

MATH 210 FINITE MATHEMATICS

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7.1 Experiments, Sample Spaces, and Events

Definition 1

1. Experiment:
2. Outcome:
3. Sample Space:
4. Event:
5. Mutually Exclusive

Example 1

- 1.
- 2.
- 3.
- 4.

Example 2

Consider the experiment of rolling one die.



1. What are the outcomes? (Sample Space)
2. Find the event E where $E = \{x \mid x \text{ is an even number}\}$
3. Find the event F where $F = \{x \mid x \text{ is a number greater than } 3\}$

4. Find the event $E \cap F$.
5. Find the event $E \cup F$.
6. Are E and F mutually exclusive? Explain.
7. What is the complement of E ?

Example 3

Consider the experiment of flipping a fair coin three times and observing the resulting sequence of heads or tails. Determine the sample space.

Example 4

Let $S = \{b, e, l, q, v, x\}$ be a sample space and let $E = \{b, e\}$, $F = \{b, q, x\}$, and $G = \{e, l, v\}$.

1. Find the events E^c , $F \cap G$, and $F^c \cap G$.

2. Are E^c and $F^c \cap G$ mutually exclusive?

Example 5

Are the events $E = \{x \mid x \text{ is a king}\}$ and $F = \{x \mid x \text{ is a 5}\}$

1. Write E and F in roster notation.
2. Are E and F mutually exclusive?

Example 6

An experiment consists of casting a pair of dice and observing the top number.

1. Determine the sample space

		Second Throw					
		1	2	3	4	5	6
First Throw	1						
	2						
	3						
	4						
	5						
	6						

2. Determine the event that the sum of the numbers is greater than or equal to 9.
3. Determine the event that at least one die is a 5.
4. Determine the event that one die is a 2 and the other is less than 3.