Handout 14

Probability & Statistics

14.1 Introduction To Probability

- A *'trial'* is a probability experiment. E.g. Flipping a coin.
- An *'outcome'* is a result of a trial. E.g. The *'outcome'* is either *heads* or *tails*.
- The *'sample space'* is the set of all possible *'outcomes'*.

EXAMPLE: List the *'sample space'* of throwing a die[i]? State how many outcomes there are?

$$S = \{1, 2, 3, 4, 5, 6\}$$

$\#S = 6$ There are six possible outcomes

- The *'event'*, E, is *the set of 'outcomes'* specified to occur, selected from the *'sample space'*.

$$\text{The } \textit{'probability'} \text{ of an } \textit{'event'} \text{ occurring, } P(E) = \frac{\text{number of desired outcomes}}{\text{number of possible outcomes}} = \frac{\#E}{\#S}$$

EXAMPLE: What is the probability of getting the number '3' as an *'outcome'*, when you throw a six sided die?

$$E = \{3\} \qquad \therefore \#E = 1$$
$$S = \{1, 2, 3, 4, 5, 6\} \qquad \therefore \#S = 6$$

$$P(E) = \frac{\#E}{\#S} = \frac{1}{6}$$

[i] Plural is "dice", singular is "die". A *'sample space'* is also called an *'event space'*.