

Quiz 7:

Question 1

Correct Mark 1.00 out of 1.00

Flag question

Two balls numbered as 1 and -1 are kept in a box. Each participant is asked to take one ball out at random. Record the number on the ball before returning it to the box. Denote X_1 and X_2 as the number recorded by the first and the second participant, respectively.

Determine the mean of X_2 if $X_1 = -1$.

- ☐ (A) 1/4
- ☐ (B) 1/2
- ☐ (C) 1
- ☒ (D) 0
- ☐ (E) other



Your answer is correct.

The correct answer is:

(D) 0

Question 2

Correct Mark 1.00 out of 1.00

Flag question

The following table gives the values of the joint probability mass function of two random variables X and Y .

x	y	$f_{XY}(x, y)$
0	0	0.1
1	0	0.4
1	1	0.3
0	1	0.2

Find the covariance of X and Y .

- ☐ (A) - 0.25
- ☐ (B) 0.05
- ☒ (C) - 0.05
- ☐ (D) 0
- ☐ (E) other



Question 3

Correct Mark 1.00 out of 1.00

Flag question

The following table gives the values of the joint probability mass function of two random variables X and Y .

x	y	$f_{XY}(x, y)$
0	0	1/2
1	0	1/4
1	1	1/4

Are the variables X and Y independent?

- ☐ (A) Yes
- ☒ (B) No



Your answer is correct.

The correct answer is:

(B) No

Question 4

Correct Mark 1.00 out of 1.00

Flag question

The joint probability mass function of two random variables X and Y is given as,

$$f_{XY}(x, y) = 0.25 \quad \text{for } (x, y) = (-1, 0), (0, 0), (1, 0), \text{ and } (0, 1).$$

Find the variance of X .

- ☐ (A) 1
- ☐ (B) 0
- ☐ (C) 1/4
- ☒ (D) 1/2
- ☐ (E) other



Quiz 8

Question 1 Correct Mark 1.00 out of 1.00 [Flag question](#)

A random number generator is set to produce the 10 integers (0 to 9) at random. Suppose that all 10 integers have an equal chance to be generated. What is the variance of the sum of 5 independently generated integers?

- ☐ a. 9.17
- ☒ b. 41.25
- ☐ c. 45.83
- ☐ d. 6.42
- ☐ e. other

Your answer is correct.

The correct answer is:
41.25

Question 2 Incorrect Mark 0.00 out of 1.00 [Flag question](#)

Manufactured rectangle metal sheets have an average width of 7 inches and an average length of 3 inches. Assume independence between the width (X) and the length (Y). The deviation in length is uniformly distributed on $[-0.07, 0.07]$ inches, and the deviation in width is uniformly distributed on $[-0.16, 0.16]$ inches. Denote A as the surface area of the rectangle, (i.e., $A = XY$). Find the variance of A (in inches⁴).

- ☒ a. 0.1568
- ☐ b. 0.4328
- ☐ c. 0.6579
- ☐ d. 0.3960
- ☐ e. other

Question 3 Correct Mark 1.00 out of 1.00 [Flag question](#)

Suppose that the length and width of a rectangle metal sheet are cut independently. The length is normally distributed with a mean of 10 inches and a standard deviation of 0.06 inches. The width is normally distributed with a mean of 5 inches and a standard deviation of 0.01 inches. If two metal sheets are randomly picked, what is the probability that the sum of their lengths is more than 19.95 inches?

- ☐ a. 0.1539
- ☐ b. 0.8461
- ☐ c. 0.2776
- ☒ d. 0.7224
- ☐ e. other

Your answer is correct.

The correct answer is:
0.7224

Question 4 Incorrect Mark 0.00 out of 1.00 [Flag question](#)

To determine the density of a liquid, an experiment is carried out where the mass and the volume of the liquid are measured. The mass and the volume have mean values of 32 g and 30 ml, respectively. The deviations of the mass and the volume follow uniform distributions on the intervals of $(-2, 2)$ and $(-1.5, 1.5)$, respectively. What is the standard deviation of the density of the liquid (in grams per ml)?

- ☐ a. 0.0024
- ☒ b. 0.0502
- ☐ c. 0.0025
- ☐ d. 0.0493
- ☐ e. other

Quiz 9:

Question 1 Correct Mark 1.00 out of 1.00 Flag question

Let X be the transaction total (in dollars) of a purchase made in a convenience store. Assume that X follows an exponential distribution with the average transaction total of a purchase as \$20. What is the probability that the next transaction is less than \$15? Pick the interval that includes the probability.

- ☐ (A) $[0, 0.2]$
- ☐ (B) $[0.2, 0.4]$
- ☒ (C) $[0.4, 0.6]$
- ☐ (D) $[0.6, 0.8]$
- ☐ (E) $[0.8, 1]$

Your answer is correct.

The correct answer is:
(C) $[0.4, 0.6]$

Question 2 Correct Mark 1.00 out of 1.00 Flag question

Determine the 3th moment, $E\{X^3\}$, of the continuous uniform distribution $X \sim \mathcal{U}\{-1, 3\}$, i.e. $f(x) = 1/4$ for $-1 \leq x \leq 3$ and 0 else.

- ☒ a. 5
- ☐ b. 0
- ☐ c. 8
- ☐ d. 1
- ☐ e. other

Your answer is correct.

The correct answer is:
5

A large freight elevator can transport a maximum of 9800 pounds. Suppose a load of cargo containing 49 boxes must be transported via the elevator. Experience has shown that the weight of boxes of this type of cargo follows a continuous uniform distribution with mean 205 pounds and standard deviation 15 pounds. Assume the boxes are independent.

What is the probability that all 49 boxes can be safely loaded onto the freight elevator? Choose the interval that includes your answer.

- ☒ a. $[0, 0.2]$
- ☐ b. $[0.2, 0.4]$
- ☐ c. $[0.4, 0.6]$
- ☐ d. $[0.6, 0.8]$
- ☐ e. $[0.8, 1]$

Your answer is correct.

The correct answer is:
 $[0, 0.2]$

Question 4 Incorrect Mark 0.00 out of 1.00 Flag question

The probability of a randomly picked student wearing glasses is 0.4. Twenty-five students plan to carry out the following experiment independently: they each pick 10 random students on campus and record the number of students wearing glasses out of the 10. Denote X_i as the number recorded by the i^{th} student. What is the probability that they observe more than 95 students wearing glasses in total? Choose the interval that includes your answer.

- ☐ a. $[0, 0.2]$
- ☐ b. $[0.2, 0.4]$
- ☒ c. $[0.4, 0.6]$
- ☐ d. $[0.6, 0.8]$
- ☐ e. $[0.8, 1]$

Your answer is incorrect.

The correct answer is:
 $[0.6, 0.8]$