

Probability

1. You roll a pair of standard dice. Create the sample space for a single roll of the dice and use the sample space to compute the following probabilities.

Create a sample space.

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{[2][1], [2][2], [2][3], [2][4], [2][5], [2][6],  
[3][1], [3][2], [3][3], [3][4], [3][5], [3][6],  
[4][1], [4][2], [4][3], [4][4], [4][5], [4][6],  
[5][1], [5][2], [5][3], [5][4], [5][5], [5][6],  
[6][1], [6][2], [6][3], [6][4], [6][5], [6][6]}
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$P(\text{getting a 1 on the first die or getting a 5 on the second die})$

$$\frac{1}{3}$$

$P(\text{sum of the dice}=10)$

$$\frac{1}{12}$$

$P(\text{getting a 3 on the second die given that you got a 2 on the first die})$

$$\frac{1}{6}$$

$P(\text{getting an odd number on the first die and a value greater than 4 on the second die})$

$$\frac{1}{6}$$

2. Below is some hypothetical data on the voting preferences of individuals of different religious affiliations.

$P(\text{Vote for Orange Party})$

$$0.126$$

$P(\text{Vote for Green Party or Religion C})$

$$0.591$$

$P(\text{Vote for Blue party, given that individual is Religion C})$

0.374

| $P(\text{Religion B, given that individual voted for Orange Party})$

0.302

3. The hypothetical probabilities of types of weather in two neighborhoods on an average day in the month of August are shown below:

| $P(\text{fog in the Western neighborhood and sunshine in the Central neighborhood})$

0.35

| $P(\text{sunny on August 1 in the Western neighborhood for three consecutive years})$

0.04

| $P(\text{fog in the Western neighborhood or fog in the Central neighborhood})$

0.55

| $P(\text{rain in the Central neighborhood given that it is not sunny in the Central neighborhood})$

0.66

4. In a random sample of male and female graduates of the New York School for the Arts between the ages of 22–35 you know that:

| $P(\text{man is a ballet dancer and a musical performer})$

0.089

| $P(\text{woman is an actress and a musical performer})$

0.201

| $P(\text{woman is an actress or a musical performer})$

0.714

5. A college student frequents one of two coffee houses on campus, choosing Starbucks 70% of the time and Peet's 30% of the time. Regardless of where she goes, she buys a cafe mocha on 60% of her visits.

| Probability of going to Starbucks and ordering a cafe mocha

0.42

| Are the two events in part A independent?

Yes.

| Probability of (Peete's | ordered a mocha)

0.3

| Probability of Starbucks or orders Cafe mocha

0.88

6. Whether a grant proposal is funded quite often depends on the reviewers. Suppose a group of research proposals was evaluated by a group of experts as to whether the proposals were worthy of funding. When these same proposals were submitted to a second independent group of experts, the decision to fund was reversed in 30% of the cases. If the probability that a proposal is approved for funding by the first peer review group is .2, what are the probabilities of these events?

| Proposal is approved by both groups

0.06

| Proposal disapproved by both groups

0.56

| Proposal is approved by only one group

0.44