

Probability

$$0 \leq P \leq 1$$

OR

$$0\% \leq P \leq 100\%$$

Sample Space

A sample space is the set of all possible outcomes of an experiment.

**E.g. The sample space of possible outcomes for tossing a coin is
{H, T}**

1. Find the sample space of possible outcomes for rolling a six-sided die.

2. Find the sample space of possible outcomes for tossing two coins.

$$P(A) = \frac{n(A)}{n(\text{Total})}$$

$$P(A) + P(A') = 1$$

where A is an event and A' is the complementary event of A.

1. A six-sided die is rolled once. Find the probability of getting:


- (a) a 6
- (b) 4 or 6
- (c) not 6

2. A pair of dice is rolled. Find the probability of getting

- (a) two 4s
- (b) at least one 6
- (c) only one 6
- (d) a sum of 7
- (e) no 6

Exercise

Paper 1


1.  Celeste wishes to hire a taxicab from a company which has a large number of taxicabs. The taxi cabs are randomly assigned by the company.

The probability that a taxicab is yellow is 0.4.

The probability that a taxicab is Fiat is 0.3.

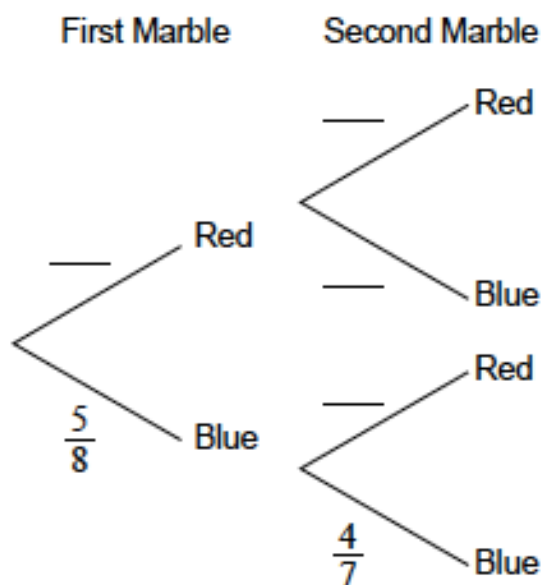
The probability that a taxicab is yellow or a Fiat is 0.6.

Find the probability that the taxicab hired by Celeste is **not** a yellow Fiat.

2.  A bag contains eight marbles. Three marbles are red and five are blue. Two marbles are drawn from the bag without replacement.


(a) Write down the probability that the first marble drawn is red.

(b) Complete the following tree diagram.



(c) Find the probability that both marbles are blue.

Paper 2

1.  A company uses two machines, *A* and *B*, to make boxes. Machine *A* makes 60% of the boxes.

80% of the boxes made by machine *A* pass inspection.
90% of the boxes made by machine *B* pass inspection.

A box is selected at random.

(a) Find the probability that it passes inspection.

(b) The company would like the probability that a box passes inspection to be 0.87. Find the percentage of boxes that should be made by machine *B* to achieve this.
