Question 1

***1) Business Problem: A retail store wants to analyze the sales data of a particular***

***product category to understand the typical sales performance and make strategic***

***decisions.***

Let's consider the weekly sales data (in units) for the past month for a specific product

category:

Week 1: 50 units

Week 2: 60 units

Week 3: 55 units

Week 4: 70 units

Question:

1. Mean: What is the average weekly sales of the product category?

2. Median: What is the typical or central sales value for the product category?

3. Mode: Are there any recurring or most frequently occurring sales figures for the

product category?

**Ans:**

|  |  |
| --- | --- |
| Mean | 58.75 |
| Median | 57.5 |
| Mode | No |

Question 2 Data:

Let's consider the waiting times (in minutes) for the past 20 customers:

15, 10, 20, 25, 15, 10, 30, 20, 15, 10,

10, 25, 15, 20, 20, 15, 10, 10, 20, 25

Question:

1. Mean: What is the average waiting time for customers at the restaurant?

2. Median: What is the typical or central waiting time experienced by customers?

3. Mode: Are there any recurring or most frequently occurring waiting times for

customers?

**Ans:**

|  |  |
| --- | --- |
| Mean | 17 |
| Median | 15 |
| Mode | 10 |

**3. Business Problem: A car rental company wants to analyze the rental durations of**

**its customers to understand the typical rental period and optimize its pricing and**

**fleet management strategies.**

**Data:**

**Let's consider the rental durations (in days) for a sample of 50 customers:**

**3, 2, 5, 4, 7, 2, 3, 3, 1, 6,**

**4, 2, 3, 5, 2, 4, 2, 1, 3, 5,**

**6, 3, 2, 1, 4, 2, 4, 5, 3, 2,**

**7, 2, 3, 4, 5, 1, 6, 2, 4, 3,**

**5, 3, 2, 4, 2, 6, 3, 2, 4, 5**

**Question:**

**1. Mean: What is the average rental duration for customers at the car rental company?**

**2. Median: What is the typical or central rental duration experienced by customers?**

**3. Mode: Are there any recurring or most frequently occurring rental durations for**

**customers?**

**Ans:**

|  |  |
| --- | --- |
| Mean | 3.44 |
| Median | 3 |
| Mode | 2 |

**Questions on measure of dispersion**

**1) Problem: A manufacturing company wants to analyze the production output of a**

**specific machine to understand the variability or spread in its performance.**

**Data:**

**Let's consider the number of units produced per hour by the machine for a sample of 10**

**working days:**

**Day 1: 120 units**

**Day 2: 110 units**

**Day 3: 130 units**

**Day 4: 115 units**

**Day 5: 125 units**

**Day 6: 105 units**

**Day 7: 135 units**

**Day 8: 115 units**

**Day 9: 125 units**

**Day 10: 140 units**

**Question:**

**1. Range: What is the range of the production output for the machine?**

**2. Variance: What is the variance of the production output for the machine?**

**3. Standard Deviation: What is the standard deviation of the production output for the**

**machine?**

**Ans:**

**Range = 140 - 105 = 35 units**

**Variance = 111.11**

**Standard Deviation = √111.11 = 10.54 units**

**2) Problem: A retail store wants to analyze the sales of a specific product to**

**understand the variability in daily sales and assess its inventory management.**

**Data:**

**Let's consider the daily sales (in dollars) for the past 30 days:**

**$500, $700, $400, $600, $550, $750, $650, $500, $600, $550,**

**$800, $450, $700, $550, $600, $400, $650, $500, $750, $550,**

**$700, $600, $500, $800, $550, $650, $400, $600, $750, $550**

**Questions:**

**1. Range: What is the range of the daily sales?**

**2. Variance: What is the variance of the daily sales?**

**3. Standard Deviation: What is the standard deviation of the daily sales?**

**Ans:**

**Range = $800 - $400 = $400**

**Variance ≈ $31736.21**

**Standard Deviation ≈ √$31736.21 ≈ $178.23**

**3) Problem: An e-commerce platform wants to analyze the delivery times of its**

**shipments to understand the variability in order fulfilment and optimize its**

**logistics operations.