

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 explore the properties of data with 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.

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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 1 (p. 1)

The age of cars in the staff parking lot

Solution to Exercise 2 (p. 1)

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

Solution to Exercise 3 (p. 1)

Continuous

Solution to Exercise 4 (p. 1)

0.5 - 9.5

Solution to Exercise 5 (p. 1)

$X \sim U(0.5, 9.5)$

Solution to Exercise 6 (p. 2)

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

Solution to Exercise 7 (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 8 (p. 2)

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

Solution to Exercise 9 (p. 3)

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

Solution to Exercise 11 (p. 3)

$\mu = 5$

Solution to Exercise 12 (p. 4)

b. $k = 7.25$