

12.1 Probability

Frequency Table – A list of the outcomes in a sample space and the number of times each outcome occurs.

Below are three types of triangles: acute, right or obtuse. Make a frequency table using those categories.



	tally	frequency	cumulative frequency
acute		13	13
right		7	20
obtuse		5	25

Cumulative Probability – Probability over a continuous range of events. Use a frequency table to find.

Use the frequency table to find the probability that a student is involved in at least one extra-curricular activity.

Number of Activities	Number of Students
More than 1	144
1	360
None	216
Total	720

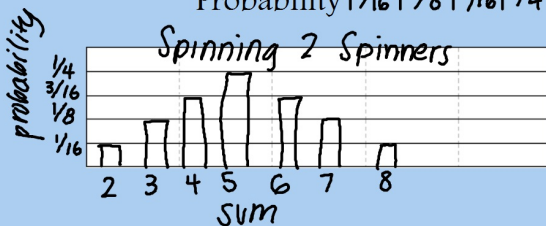
$$\frac{144 + 360}{720} = \frac{504}{720} \approx 70\%$$

Probability Distribution – A function that gives the probability of each event in a sample space. Use a table or a graph.

Suppose you spin two spinners. Each spinner has four possible outcomes: 1, 2, 3 or 4. Use a table and a graph to show the probability distribution for the sum of the numbers.

1 1 2 2 2 2 3 3 3 4 4 4 4 5 5 5 6 6 7 7 8

Sum	2	3	4	5	6	7	8
Frequency	1	2	3	4	3	2	1
Probability	1/16	1/8	3/16	1/4	3/16	1/8	1/16



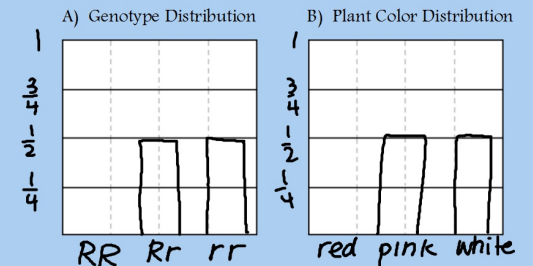
A situation may be described by more than one sample space. In that case, each sample space has its own probability distribution.

Use the information in the chart of inherited gene pairs. Graph the probability distribution for each sample space.

Inherited Gene Pairs from One Recessive and one

Hybrid Pea Plant		Parent Plant	
		r	r
Parent Plant	R	Rr	Rr
	r	rr	rr

RR = dominant gene pair (red flower)
 Rr = Hybrid gene pair (pink flower)
 rr = recessive gene pair (white flower)

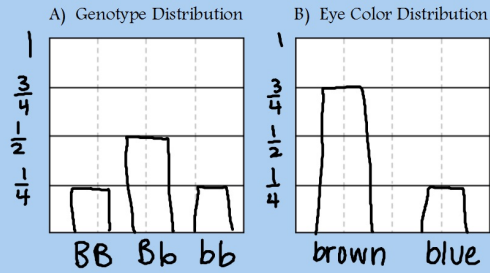


BB = Brown eyes—dominant

Bb = Brown eyes

bb = Blue eyes—recessive

		Gene from Mother	
		B	b
Gene from Father	B	BB	Bb
	b	Bb	bb



You can design a simulation based on a probability distribution. First, use the probabilities to assign numbers to each event in the sample space. For example, if $P(\text{event}) = 0.15$, assign 15 out of 100 numbers to that event. Then you can conduct trials by generating random numbers.

The probability of an information desk at a community library receiving calls each hour varies according to the following distribution.

c	0	1	2	3	4	5
P(c)	0.05	0.15	0.25	0.3	0.2	0.05

Use random numbers to predict the number of calls received during an eight-hour shift.

1. Define how the simulation will be done. Use random numbers. Assign numbers from 1 to 100 to the events, based on the probability of each event. Use cumulative probabilities to help.
2. Conduct the simulation. Model the eight-hour shift by generating eight random numbers from 1 to 100.
3. Interpret the simulation.

Event	Probability	Cumulative Probability	Assigned Numbers
0	.05	.05	1-5
1	.15	.20	6-20
2	.25	.45	21-45
3	.3	.75	46-75
4	.2	.95	76-95
5	.05	1	96-100

95 = 4 calls
 91 = 4 calls
 15 = 1 call
 52 = 3 calls
 41 = 2 calls
 74 = 3 calls
 5 = 0 calls
 34 = 2 calls