Statistics for Data Science -1

Continuous Random Variables-Continuous distributions

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Learning objectives

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1. Define what is a continuous random variable.

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2. Probability distribution function and examples

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3. Cumulative distribution function, graphs, and examples.

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1. Define what is a continuous random variable.
2. Probability distribution function and examples
3. Cumulative distribution function, graphs, and examples.
4. Expectation and variance of random variables.

Non Uniform distribution

Triangular distribution

Example

Suppose that the number of minutes of playing time of a certain college basketball player in a randomly chosen game has the following density curve.
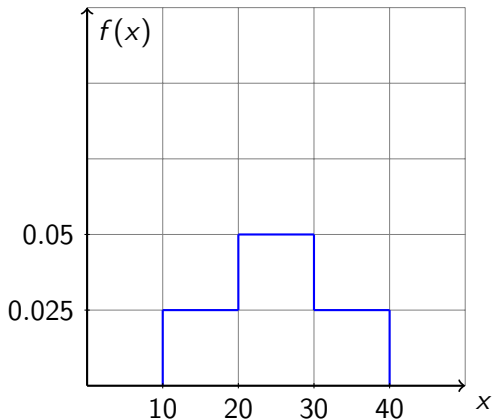
Questions

Find the probability that the player plays

1. Over 20 minutes
2. Less than 25 minutes
3. Between 15 and 35 minutes
4. More than 35 minutes

Solution

Let X be amount of playing time in minutes. Find the probability that the player plays

1. Over 20 minutes $= P(X > 20) = 0.5 + 0.25 = 0.75$
2. Less than 25 minutes $= P(X < 25) = 0.25 + 0.25 = 0.5$
3. Between 15 and 35 minutes $= P(15 \leq X \leq 35) = 0.125 + 0.5 + 0.125 = 0.75$
4. More than 35 minutes $= P(X > 35) = 0.125$

Triangular distribution

It is now 2 p.m., and Joan is planning on studying for her statistics test until 6 p.m., when she will have to go out to dinner. However, she knows that she will probably have interruptions and thinks that the amount of time she will actually spend studying in the next 4 hours is a random variable whose probability density curve is as follows:
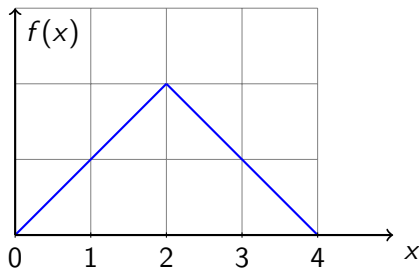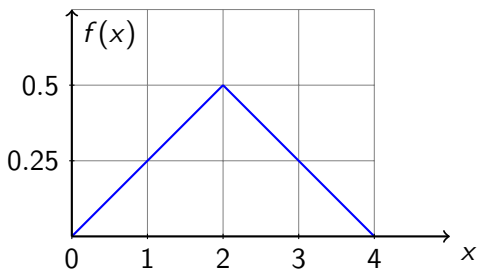
Questions

1. What is the height of the curve at the value 2?
2. What is the probability she will study more than 3 hrs?
3. What is the probability she will study between 1 and 3 hrs?
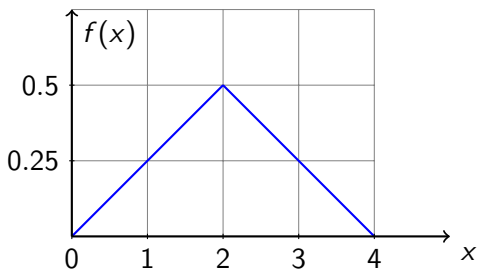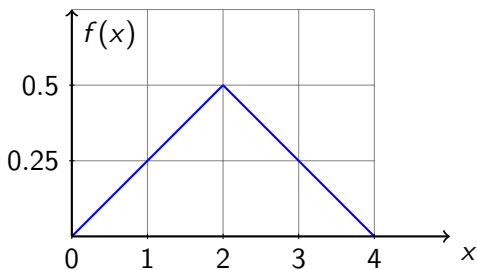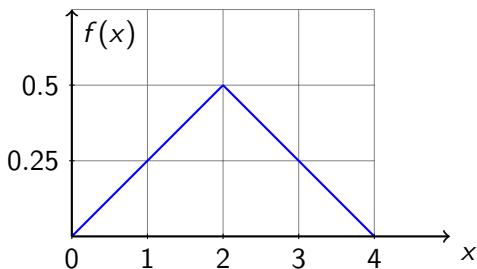
Solution

Solution

1. What is the height of the curve at the value 2?
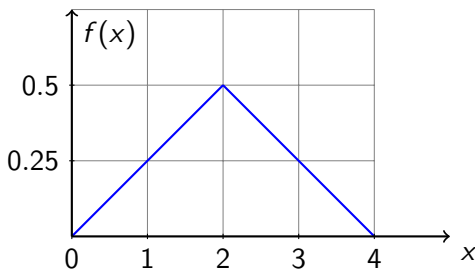
Solution

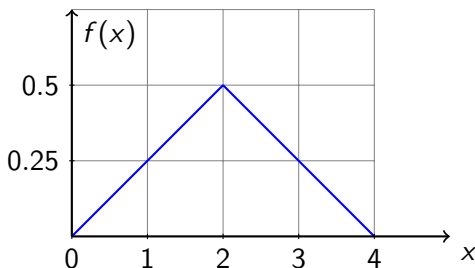1. What is the height of the curve at the value 2? $=1/2$ *unit*

Solution

1. What is the height of the curve at the value 2?$=1/2 unit$
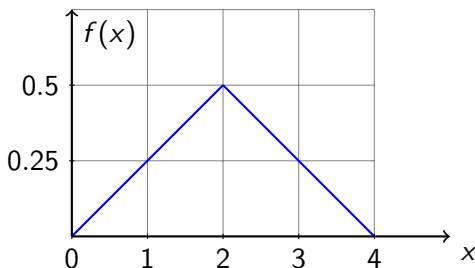2. What is the probability she will study more than 3 hrs?

Solution

1. What is the height of the curve at the value 2?$=1/2 unit$
2. What is the probability she will study more than 3 hrs?$=1/8$

Solution

1. What is the height of the curve at the value 2?$=1/2 unit$
2. What is the probability she will study more than 3 hrs?$=1/8$
3. What is the probability she will study between 1 and 3 hrs?

Solution

1. What is the height of the curve at the value 2?$=1/2 unit$
2. What is the probability she will study more than 3 hrs?$=1/8$
3. What is the probability she will study between 1 and 3 hrs?$=3/4$

Section summary

- Non uniform distribution
- Triangular distribution