

Lesson 3.2-3.3

11/11 points (100%)

Quiz, 11 questions

 **Congratulations! You passed!**[Next Item](#)1 / 1
points

1.

If continuous random variable X has probability density function (PDF) $f(x)$, what is the interpretation of the following integral: $\int_{-2}^5 f(x) dx$?

☐ $P(X \geq -2 \cup X \leq 5)$

☐ $P(X \leq -2 \cap X \geq 5)$

☒ $P(X \geq -2 \cap X \leq 5)$

CorrectThis could also be written $P(-2 \leq X \leq 5)$.

☐ $P(X \leq -2 \cap X \leq 5)$

1 / 1
points2. If $X \sim \text{Uniform}(0, 1)$, then what is the value of $P(-3 < X < 0.2)$?**Correct Response**

$$\int_{-3}^{0.2} f(x) dx = \int_{-3}^{0.2} I_{\{0 < x < 1\}}(x) dx = \int_0^{0.2} 1 dx = 0.2.$$

Lesson 3.2-3.3

1 / 1
points

11/11 points (100%)

Quiz, 11 questions

3.

If $X \sim \text{Exponential}(5)$, find the expected value $E(X)$. (Round your answer to one decimal place.)

0.2

Correct Response

With $X \sim \text{Exponential}(\lambda)$, we have $E(X) = 1/\lambda$.



1 / 1
points

4.

Which of the following scenarios could we most appropriately model using an exponentially distributed random variable?

- ☐ The hours of service until all light bulbs in a batch of 5000 fail
- ☐ The probability of a light bulb failure before 100 hours in service
- ☒ The lifetime in hours of a particular lightbulb

Correct

This is a positive, continuous quantity.

- ☐ The number of failed lightbulbs in a batch of 5000 after 100 hours in service



1 / 1
points

5.

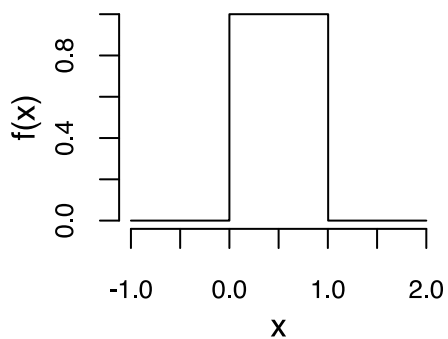
If $X \sim \text{Uniform}(2, 6)$, which of the following is the PDF of X ?

- ☐ Option:

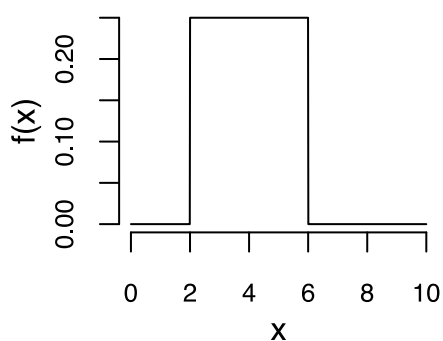
Lesson 3.2-3.3

Quiz, 11 questions

11/11 points (100%)



Option:

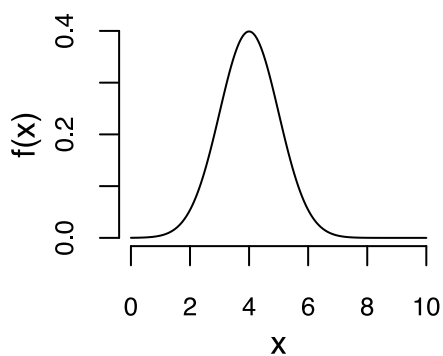


Correct

This PDF has uniform value (1/4) over the interval $[2, 6]$ and is 0 everywhere else.



Option:

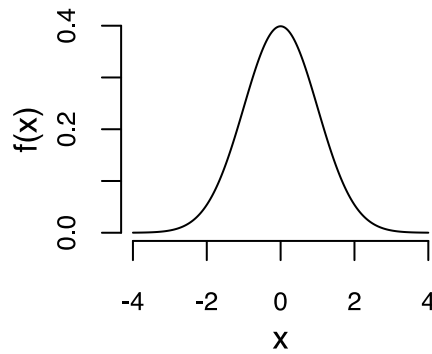


Option:

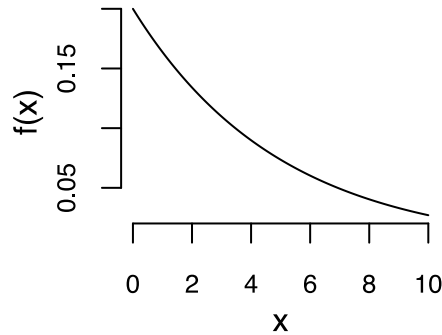
Lesson 3.2-3.3

11/11 points (100%)

Quiz, 11 questions



Option:

1 / 1
points

6.

If $X \sim \text{Uniform}(2, 6)$, what is $P(2 < X \leq 3)$? Round your answer to two decimal places.

