

MA 162: Finite Mathematics - Section 7.3

Fall 2014

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Announcements:

- Homework 7.1/7.2 due Friday at 6pm.
- Homework 7.3 due next Tuesday at 6pm.

7.3 - Rules of Probability

(1) $P(E) \geq 0$ for any event E .

(2) $P(S) = 1$. (S is the entire sample space)

(3) If E and F are mutually exclusive, then

$$P(E \cup F) = P(E) + P(F)$$

7.3 - Rules of Probability

(4) If E and F are any two events of an experiment, then

$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

(5) (Complements) If E is an event of an experiment and E^c denotes the complement of E , then

$$P(E^c) = 1 - P(E)$$

Example - Rolling Dice

A pair of fair 6-sided dice are rolled.

- Determine the probability that both die turn up odd numbers.
- Determine the probability that the sum of the values of the dice is at least 9.
- Determine the probability that one die turns up a number greater than or equal to 5 and the other die turns up a number less than or equal to 4.

Example - Flipping Coins

A fair coin is flipped 4 times.

- What is the probability of getting exactly 2 heads?

- What is the probability of getting at least 2 heads?

Example - Playing Cards

Two cards are drawn from a standard deck of 52 playing cards.

- What is the probability that the two cards have the same suit?
- What is the probability that at least one card has value from *J* up to *A*?
- What is the probability that the two card hand contains a Jack or a diamond?

Example - Playing Cards

Two cards are drawn from a standard deck of 52 playing cards.

- What is the probability that the two cards hand contains a Jack and a diamond?

Example - Movie Survey

A group of 400 people aged 12 to 74 were surveyed about how often per month they go to a theater to see movies. The results are as follows:

Age:	12 – 24	25 – 44	45 – 64	65 – 74	total
0	10	24	40	14	88
1 – 2	44	46	51	3	144
3 – 4	54	30	10	3	97
> 4	12	44	11	4	71
total	120	144	112	24	400

What is the probability that a random person from this survey...

- ...watches 0 movies per month?
- ...watches at least 3 movies per month?
- ...is less than 45 years old and watches between 1 and 4 movies per month?

Example - Movie Survey

Age:	12 – 24	25 – 44	45 – 64	65 – 74	total
0	10	24	40	14	88
1 – 2	44	46	51	3	144
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> 4	12	44	11	4	71
total	120	144	112	24	400

- If you only consider those people in the 25 – 44 age range, what is the probability they watch at least 3 movies per month?
- If you only consider those people who watch at least 4 movies per month, what is the probability they are 25 – 64 years old?