

UNIT 20 *Probability of Two or More Events*

Introduction to SIM

Learning objectives

The work in this unit continues the development of probability but is *not* included in the current CXC/CSEC Mathematics syllabus. After completing this unit of STUDENT INSTRUCTIONAL MATERIAL (SIM) you should

- be able to identify possible outcomes of two (or more) events by listing the outcomes
- be confident in finding probabilities when all outcomes are equally likely
- be able to use tree diagrams to determine probabilities of particular events.

Key points and principles

- The probability of any outcome, p , must satisfy $0 \leq p \leq 1$.
- The sum of the probabilities of all outcomes must equal 1.
- Use a tree diagram to illustrate two or more events with probabilities attached to each branch.

Facts to remember

- For finding probabilities by experiment:

$$\text{probability of event} = \frac{\text{frequency of event}}{\text{total frequency}}$$

- For equally likely outcomes:

$$\text{probability of particular event} = \frac{\text{number of ways of obtaining event}}{\text{total no. of possible outcomes}}$$

For example, when throwing a fair die,

$$p(6) = \frac{1}{6}, \quad p(\text{prime number}) = p(2, 3 \text{ or } 5) = \frac{3}{6} = \frac{1}{2}$$

- When using a tree diagram, multiply the probabilities along each branch to find the probability of particular events.

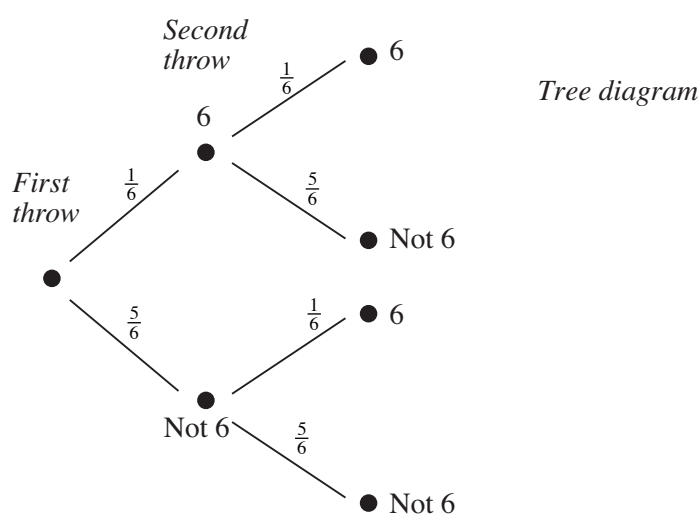
The work covered in this unit is not on the current CXC/CSEC Mathematics syllabus and therefore not examined, but is of relevance to the development of the topic.

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Glossary of terms

- *Probability* - the likelihood of the occurrence of an event.
- *Tree diagram* - a diagram which can be helpful in illustrating possible outcomes of an experiment. Probabilities are assigned to the branches when one or more events are being considered. The probability of any outcome is the product of all possibilities along the relevant branches. For example, throwing a die and noting whether the score is 6 on each occasion, as illustrated below.



- *Replacement* - replacing an item so that the probabilities remain unchanged for each experiment.
For example, when two balls are taken from a bag in turn, with the first ball being put back (replaced) in the bag before the second is taken out.
- *Non-replacement* - in the example above, the first ball is NOT put back in the bag before the second is taken out.