2.1 Probability Experiments

A Probability Experiments

Probability experiment or trial
- ✓ any procedure that can be infinitely repeated

Outcome
- ✓ a possible result of an experiment

Trial
- ✓ one round of a probability experiment

Sample space
- ✓ The set of all possible outcomes of a probability experiment

Event
- ✓ A set of outcomes with the same result

B Tossing a coin

When tossing a coin there are only two possible outcomes:

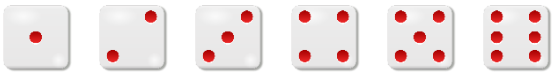
 Head

 Tail

Trial: tossing a coin
Possible outcomes: either a head H or tail T
Sample space: {H, T}
Example of event: tossing a head H

C Rolling a die

When rolling a die there are only six possible outcomes:



Trial: rolling a die
Possible outcomes: 1, 2, 3, 4, 5 or 6
Sample space: {1,2,3,4,5,6}
Example of event: rolling a 5

C Experimental Probability

Experimental probability may be determined at the end of a probability experiment by:

$$P(E) = \frac{\text{number of succesful trials (when the event } E \text{ happened)}}{\text{total number of trials}}$$

Notes:
- ✓ Probability is always a number between 0 and 1 and may be written as a fraction, decimal or percentage.
- ✓ If the probability of an event is 0, that event is *impossible*.
- ✓ If the probability of an event is 1, that event is *certain*.

Example 1. Write the following probabilities as a fraction, decimal and percentage.

a) 40%

b) 0.25

Example 2. During a probability experiment, a coin was tossed many times. In 6 trials, the outcome was head H and in 5 cases, the outcome was tail T.

a) How many trials were in total?

b) What is the experimental probability of tossing a head H?

c) What is the experimental probability of tossing a tail T?

Example 3. During a probability experiment, a die was rolled many times. The results are presented in the following table of frequency:

Possible events *E* (rolling a …)	1	2	3	4	5	6
Number of successful trials	12	10	8	15	9	7

a) How many trials were in total?

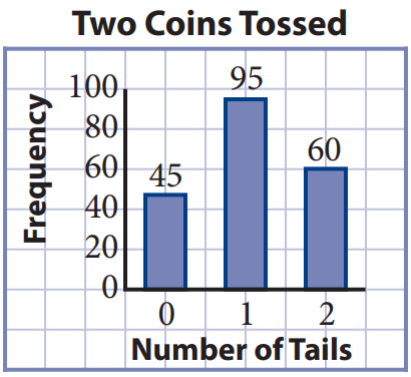
b) What is the experimental probability of rolling a 5?

c) What is the experimental probability not rolling a 5?

d) What is the experimental probability of rolling an odd number?

Example 3. Two coins were tossed a total of 200 times. The results are shown in the graph. Find the experimental probability for each event.

a) two heads



b) one head

c) two tails

Example 4. Use the Dice Roller Simulator and roll 2 dice 20 times (trials). Find the experimental probability for each event.

a) What is the experimental probability of rolling a double?

b) What is the experimental probability of rolling a sum equals to 7?

Reading Pages 60-65
Homework Pages 66-67 # 3, 6