are drawn from a standard deck of 52 cards. What is the probability of getting 4 of a kind?

33. A dart thrown at the board is equally likely to hit anywhere on the board. What is the probability that the dart hits the shaded part of one of the three circles if the inner radius of each circle is 2 inches and the outer radius is 3 inches and the entire board is 20 inches long and 15 inches wide?



$$1. 50C1 + 50C2 + 50C3 = 20,875$$

$$2. 26/36 = 13/18$$

$$3. \frac{{}_{20}C_2}{{}_{100}C_2} = \frac{19}{495}$$

$$4a. (26)^3(10)^4$$

$$4b. (26)(25)(24)(10)(9)(8)(7)$$

OR $(26P3)(10P4)$

$$5. 100\%$$

$$6. 12!$$

$$7. \frac{1950}{3510} + \frac{103}{3510} - \frac{97}{3510} = \frac{326}{585}$$

$$8. (8C2)(4C1) = 112$$

$$9. (6)(4)(12) = 288$$

$$10. \frac{18}{35} \cdot \frac{11}{35} \cdot \frac{18}{35} = 0.08$$

$$10b. \frac{18}{35} \cdot \frac{11}{34} \cdot \frac{17}{33} = \frac{3}{35} \quad \text{OR} \quad \frac{{}_{18}P_1 \cdot {}_{11}P_1 \cdot {}_{17}P_1}{{}_{35}P_3}$$

$$11. \frac{10!}{3!2!} = 302,400$$

$$12. 1 - \frac{3}{36} = \frac{11}{12}$$

$$13. \frac{1}{10}$$

$$14. 40C3 = 9,880$$

$$15. \frac{13}{52} \cdot \frac{13}{52} = \frac{1}{16}$$

$$15b. \frac{{}_{13}P_1 \cdot {}_{13}P_1}{{}_{52}P_2} = \frac{13}{204} \quad \text{or} \quad \frac{13}{52} \cdot \frac{13}{51}$$

$$16. 32x^{10} - 240x^8y + 720x^6y^2 - 1080x^4y^3 + 810x^2y^4 - 243y^5$$

$$17. \frac{1}{4}$$

$$18. \frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{4}{13}$$

$$19. 40P3 = 59,280$$

$$20. -35,437,500$$

$$21. a) 0.15; \quad b); (1/6)$$

$$22. 4! = 24$$

$$23. 2n$$

$$24. \frac{7}{36} + \frac{18}{36} - \frac{4}{36} = \frac{7}{12}$$

$$25. \frac{18}{35} \cdot \frac{13}{35} \cdot \frac{4}{35} \approx 0.22$$

$$26. 10C2 = 45$$

$$27. \frac{{}_4C_2 \cdot {}_5C_1}{{}_9C_3} = 0.3571$$

$$28. \frac{{}_{13}C_4 \cdot {}_{39}C_1}{{}_{52}C_5} \approx 0.0107$$

$$29. \frac{{}_{13}C_{10}}{{}_{52}C_{10}}; \quad 29b. \frac{{}_{39}C_{10}}{{}_{52}C_{10}}; \quad 29c. 1 - \frac{{}_{39}C_{10}}{{}_{52}C_{10}}$$

$$30. \frac{7}{16}$$

$$31. \frac{{}_5C_2}{{}_9C_2}; \quad b) \frac{{}_1P_1 \cdot {}_8P_1}{{}_9P_2} = \frac{1}{9}; \quad c) \frac{{}_3P_1 \cdot {}_3P_1}{{}_9P_2} = \frac{1}{8}$$

$$d) \frac{{}_1C_1 \cdot {}_8C_1}{{}_9C_2} = \frac{2}{9} \quad \text{can't use fundamental counting principle for part C}$$

$$32. \frac{{}_4C_4 \cdot {}_{13}C_1 \cdot {}_4C_1 \cdot {}_{12}C_1}{{}_{52}C_5} \approx 0.000240$$

$$33. 0.157$$