1 Continuous Random Variables

Definition

Examples

Probability Density Function

Example

$$f(x) = \begin{cases} 12x^2(1-x) & \text{if } 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Plot the graph of $f(x)$. Is $f(x)$ a probability density function? Why or why not?

If $f(x)$ is a pdf then calculate the following.

a. $P(X = 0.4)$

b. $P(X < 0.4)$

c. $P(0.6 \leq X \leq 0.8)$

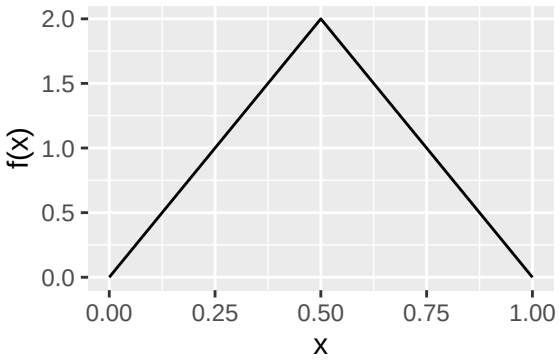
Calculate E[X]

Calculate Var[X]

2 Review

Q1.

```
data.frame (x = c(0, 0.5, 1),
                y = c(0, 2, 0)) %>%
  ggplot(aes(x = x, y = y)) +
  geom_line() +
  labs(y = "f(x)")
```



Is the function depicted with the plot above a pdf? Why/not?

Q2. a. A lottery game requires players to guess six numbers from 1 to 49. If a player guessed all the six numbers then they win the lottery of the week. What is the probability that a player will win the lottery?

b. What is the expected number of weeks until the first win for a player?

c. What is the variance?

Q3. A customer service agent receives on average 2 calls every 5 minutes.

a. What is the probability that they will receive 0 calls in the next 5 minutes?

b. What is the probability that they will receive more than 2 calls in the next 5 minutes?