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1. When collecting data, why is it sometimes better to conduct a sample survey than a census? 3
2. Define the following variable types: a) The indoor temperature b) The color of baseball cap worn by students c) weight d) satisfaction of a customer 4
3. What is the difference between a population and a sample in statistics? A school takes a poll to find out what students want to eat at lunch. 70 students are randomly chosen to answer the poll questions. What are the population, the sample and the variable of this study? 5
4. What is the relation between Arithmetic, Geometric and Harmonic Mean? Calculate Arithmetic, Geometric and Harmonic Mean of the following data: 5

Height (in)	Class Mark (X)	Frequency (f)
60-62	61	5
63-65	64	18
66-68	67	42
69-71	70	27
72-74	73	8

5. If you are given ordinal, ratio and nominal data then which types of central tendency do you choose for these data? Explain. 4

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B

1. Why do we study Dispersion? What is the problem of Range? 4
2. Find the sample variance, sample standard deviation and coefficient of variation for the following data: 5

Size of orders X	20<30	31<40	41<50	51<60	61<70
No. of orders f	3	8	12	6	1

3. Does correlation and dependency mean the same thing? In simple words if two events have correlation of zero, does this convey they are not dependent and vice-versa? 3
4. Can single outlier decrease or increase the correlation with a big magnitude? Is Pearson coefficient very sensitive to outliers? 4
5. What's the difference between correlation and simple linear regression? 4

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1. Among two approaches for curve fitting which data type are suitable for them? Explain with example. 3
2. Fit a least square line for the following data. 5

X	1	2	3	4	5
Y	2	5	3	8	7

3. A die is rolled and a coin is tossed. What is the sample space of the problem? Find the probability that the die shows an odd number and the coin shows a head. 4
4. Among following events find out dependent and independent events? 3
   vii) ~~Robbing a bank and going to jail – Dependent~~
   viii) Owning a dog and growing your own herb garden.
   ix) Winning the lottery and running out of milk.
5. You toss a fair coin three times: 1+2+2
   a. What is the probability of three heads, HHH?
   b. What is the probability that you observe exactly one heads?
   c. Given that you have observed at least one heads, what is the probability that you observe at least two heads?

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B

1. Let X be a random variable with PDF given by

$$f(x) = \begin{cases} cx^2 & |x| \leq 1 \\ 0 & otherwise \end{cases}$$

5

a) Find the constant c.

b) Find P(X≥12).

2. A biased die with six faces is rolled. The discrete random variable X represents the score on the uppermost face. The probability distribution of X is shown in the table below:

x	1	2	3	4	5	6
P(X = x)	a	a	a	b	b	0.3

5

Given that E(X) = 4.2, find the value of a and b.

3. When does binomial distribution become impractical? Let's say that 80% of all business startups in the IT industry report that they generate a profit in their first year. If a sample of 10 new IT business startups is selected, find the probability that exactly seven will generate a profit in their first year. 4

4. Why queuing theory is important for computer science? Explain with some example. 3

5. For Supermarket express lanes which queue configuration do you prefer? Explain with its benefit. 3