

PS TEST UNIT 1

2.5 marks each

1. The total number of goals scored in the last 14 soccer matches is listed below:

(6, 4, 1, 3, 2, 4, 2, 4, 3, 7, 1, 4, 1, 0).

Compute the standard deviation.

A. 5

B. 1

C. 2

D. 1.5

Ans - C

2. In a game show, participants are required to pick balls out of a sack in order to win different prices.

At the start of the show, the winning ball is added to the sack with 49 other balls.

The first participant, gets three tries to pick the winning ball.

The picked ball is not added back.

Calculate the probability that the first participant is able to pick the winning ball in their last attempt.

A. $1/49$

B. $1/50$

C. $1/52$

D. $1/48$

Ans - B

3. A total of 25 patients admitted to a hospital are tested for levels of blood sugar, (mg/dl) and the results obtained were as follows:

87, 71, 83, 67, 85, 77, 69, 76, 65, 85, 85, 54, 70, 68, 80, 73, 78, 68, 85, 73, 81, 78, 81, 77, 75

Find the mean (mg/dl) of the above data.

A. 75.64

B. 86.64

C. 77.64

D. 80.64

Ans - A

4. In an insurance company, three actuarial analysts, X, Y and Z are assigned to price insurance solutions for specific clients in an Excel sheet. X is responsible for 40% of clients, Y for 35% and Z for 25% of the clients.

In performing the required calculations within the Excel Sheet, X, Y and Z make an error with a probability of 4%, 6% and 3% respectively.

Calculate the probability that a randomly selected Excel Sheet for the price contains an error.

A. 0.0445

B. 0.0285

C. 0.0385

D. 0.043

Ans - A

5. Suppose PDF for a continuous random variable is $f(x) = \frac{x}{4}$ for $0 \leq x \leq 4$ and 0 otherwise.

What is the value of the median?

A. -2

B. 3

C. 2

D. 1/2

Ans - C

6. The stem and leaf diagram shows information about the time taken by each student to complete a puzzle.

Key: 2|3 means 23 minutes

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2 | 3 5 6 8 8 8 9
3 | 0 2 3 6 7
4 | 1 4
5 | 8

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If a student took less than 40 minutes, they win a prize.

One of the students is picked at random. Rhea says that the probability that the student won a prize is $\frac{2}{3}$.

Is Rhea correct?

- A. Correct
- B. Not correct

7. The ages in years of a group of 20 individuals are as follows:

50	56	55	49	52	57	56	57	56	59
54	55	61	60	51	59	62	52	54	49

If $\bar{x}$ denotes the mean and s the standard deviation of the sample, find the percentage of items falling within the interval $\bar{x} \pm s$.

- A. 70%
- B. 65%
- C. 60%
- D. 75%

Ans – B

b)

$$\begin{aligned}\bar{x} &= \frac{1104}{20} = 55.2 \\ s^2 &= \frac{\sum x^2 - n\bar{x}^2}{n-1} \\ &= \frac{61,226 - 20(55.2)^2}{19} \\ &= 285.2 \\ s &= 3.874\end{aligned}$$

Interval $\bar{x} \pm s \sim (51.326, 59.074)$

All the items except the following 7 fall within the interval –
49 50 51 49 61 60 62

$$\text{required percentage} = \frac{13}{20} \times 100 = 65\%$$

8. The mean of 5 observations is 15 and the variance is 9. If two more observations having values -3 and 10 are combined with these 5 observations, what will be the new variance of 7 observations?

- A. 50
- B. 52.47
- C. 49.6
- D. 51.5

Ans – D

9. Suppose the PDF for X, a continuous random variable is $f(x) = a(x^2 + x)$ for $0 \leq x \leq 1$ while 0 otherwise. What is the value for $P(X < 0.75)$?

- A. 50.6%
- B. 56.45%
- C. 49.99%
- D. 51%

Ans - A

10. A man wins a rupee for head and loses a rupee for tail when a fair coin is tossed. Suppose that he tosses once and quits if he wins; but tries once more if he losses on the first toss. What are his expected winnings?

- A. $\frac{1}{2}$
- B. $\frac{1}{4}$
- C. 0
- D. 1

Ans – C

11.

If A and B are independent and $P[A] = P[B] = 1/2$, Find $P[A\bar{B} \cup \bar{A}B]$ where $\bar{B}$ denotes complement of B .

- A. $\frac{1}{2}$
- B. 1
- C. 1
- D. $\frac{1}{4}$

Ans – A

12. In probability theory, exhaustive events are best described as events:

- A. with a probability of zero.
- A. that are mutually exclusive.
- A. that include all potential outcomes.
- D. None of the above

Ans : C