

CONTINUOUS RANDOM VARIABLES: REVIEW*

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Based on *Continuous Random Variables: Review*[†] by

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Abstract

This module provides a number of homework/review problems related to Continuous Random Variables.

Exercise – Exercise refer to the following study: A recent study of mothers of junior high school children in Santa Clara County reported that 76% of the mothers are employed in paid positions. Of those mothers who are employed, 64% work full-time (over 35 hours per week), and 36% work part-time. However, out of all of the mothers in the population, 49% work full-time. The population under study is made up of mothers of junior high school children in Santa Clara County.

Let E =employed, Let F =full-time employment

Exercise 1

(Solution on p. 4.)

- Find the percent of all mothers in the population that NOT employed.
- Find the percent of mothers in the population that are employed part-time.

Exercise 2

(Solution on p. 4.)

The type of employment is considered to be what type of data?

Exercise 3

(Solution on p. 4.)

In symbols, what does the 36% represent?

Exercise 4

(Solution on p. 4.)

Find the probability that a randomly selected person from the population will be employed OR work full-time.

Exercise 5

(Solution on p. 4.)

Based upon the above information, are being employed AND working part-time:

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- mutually exclusive events? Why or why not?
- independent events? Why or why not?

Exercise - Exercise refer to the following: We randomly pick 10 mothers from the above population. We are interested in the number of the mothers that are employed. Let X =number of mothers that are employed.

Exercise 6 *(Solution on p. 4.)*
State the distribution for X .

Exercise 7 *(Solution on p. 4.)*
Find the probability that at least 6 are employed.

Exercise 8 *(Solution on p. 4.)*
A person invests \$1000 in stock of a company that hopes to go public in 1 year.

- The probability that the person will lose all his money after 1 year (i.e. his stock will be worthless) is 35%.
- The probability that the person's stock will still have a value of \$1000 after 1 year (i.e. no profit and no loss) is 60%.
- The probability that the person's stock will increase in value by \$10,000 after 1 year (i.e. will be worth \$11,000) is 5%.

Find the expected PROFIT after 1 year.

Exercise 9 *(Solution on p. 4.)*

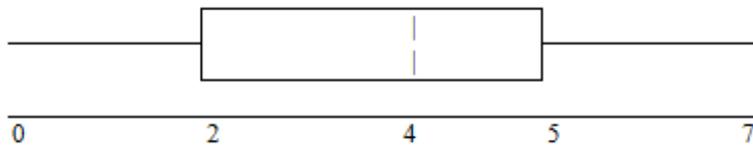
Rachel's piano cost \$3000. The average cost for a piano is \$4000 with a standard deviation of \$2500. Becca's guitar cost \$550. The average cost for a guitar is \$500 with a standard deviation of \$200. Matt's drums cost \$600. The average cost for drums is \$700 with a standard deviation of \$100. Whose cost was lowest when compared to his or her own instrument? Justify your answer.

Exercise 10 *(Solution on p. 4.)*

For the following data, which of the measures of central tendency would be the LEAST useful: mean, median, mode? Explain why. Which would be the MOST useful? Explain why.

4, 6, 6, 12, 18, 18, 18, 200

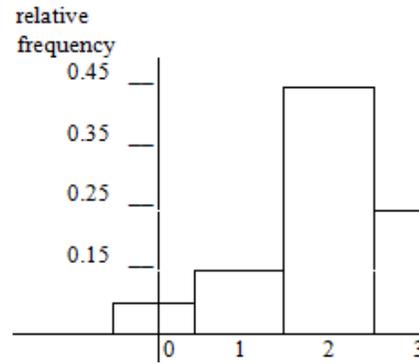
Exercise 11 *(Solution on p. 4.)*



For each statement below, explain why each is either true or false.

- 25% of the data are at most 5.
- There is the same amount of data from 4 – 5 as there is from 5 – 7.
- There are no data values of 3.
- 50% of the data are 4.

Exercise – Exercise refer to the following: 64 faculty members were asked the number of cars they



owned (including spouse and children’s cars). The results are given in the following graph:

Exercise 12 *(Solution on p. 4.)*

Find the approximate number of responses that were “3.”

Exercise 13 *(Solution on p. 4.)*

Find the first, second and third quartiles. Use them to construct a box plot of the data.

Exercise – Exercise refer to the following study done of the Girls soccer team “Snow Leopards”:

Hair Style	Hair Color		
	blond	brown	black
ponytail	3	2	5
plain	2	2	1

Table 1

Suppose that one girl from the Snow Leopards is randomly selected.

Exercise 14 *(Solution on p. 4.)*

Find the probability that the girl has black hair GIVEN that she wears a ponytail.

Exercise 15 *(Solution on p. 4.)*

Find the probability that the girl wears her hair plain OR has brown hair.

Exercise 16 *(Solution on p. 4.)*

Find the probability that the girl has blond hair AND that she wears her hair plain.

Solutions to Exercises in this Module

Solution to Exercise (p. 1)

- a. 24%
- b. 27%

Solution to Exercise (p. 1)

Qualitative

Solution to Exercise (p. 1)

$P(\text{PT} | E)$

Solution to Exercise (p. 1)

0.7336

Solution to Exercise (p. 1)

- a. No,
- b. No,

Solution to Exercise (p. 2)

$B(10, 0.76)$

Solution to Exercise (p. 2)

0.9330

Solution to Exercise (p. 2)

\$150

Solution to Exercise (p. 2)

Matt

Solution to Exercise (p. 2)

Mean

Solution to Exercise (p. 2)

- a. False
- b. True
- c. False
- d. False

Solution to Exercise (p. 3)

16

Solution to Exercise (p. 3)

2, 2, 3

Solution to Exercise (p. 3)

$\frac{5}{10} = 0.5$

Solution to Exercise (p. 3)

$\frac{7}{15}$

Solution to Exercise (p. 3)

$\frac{2}{15}$