

1) There are 12 tulip bulbs in a package. Nine will yield red tulips while three will yield yellow tulips. If two bulbs are selected at random out of the package and not replaced, find the following probabilities:

a) Both tulips will be red

$$\frac{9}{12} \cdot \frac{8}{11} = \frac{6}{11}$$

b) The first tulip is yellow and the second tulip is red

$$\frac{3}{12} \cdot \frac{9}{11} = \frac{9}{44}$$

2) A bag contains 2 orange, 4 black, and 6 blue marbles. Three marbles are drawn one at a time and not replaced. Find the probability of each event:

a) All three are black

$$\frac{4}{12} \cdot \frac{3}{11} \cdot \frac{2}{10} = \frac{1}{55}$$

b) All three are blue

$$\frac{6}{12} \cdot \frac{5}{11} \cdot \frac{4}{10} = \frac{1}{11}$$

c) None of the marbles are blue

$$\frac{6}{12} \cdot \frac{5}{11} \cdot \frac{4}{10} = \frac{1}{11}$$

d) The order of drawing is Black - Orange - Blue

$$\frac{4}{12} \cdot \frac{2}{11} \cdot \frac{6}{10} = \frac{2}{55}$$

Find the probability.

3) A security code consists of 5 digits (0-9) and a digit may not be used more than once. What is the probability a thief guesses your correct security code?

$$10 \cdot 9 \cdot 8 \cdot 7 \cdot 6$$

$$\frac{1}{30,240}$$

4) Amy must choose a password for her voicemail that consists of 3 letters followed by 3 digits. She cannot use the letters A and Z or the digits 0 and 9. Each letter or numbers may be used more than once. What is the possibility of her nosy mother guessing her password?

$$\frac{26}{L} \cdot \frac{26}{L} \cdot \frac{26}{L} \cdot \frac{8}{D} \cdot \frac{8}{D} \cdot \frac{8}{D}$$

$$\frac{1}{7,077,888}$$

5) If one person is randomly selected from a class that has 6 sophomores, 12 juniors, and 7 seniors, find the probability that the person is a senior.

$$\frac{7}{25}$$

6) If a bag has 22 orange, 18 red, 12 green, and 8 blue marbles, what is the probability that in one draw you will select a blue marble?

$$\frac{8}{60} = \frac{2}{15}$$

7) 1 number cube is rolled twice. What is the probability that one roll is a "3" and the other roll is an even number?

$$\frac{1}{6} \cdot \frac{3}{6} = \frac{1}{12}$$

8) You toss a coin in the air 5 times. What is the probability you get 3 heads and then 2 tails?

$$\left(\frac{1}{2}\right)^5 = \frac{1}{32}$$

9) Your teacher has a bag of candy to pass out. It contains 5 snickers, 3 skittles, 4 hot tamales, and 7 starburst. You get to select 3 candies from the bag. What is the probability that you select all 3 skittles?

$$\frac{3}{19} \cdot \frac{2}{18} \cdot \frac{1}{17} = \frac{1}{969}$$

10) The letters of the word G E O M E T R Y are written on separate cards and placed face down on a desk. If you randomly choose one card, what is the probability that it contains a consonant?

$$\frac{5}{8}$$

11) Based on the chart below, determine the following probabilities:

Number	Frequency of Rolls
1	2
2	7
3	3
4	1
5	1
6	6

20

a) Rolling a 1 or 6

$$\frac{2}{20} + \frac{6}{20} = \frac{8}{20} = \frac{2}{5}$$

b) Rolling a number greater than 2

$$\frac{11}{20}$$

12) What is the theoretical probability of rolling a number 4 or greater on a number cube?

4, 5, 6

$$\frac{3}{6} = \frac{1}{2}$$

For the problems below, let  $A = \{2, 3, 4, 5\}$ ,  $B = \{2, 4, 6, 8\}$ ,  $C = \{1, 4, 10, 11, 14, 17\}$ . Determine each set.  $\Omega = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

13)  $A \cap B$

$$\{2, 4\}$$

14)  $A \cup C$

$$\{1, 2, 3, 4, 5, 10, 11, 14, 17\}$$

15)  $A \cap B \cap C$

$$\{4\}$$

16)  $(A \cup C) \cap B$

$$\{2, 4\}$$

17)  $C'$

$$\{2, 3, 5, 6, 7, 8, 9, 12, 13, 15, 16, 18, 19, 20\}$$

18)  $(A \cup C)'$

$$\{6, 7, 8, 9, 12, 13, 15, 16, 18, 19, 20\}$$

A bag of marbles contains the following colors: 2 red, 3 blue, 6 yellow, and 4 green. You want to select 2 out of the bag.

19. What is the probability of choosing a red marble, replace it and choose a green marble?

$$\frac{2}{15} \cdot \frac{4}{15} = \frac{8}{225}$$

20. What is the probability of choosing two red marbles with replacement?

$$\frac{2}{15} \cdot \frac{2}{15} = \frac{4}{225}$$

21. What is the probability of choosing two red marbles without replacement?

$$\frac{2}{15} \cdot \frac{1}{14} = \frac{1}{105}$$

22. What is the probability of choosing a blue marble and a yellow marble without replacement?

$$\frac{3}{15} \cdot \frac{6}{14} = \frac{3}{35}$$

Two dice are rolled in a board game; one blue and one red. Find the following probabilities.

