

Day 3 – Compound Probability: Mutually Exclusive vs. Overlapping

Determine if the following events are mutually exclusive or overlapping.

overlapping 1. The experiment is rolling a die.
 The 1st event: the number is greater than 3
 The 2nd event: the number is even.

M.E. 2. The experiment is year in school.
 The 1st event: the person is a senior.
 The 2nd event: the person is a junior.

overlapping 3. The experiment is answering multiple choice questions.
 The 1st event: the correct answer is chosen
 The 2nd event: the answer A is chosen.

overlapping 4. The experiment is selecting a chocolate bar.
 The 1st event: the bar has nuts
 The 2nd event: the bar has caramel.

4/13 5. One card is randomly drawn from a deck of 52 cards.
 The card is face down on the table. What is the probability of getting a Jack or a Spade?

$$P(\text{Jack}) + P(\text{spade}) - P(\text{both})$$

$$4/52 + 13/52 - 1/52 = 16/52 = 4/13$$

	Black	Black	Red	Red
A	A♠	A♣	A♥	A♦
2	2♠	2♣	2♥	2♦
3	3♠	3♣	3♥	3♦
4	4♠	4♣	4♥	4♦
5	5♠	5♣	5♥	5♦
6	6♠	6♣	6♥	6♦
7	7♠	7♣	7♥	7♦
8	8♠	8♣	8♥	8♦
9	9♠	9♣	9♥	9♦
10	10♠	10♣	10♥	10♦
Jack	Jack♠	Jack♣	Jack♥	Jack♦
Queen	Queen♠	Queen♣	Queen♥	Queen♦
King	King♠	King♣	King♥	King♦

Use the general addition rule to compute the probability that if you roll two six-sided dice.

2/9 6. you get doubles or a sum of 4
 $P(\text{doubles}) + P(\text{sum of 4}) - P(\text{both})$
 $6/36 + 3/36 - 1/36 = 8/36 = 2/9$

1/3 7. you get doubles or a sum of 7
 $P(\text{doubles}) + P(\text{sum of 7}) - P(\text{both})$
 $6/36 + 6/36 - 0/36 = 12/36 = 1/3$

11/36 8. you get a 5 on the first die or you get a 5 on the second die.
 $P(5) + P(5) - P(\text{two 5s})$
 $6/36 + 6/36 - 1/36 = 11/36$

	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

Use the Venn diagram to answer the following questions.

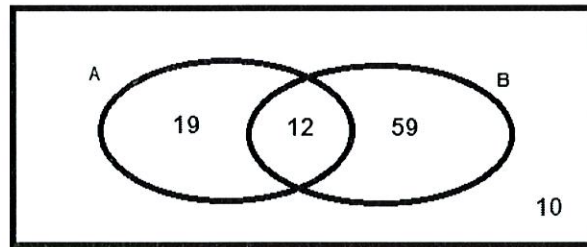
31/100 9. $P(A)$

71/100 10. $P(B)$

29/100 11. $P(B)'$

9/10 12. $P(A \cup B)$ $90/100 = 9/10$

3/25 13. $P(A \cap B)$ $12/100 = 3/25$



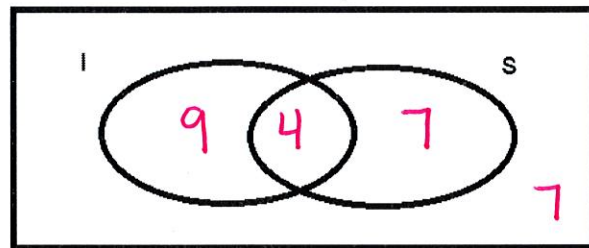
When you arrive home today, you find 27 cupcakes in a large circular plate. There are 13 that have icing, 11 have sprinkles, and 4 have both.

13/27 14. $P(I)$

11/27 15. $P(S)$

20/27 16. $P(I \cup S)$

4/27 17. $P(I \cap S)$



Use the data below to find each of the following probabilities.

Coollest Deals Sold at Ike's

Topping choice	Ice cream choice				
	Vanilla	Chocolate	Cookie dough	Mint chip	
Sprinkles	9	12	16	14	51
Hot fudge	11	4	16	15	46
Caramel	10	12	18	15	55
	30	28	50	44	152

7/38 18. $P(\text{Chocolate})$ $28/152 = 7/38$

31/38 19. $P(\text{Chocolate})'$ $124/152 = 31/38$

2/19 20. $P(\text{Sprinkles} \cap \text{Cookie Dough})$ $16/152 = 2/19$

75/152 21. $P(\text{Caramel} \cup \text{Vanilla})$ $\frac{55+30-10}{152} = 75/152$