

3. A deck of 40 cards consists of the following:
- 10 black cards showing squares, numbered 1–10
 - 10 black cards showing circles, numbered 1–10
 - 10 red cards showing X's, numbered 1–10
 - 10 red cards showing diamonds, numbered 1–10

A card will be selected at random from the deck.

a. i. Are the events “the card shows a square” and “the card is red” disjoint? Explain.

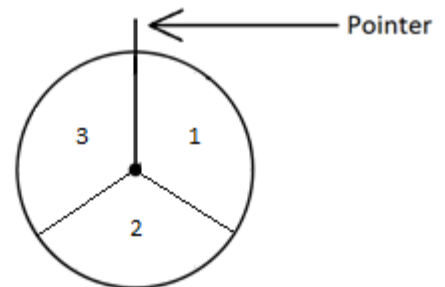
ii. Calculate the probability that the card will show a square or will be red.

b. i. Are the events “the card shows a 5” and “the card is red” disjoint? Explain.

ii. Calculate the probability that the card will show a 5 or will be red.

4. The diagram below shows a spinner. When the pointer is spun, it is equally likely to stop on 1, 2, or 3. The pointer will be spun three times. Expressing your answers as fractions in lowest terms, find the probability, and explain how the answer was determined that the total of the values from all three spins is ...

a. 9.



b. 8.

c. 7.

5. A number cube has faces numbered 1 through 6, and a coin has two sides, heads and tails. The number cube will be rolled once, and the coin will be flipped once. Find the probabilities of the following events. (Express your answers as fractions in lowest terms.)
- The number cube shows a 6.
 - The coin shows heads.
 - The number cube shows a 6, and the coin shows heads.
 - The number cube shows a 6, or the coin shows heads.

6. Kevin will soon be taking exams in math, physics, and French. He estimates the probabilities of his passing these exams to be as follows:
- Math: 0.9 Physics: 0.8 French: 0.7

Kevin is willing to assume that the results of the three exams are independent of each other. Find the probability of each event, to the nearest thousandth.

- Kevin will pass all three exams.
- Kevin will pass math but fail the other two exams.
- Kevin will pass exactly one of the three exams.

7. If $P(A) = 0.48$ and $P(B) = 0.67$ and $P(A \cap B) = 0.22$, find the following:

- | | |
|--|-------------------|
| a. $P(A \cup B) =$ | d. $P(B A) =$ |
| b. $P(A \cup B^c) =$ | e. $P(A^c B^c) =$ |
| c. $P(A^c \cap B) =$ | |
| f. Are A and B disjoint events? Why or why not? | |
| g. Are A and B independent events? Why or why not? | |

8. If $P(G) = 0.18$, $P(M) = 0.24$ and G and M are independent, what's the probability of G and M ?
9. If $P(W) = 0.61$ and $P(J) = 0.45$ and $P(J|W) = 0.2$, find the following:
- $P(W \text{ and } J) =$
 - $P(W \text{ or } J) =$
10. If $P(D) = 0.48$, $P(R) = 0.25$ and D and R are disjoint, what is the probability of D or R ?
11. Suppose in a library 23% of the books are children's books, 42% of the books are adult fiction, and the rest are non-fiction.
- What is the probability that a randomly selected book is:
 - Non-fiction?
 - Not a children's book?
 - A children's book or an adult fiction?
 - If the type of book is independent of the next what is the probability that:
 - 2 randomly selected books are both children's books?
 - 2 randomly selected books are fiction then non-fiction?
 - 2 randomly selected books are children's and adult fiction, in either order?
 - 2 randomly selected books are not adult fiction?
 - At least 1 out of 4 randomly selected books is a children's book?
 - The first non-fiction book is the 5th one selected?
12. In a large university 13.5% of the students take economics, 24.7% of the students take statistics, and 11.7% take economics and statistics.
- Draw a Venn Diagram
 - What is the probability that a randomly selected student:
 - Took economics or statistics?
 - Didn't take economics but did take statistics?
 - Didn't take economics or didn't take statistics?
 - That took statistics didn't take economics?
 - Didn't take statistics given they took economics?
 - Are taking statistics and taking economics mutually exclusive? independent? Explain for each.

13. The following table shows the results of survey that asked people whether they were involved in any type of charity work.

	Frequently	Occasionally	Not at all	Total
Male	221	456	795	1472
Female	207	430	741	1378
Total	428	886	1536	2850

What is the probability that

- a randomly selected person is male and frequently involved in charity work?
- a randomly selected person is male or occasionally involved in charity work?
- a randomly selected person is female or not involved in charity work?
- a randomly selected person is male given they frequently involved in charity work?
- a randomly selected female is occasionally involved in charity work?
- a person not involved in charity is female?
- Is sex and involvement in charity independent? Disjoint?

Answers

1a 0.59, 0.83	1b 0.91	1c 0.9303	2a See Teacher	2b 0.06	2c No
3ai Yes	3aii 0.75	3bi No	3bii 0.55	4a $\frac{1}{27}$	4b $\frac{1}{9}$
4c $\frac{2}{9}$	5a $\frac{1}{6}$	5b $\frac{1}{2}$	5c $\frac{1}{12}$	5d $\frac{7}{12}$	6a 0.504
6b 0.054	6c 0.092	7a 0.93	7b 0.55	7c 0.45	7d 0.4583
7e 0.2121	7f No	7g No	8 0.0432	9a 0.122	9b 0.938
10 0.73	11ai 0.35	11aii 0.77	11aiii 0.65	11bi 0.0529	11bii 0.147
11biii 0.1932	11biv 0.3364	11bv 0.6485	11bvi 0.0625	12a See Teacher	12bi 0.265
12bii 0.130	12biii 0.883	12biv 0.5263	12bv 0.1333	12c No	13a 0.0775
13b 0.6674	13c 0.7625	13d .5164	13e 0.3120	13f .4824	13g Yes Independent Not Disjoint