0.25

Correct ResponseThis is $\int_2^3 1/4 dx$.

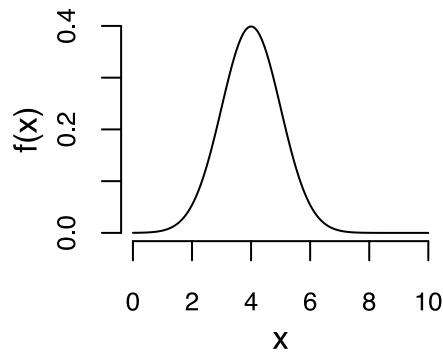
1 / 1
pointsLesson 3.2-3.3
7.

11/11 points (100%)

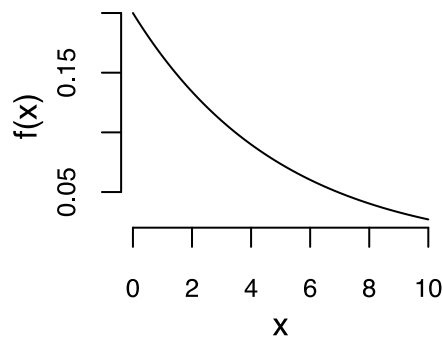
Quiz, 11 questions

If $X \sim N(0, 1)$, which of the following is the PDF of X ?

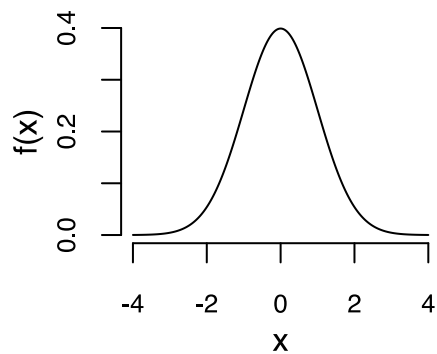
Option:



Option:



Option:



Lesson 3.2-3.3

Correct

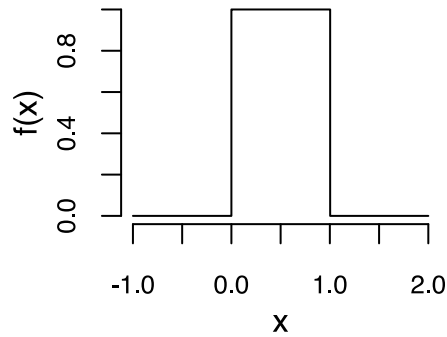
11/11 points (100%)

Quiz, 11 questions

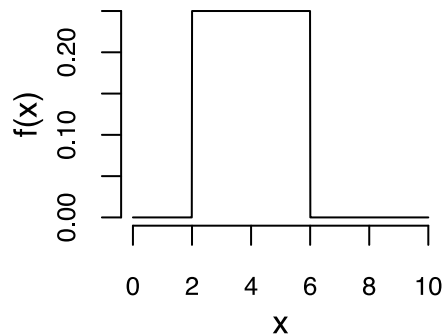
This is the standard normal distribution.



Option:



Option:



1 / 1
points

8.

If $X \sim N(2, 1)$, what is the expected value of $-5X$? This is denoted as $E(-5X)$.

-10

Correct Response

For any number c and any random variable with expectation $E(X)$, we have $E(cX) = cE(X)$.

Lesson 3.2-3.3

11/11 points (100%)Quiz, 11 questions

1 / 1
points

9. Let $X \sim N(1, 1)$ and $Y \sim N(4, 3^2)$. What is the value of $E(X + Y)$?

5

Correct Response

For random variables X and Y with expectations $E(X)$ and $E(Y)$, we always have $E(X + Y) = E(X) + E(Y)$.

1 / 1
points

10.

The normal distribution is also linear in the sense that if $X \sim N(\mu, \sigma^2)$, then for any real constants $a \neq 0$ and b , the distribution of $Y = aX + b$ is distributed $N(a\mu + b, a^2\sigma^2)$.

Using this fact, what is the distribution of $Z = \frac{X - \mu}{\sigma}$?



$N(0, 1)$

Correct

Here $a = 1/\sigma$ and $b = -\mu/\sigma$. Subtracting the mean and dividing by the standard deviation is referred to as standardizing a random variable.



$N(\mu, \sigma^2)$



$N(\mu, \sigma)$



$N(1, \sigma^2)$



$N(\mu/\sigma, 1)$

Lesson 3.2-3.3

11/11 points (100%)

Quiz, 11 questions

1 / 1
points

11.

Which of the following random variables would yield the highest value of $P(-1 < X < 1)$?

Hint: Random variables with larger variance are more dispersed.

 $X \sim N(0, 0.1)$ **Correct**

Of the four options, this is the least dispersed, meaning that most of the probability is associated with small values of X .

 $X \sim N(0, 1)$  $X \sim N(0, 10)$  $X \sim N(0, 100)$ 