

5.1 Probability Distributions

MDM4U

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Part 1: Introducing Probability Distribution

What is a *probability distribution*?

A table, formula or graph that provides the _____ of a _____ random variable assuming any of all of its possible values.

_____ : A variable that has a unique value for each outcome.

A *probability distribution* must satisfy the following criteria:

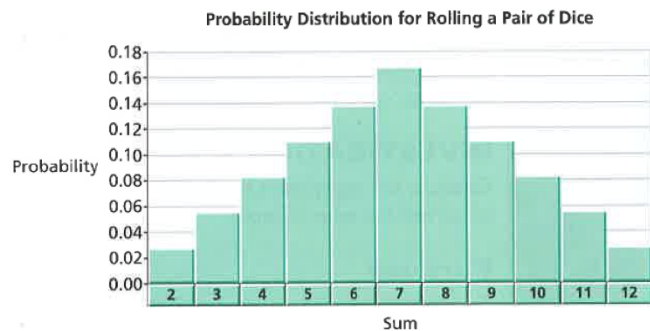
1. The probability of each value of the discrete random variable is between ___ and ___, inclusive.
2. The sums of all the probabilities is ___.

Consider the experiment in which two six-sided dice are rolled. Suppose one die is red and the other is blue. Create a **table** to represent the probability distribution for the possible sums of the dice:

Sum	Theoretical Probability

		Red Die					
		1	2	3	4	5	6
Blue Die	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

The **graph** below is another way to represent the probability distribution. This graph also provides the probability of each sum occurring when a pair of dice is rolled.



Example 2: A summer camp has seven 4.6 meter canoes, ten 5.0 meter canoes, four 5,2 meter canoes, and four 6.1 meter canoes. Canoes are assigned randomly for campers going on a canoe trip. Show the probability distribution for the length of an assigned canoe. Then calculated the expected length of an assigned canoe.

Length of Canoe (m), x	Probability, $P(x)$

Example 3: A school raffle sold 1500 tickets at \$2 each. There are four prizes of \$500, \$250, \$150, and \$75.

a) Create a probability distribution for the amount of money you could win.

Winnings, x	Probability, $P(x)$



b) Calculate your expected gain if you buy a ticket