23. What is the probability that the red dice will be odd and the blue dice will be even?

$$\frac{3}{6} \cdot \frac{3}{6} = \frac{1}{4}$$

24. What is the probability that sum of the dice will be less than or equal to 4 and the blue die lands on 2.

$$\frac{2}{36} = \frac{1}{18}$$

25. What is the probability red die lands on an even number and the sum is greater than 4.

$$\frac{16}{36} = \frac{4}{9}$$

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

A Student survey is handed out to 25 random students. The results are shown in the table below as it pertains to owning a car and having a job.

		Owns a Car		
		Yes	No	
has a Job	Yes	9	3	12
	No	8	5	13
		17	8	25

26. What is the probability that a student has a job and owns a car?

$$\frac{9}{25}$$

27. What is the probability that a student owns a car given that they have a Job?  $P(\text{car}|\text{job})$

$$\frac{9}{12} = \frac{3}{4}$$

28. Given that a student owns a car, what is the probability that they do not have a job?  $P(\text{No job}|\text{car})$

$$\frac{8}{17}$$

29. What is the probability that a student has a job?

$$\frac{12}{25}$$

The following table shows a sample of 10<sup>th</sup> grade students at BHS and their favorite music.

	Boys	Girls	total
Alternative	27	21	48
Rap	20	8	28
Country	15	29	44
Total	62	58	120

30. Make a table of the joint and marginal relative frequency given the above data.

	Boys	Girls	total
Alternative	0.225	0.175	0.4
Rap	0.17	0.07	0.23
Country	0.125	0.24	0.37
Total	0.52	0.48	1

31. What is the probability girl who likes rap?

$$\frac{8}{120} = 0.07$$

32. Given that they like country, what is the probability they are a girl?  $P(\text{Girl}|\text{country})$

$$\frac{29}{44}$$

33. What is the probability that they like country, given that they are a boy?  $P(\text{country}|\text{boy})$

$$\frac{15}{62}$$

34. What is the probability that they are a boy and likes alternative?

$$\frac{27}{120} = \frac{9}{40}$$

compound prob! Think inclusive or exclusive!

You must choose one card out of a standard deck of cards. Determine the probabilities:

35. A heart or a jack

inc.  $\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

36. A heart or 7 of diamonds

exc.  $\frac{13}{52} + \frac{1}{52} = \frac{14}{52} = \frac{7}{26}$

37. A red card or 7 of diamonds

inc.  $\frac{26}{52} + \frac{1}{52} - \frac{1}{52} = \frac{26}{52} = \frac{1}{2}$

38. A face card or a club

inc  $\frac{12}{52} + \frac{13}{52} - \frac{3}{52} = \frac{22}{52} = \frac{11}{26}$

39. An even number card or a numbered card greater than 5

2, 4, 6, 8, 10

6, 7, 8, 9, 10

inc  $\frac{20}{52} + \frac{20}{52} - \frac{12}{52} = \frac{28}{52} = \frac{7}{13}$

40. A diamond or a spade

exc  $\frac{13}{52} + \frac{13}{52} = \frac{26}{52} = \frac{1}{2}$

41. A face card or an Ace

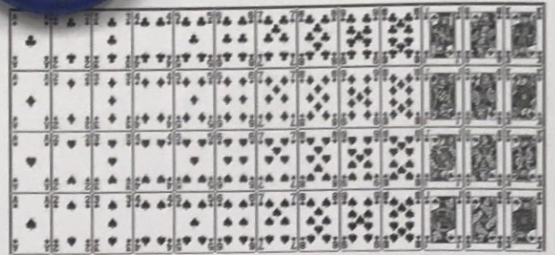
exc  $\frac{12}{52} + \frac{4}{52} = \frac{16}{52} = \frac{4}{13}$

42. A card that is not a club

$$\frac{39}{52} = \frac{3}{4}$$

43. A card is the king of spades

$$\frac{1}{52}$$



Fill in the missing survey results on the Buffalo flatbread at BHS and answer the following questions.

	Freshmen	Sophomores	Juniors	Seniors	Total
Favor	26	13	21	15	75
Oppose	4	17	6	3	30
No Opinion	10	5	8	32	55
	40	35	35	50	160

44. What is the probability that a randomly selected person opposes or has no opinion about the survey.

exc!

$$\frac{30}{160} + \frac{55}{160} = \frac{85}{160} = \frac{17}{32}$$

45. Find the probability that randomly selected person is a senior or opposes Buffalo flat bread.

inc!

$$\frac{50}{160} + \frac{30}{160} - \frac{3}{160} = \frac{77}{160}$$

46. Find the probability that a randomly selected person is a sophomore or has no opinion.

inc!

$$\frac{35}{160} + \frac{55}{160} - \frac{5}{160} = \frac{85}{160} = \frac{17}{32}$$

47. Find the probability that a randomly selected person favors or has no opinion.

exc!

$$\frac{75}{160} + \frac{55}{160} = \frac{130}{160} = \frac{13}{16}$$

48. Find the probability that a randomly selected person is a freshmen or a junior.

exc!

$$\frac{40}{160} + \frac{35}{160} = \frac{75}{160} = \frac{15}{32}$$