

MATH 120 Section 8.3 Conditional Probability

For events A and B in a sample space S , we define the conditional probability of A given B :

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Examples

1) Given that you have drawn a red card, what is the probability that it is a heart?

2) Given that an odd number turns up after rolling one die, what is the probability

a) it is a 3?

b) it is not a 3?

3) Two marbles are drawn in succession out of a box containing 3 blue and 2 white marbles.

a) Find the probability that the second marble was white, given that the first marble was replaced before the second draw. Draw a probability tree-diagram to write the sample space.

b) Find the probability that the second marble was white, given that the first marble was NOT replaced before the second draw. Draw a probability tree-diagram to write the sample space.

4) Two marbles are drawn in succession out of a box containing 2 red and 6 white marbles.

a) Find the probability that at least 1 marble was red, given that the first marble was replaced before the second draw. Draw a probability tree diagram to write the sample space.

b) Find the probability that at least 1 marble was red, given that the first marble was NOT replaced before the second draw. Draw a probability tree diagram to write the sample space.

5) A box contains 4 red, 5 white and 6 green marbles. Two marbles are drawn out of the box in succession without replacement. What is the probability that both marbles are the same color? Draw a probability tree diagram to write the sample space.