

# CONTINUOUS RANDOM VARIABLES: PRACTICE 1\*

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## Abstract

In this module the student will explore the properties of data with a uniform distribution.

## 1 Student Learning Outcomes

- The student will analyze data following a uniform distribution.

## 2 Given

The age of cars in the staff parking lot of a suburban college is uniformly distributed from six months (0.5 years) to 9.5 years.

## 3 Describe the Data

**Exercise 1** *(Solution on p. 5.)*

What is being measured here?

**Exercise 2** *(Solution on p. 5.)*

In words, define the Random Variable  $X$ .

**Exercise 3** *(Solution on p. 5.)*

Are the data discrete or continuous?

**Exercise 4** *(Solution on p. 5.)*

The interval of values for  $x$  is:

**Exercise 5** *(Solution on p. 5.)*

The distribution for  $X$  is:

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## 4 Probability Distribution

**Exercise 6***(Solution on p. 5.)*

Write the probability density function.

**Exercise 7***(Solution on p. 5.)*

Graph the probability distribution.

- a. Sketch the graph of the probability distribution.



Figure 1

- b. Identify the following values:

- i. Lowest value for  $x$ :
- ii. Highest value for  $x$ :
- iii. Height of the rectangle:
- iv. Label for  $x$ -axis (words):
- v. Label for  $y$ -axis (words):

## 5 Random Probability

**Exercise 8***(Solution on p. 5.)*

Find the probability that a randomly chosen car in the lot was less than 4 years old.

- a. Sketch the graph. Shade the area of interest.



Figure 2

- b. Find the probability.  $P(x < 4) =$

**Exercise 9***(Solution on p. 5.)*

Out of just the cars less than 7.5 years old, find the probability that a randomly chosen car in the lot was less than 4 years old.

- a. Sketch the graph. Shade the area of interest.



Figure 3

- b. Find the probability.  $P(x < 4 | x < 7.5) =$

**Exercise 10: Discussion Question**

What has changed in the previous two problems that made the solutions different?

**6 Quartiles****Exercise 11***(Solution on p. 5.)*

Find the average age of the cars in the lot.

**Exercise 12***(Solution on p. 5.)*

Find the third quartile of ages of cars in the lot. This means you will have to find the value such that  $\frac{3}{4}$ , or 75%, of the cars are at most (less than or equal to) that age.

- a. Sketch the graph. Shade the area of interest.



**Figure 4**

- b. Find the value  $k$  such that  $P(x < k) = 0.75$ .  
c. The third quartile is:

## Solutions to Exercises in this Module

**Solution to Exercise (p. 1)**

The age of cars in the staff parking lot

**Solution to Exercise (p. 1)**

$X$  = The age (in years) of cars in the staff parking lot

**Solution to Exercise (p. 1)**

Continuous

**Solution to Exercise (p. 1)**

0.5 - 9.5

**Solution to Exercise (p. 1)**

$X \sim U(0.5, 9.5)$

**Solution to Exercise (p. 2)**

$f(x) = \frac{1}{9}$

**Solution to Exercise (p. 2)**

**b.i.** 0.5

**b.ii.** 9.5

**b.iii.**  $\frac{1}{9}$

**b.iv.** Age of Cars

**b.v.**  $f(x)$

**Solution to Exercise (p. 2)**

**b.:**  $\frac{3.5}{9}$

**Solution to Exercise (p. 3)**

**b:**  $\frac{3.5}{7}$

**Solution to Exercise (p. 3)**

$\mu = 5$

**Solution to Exercise (p. 4)**

**b.**  $k = 7.25$