**

**Data:**

**Let's consider the delivery times (in days) for a sample of 50 shipments:**

**3, 5, 2, 4, 6, 2, 3, 4, 2, 5,**

**7, 2, 3, 4, 2, 4, 2, 3, 5, 6,**

**3, 2, 1, 4, 2, 4, 5, 3, 2, 7,**

**2, 3, 4, 5, 1, 6, 2, 4, 3, 5,**

**3, 2, 4, 2, 6, 3, 2, 4, 5, 3**

**Questions:**

**1. Range: What is the range of the delivery times?**

**2. Variance: What is the variance of the delivery times?**

**3. Standard Deviation: What is the standard deviation of the delivery times?**

**Ans:**

**Range = 7 - 1 = 6 days**

**Variance ≈ 1.63 days**

**Standard Deviation ≈ √1.63 ≈ 1.28**

**Problem : A company wants to analyze the monthly revenue generated by one of**

**its products to understand its performance and variability.**

**Data:**

**Let's consider the monthly revenue (in thousands of dollars) for the past 12 months:**

**$120, $150, $110, $135, $125, $140, $130, $155, $115, $145, $135, $130**

**Questions:**

**1. Measure of Central Tendency: What is the average monthly revenue for the product?**

**2. Measure of Dispersion: What is the range of monthly revenue for the product?**

**Ans:**

**Measure of Central Tendency = $132.5 140.83**

**Measure of Dispersion = $155 - $110 = $45**

**5) Problem : A survey was conducted to gather feedback from customers regarding**

**their satisfaction with a particular service on a scale of 1 to 10.**

**Data:**

**Let's consider the satisfaction ratings from 50 customers:**

**8, 7, 9, 6, 7, 8, 9, 8, 7, 6,**

**8, 9, 7, 8, 7, 6, 8, 9, 6, 7,**

**8, 9, 7, 6, 7, 8, 9, 8, 7, 6,**

**9, 8, 7, 6, 8, 9, 7, 8, 7, 6,**

**9, 8, 7, 6, 7, 8, 9, 8, 7, 6**

**Questions:**

**1. Measure of Central Tendency: What is the average satisfaction rating?**

**2. Measure of Dispersion: What is the standard deviation of the satisfaction ratings?**

**Ans:**

**Measure of Central Tendency = 7.5**

**Measure of Dispersion =1.34**

**6) Problem :A company wants to analyze the customer wait times at its call center to**

**assess the efficiency of its customer service operations.**

**Data:**

**Let's consider the wait times (in minutes) for a sample of 100 randomly selected**

**customer calls:**

**10, 15, 12, 18, 20, 25, 8, 14, 16, 22,**

**9, 17, 11, 13, 19, 23, 21, 16, 24, 27,**

**13, 10, 18, 16, 12, 14, 19, 21, 11, 17,**

**15, 20, 26, 13, 12, 14, 22, 19, 16, 11,**

**25, 18, 16, 13, 21, 20, 15, 12, 19, 17,**

**14, 16, 23, 18, 15, 11, 19, 22, 17, 12,**

**16, 14, 18, 20, 25, 13, 11, 22, 19, 17,**

**15, 16, 13, 14, 18, 20, 19, 21, 17, 12,**

**15, 13, 16, 14, 22, 21, 19, 18, 16, 11,**

**17, 14, 12, 20, 23, 19, 15, 16, 13, 18**

**Questions:**

**1. Measure of Central Tendency: What is the average wait time for customers at the call**

**center?**

**2. Measure of Dispersion: What is the range of wait times for customers at the call**

**center?**

**3. Measure of Dispersion: What is the standard deviation of the wait times for customers**

**at the call center?**

**Ans:**

**Measure of Central Tendency= 16.74 minutes.**

**Measure of Dispersion= 19 minutes**

**Measure of Dispersion = 4.89**

**7) Problem : A transportation company wants to analyze the fuel efficiency of its**

**vehicle fleet to identify any variations across different vehicle models.**

**Data:**

**Let's consider the fuel efficiency (in miles per gallon, mpg) for a sample of 50 vehicles:**

**Model A: 30, 32, 33, 28, 31, 30, 29, 30, 32, 31,**

**Model B: 25, 27, 26, 23, 28, 24, 26, 25, 27, 28,**

**Model C: 22, 23, 20, 25, 21, 24, 23, 22, 25, 24,**

**Model D: 18, 17, 19, 20, 21, 18, 19, 17, 20, 19,**

**Model E: 35, 36, 34, 35, 33, 34, 32, 33, 36, 34**

**Questions:**

**1. Measure of Central Tendency: What is the average fuel efficiency for each vehicle**

**model?**

**2. Measure of Dispersion: What is the range of fuel efficiency for each vehicle model?**

**3. Measure of Dispersion: What is the variance of the fuel efficiency for each vehicle**

**model?**

**Ans:**

1. **Model A: = 30.6 mpg**

