

14-4 Probability Distributions (Pages 777–781)

A **random variable** is a variable whose value is the numerical outcome of a random event. The probability of every possible value of the random variable is called a **probability distribution**. Probability distributions have the following properties.

1. The probability for each random variable x is $0 \leq x \leq 1$.
2. The sum of the probabilities for each value x is 1.
3. The probability for any compound event is equal to the sum of the probabilities of each individual event.

Examples

The owner of a bicycle shop recorded the number of bicycles owned by each of his customers. The results are shown in the table.

Number of Bicycles	Number of Customers
1	13
2	21
3	17
4	11
5+	2

a. Find the probability that a randomly chosen person owns 3 bicycles.

$$P(X = 3) = \frac{17}{64}$$

The number of customers with 3 bicycles divided by the total number of people surveyed

$$P(X = 3) = 0.265625$$

$$P(X = 3) = 26.5625\%$$

b. Find the probability that a randomly chosen person owns at least 4 bicycles.

$$P(X \geq 4) = \frac{13}{64}$$

$$P(X \geq 4) = 0.203125$$

$$P(X \geq 4) = 20.3125\%$$

Practice

Use the probability distribution table to answer the following questions.

X = Number of Bicycles	P(X)
1	0.203125
2	0.328125
3	0.265625
4	0.171875
5+	0.03125

1. What is the probability that a randomly chosen person has less than 3 bicycles?
2. What is the probability that a randomly chosen person has at least 3 bicycles?
3. **Standardized Test Practice** What is the probability that a randomly chosen person will have at least 1 bicycle?
A 20.3125% **B** 79.6875% **C** 100% **D** 120.3125%

Answers: 1. 53.125% 2. 46.875% 3. C