**Model B: = 25.9 mpg**

**Model C: = 23.7 mpg**

**Model D: = 18.8 mpg**

**Model E: = 34.2 mpg**

1. **Model A: = 5 mpg**

**Model B: = 5 mpg**

**Model C: = 5 mpg**

**Model D: = 4 mpg**

**Model E: = 4 mpg**

1. **Model A ≈ 3.33**

**Model B ≈ 3.11**

**Model C ≈ 5.43**

**Model D ≈ 2.67**

**Model E ≈ 1.73**

**More Statistics Questions**

**8) Problem : A company wants to analyze the ages of its employees to understand**

**the age distribution and demographics within the organization.**

**Data:**

**Let's consider the ages of 100 employees:**

**28, 32, 35, 40, 42, 28, 33, 38, 30, 41,**

**37, 31, 34, 29, 36, 43, 39, 27, 35, 31,**

**39, 45, 29, 33, 37, 40, 36, 29, 31, 38,**

**35, 44, 32, 39, 36, 30, 33, 28, 41, 35,**

**31, 37, 42, 29, 34, 40, 31, 33, 38, 36,**

**39, 27, 35, 30, 43, 29, 32, 36, 31, 40,**

**38, 44, 37, 33, 35, 41, 30, 31, 39, 28,**

**45, 29, 33, 38, 34, 32, 35, 31, 40, 36,**

**39, 27, 35, 30, 43, 29, 32, 36, 31, 40,**

**38, 44, 37, 33, 35, 41, 30, 31, 39, 28**

**Questions:**

**1. Frequency Distribution: Create a frequency distribution table for the ages of the**

**employees.**

**2. Mode: What is the mode (most common age) among the employees?**

**3. Median: What is the median age of the employees?**

**4. Range: What is the range of ages among the employees?**

**Ans:**

**Step 1:**

**Create a frequency distribution table for the ages of the employees. A frequency distribution lists the ages along with the frequency of each age in the data.**

**Here's the frequency distribution table for the ages of the 100 employees:**

|  |  |
| --- | --- |
| **Age** | **Frequency** |
| **27** | **3** |
| **28** | **5** |
| **29** | **7** |
| **30** | **6** |
| **31** | **10** |
| **32** | **5** |
| **33** | **7** |
| **34** | **3** |
| **35** | **9** |
| **36** | **7** |
| **37** | **5** |
| **38** | **6** |
| **39** | **7** |
| **40** | **6** |
| **41** | **4** |
| **42** | **2** |
| **43** | **3** |
| **44** | **3** |
| **45** | **2** |

**Step 2: Mode = 31**

**Step 3: Median Age = 33**

**Step 4: Range = 45 - 27 = 18**

**9) Problem :A retail store wants to analyze the purchase amounts made by**

**customers to understand their spending habits.**

**Data:**

**Let's consider the purchase amounts (in dollars) for a sample of 50 customers:**

**56, 40, 28, 73, 52, 61, 35, 40, 47, 65,**

**52, 44, 38, 60, 56, 40, 36, 49, 68, 57,**

**52, 63, 41, 48, 55, 42, 39, 58, 62, 49,**

**59, 45, 47, 51, 65, 41, 48, 55, 42, 39,**

**58, 62, 49, 59, 45, 47, 51, 65, 43, 58**

**Questions:**

**1. Frequency Distribution: Create a frequency distribution table for the purchase**

**amounts.**

**2. Mode: What is the mode (most common purchase amount) among the customers?**

**3. Median: What is the median purchase amount among the customers?**

**4. Interquartile Range: What is the interquartile range of the purchase amounts?**

**Step 1: Frequency Distribution**

|  |  |
| --- | --- |
| **Purchase Amount ($)** | **Frequency** |
| **28** | **1** |
| **35** | **1** |
| **36** | **1** |
| **38** | **1** |
| **39** | **2** |
| **40** | **3** |
| **41** | **2** |
| **42** | **2** |
| **43** | **1** |
| **44** | **1** |
| **45** | **2** |
| **47** | **3** |
| **48** | **2** |
| **49** | **3** |
| **51** | **2** |
| **52** | **3** |
| **55** | **2** |
| **56** | **2** |
| **57** | **1** |
| **58** | **3** |
| **59** | **2** |
| **60** | **1** |
| **61** | **1** |
| **62** | **2** |
| **63** | **1** |
| **65** | **3** |
| **68** | **1** |
| **73** | **1** |

**Step 2: Mode 40,47,49,52,58,65 dollars**

**Step 3: Median Purchase Amount = 47 dollars**

**Step 4: IQR = 19 dollars**