**Q No.1: Choose the best suitable answer.**

**Answer:**

1. B
2. B
3. C
4. A
5. C

**Q No.2**

**Answer:**

A sample of size **n** is defined to be a stratified a random sample if it is selected form of population which has been divided into a number of non overlapping groups or subpopulations called strata, such that the part of the sample is drawn at random from each stratum.

The process of performing stratified sampling is as follows:

Step 1:

Divide the population into smaller subgroups.

Step 2:

Take a random sample from each stratrum in a number that is proportion to the size of stratum.

Step 3:

Pool the subsets of strata together to form a random sample.

Step 4:

Conduct your analysis.

**Q NO.3: (Part-A)**

**SOLUTION:**

μ = 200g

z = -1.5

x =190g

σ =?

z = x-μ

σ

σz = x-μ

σ = x-μ

z

= 190-200

-1.5

= -10

-1.5

**σ = 6.67g**

**Q No.3 (b)**

**SOLUTION:**

μ = 2550

σ= 350

x=?

P(X>x) = 0.80

z= x-μ so the x= μ+σz

σ

first determine z

P(Z>z) = 0.80 implies that the area below z is 0.20

P(-z≤ Z≤0) = 0.20

P(-z≤Z≤0) =P(0≤ Z≤z) =0.20

From area table

0.20 corresponds to the z= -0.55

So;

x=μ+σz

=2550+350(-0.55)

=2550-192.5

=2357.5

**P(x<2357.5) = 0.80**

**Q No.3 (c)**

**Answer:** The normal distributions are a very important *class* of statistical distributions. All normal distributions are symmetric and have bell-shaped density curves with a single peak.

To speak specifically of any normal distribution, two quantities have to be specified: the mean **μ** , where the peak of the density occurs, and the standard deviation **σ** , which indicates the spread or girth of the bell curve. Normal distributions are symmetrical, but not all symmetrical distributions are normal.

**Q4:**

**ANSWER:**

Cluster sampling is area sampling or geographical cluster sampling. Each cluster is a geographical area. Because a geographically dispersed population can be expensive to survey, greater economy than simple random sampling can be achieved by grouping several respondents within a local area into a cluster.

Quota sampling means to take a very tailored sample that's in proportion to some characteristic or trait of a population. For example, you could divide a population by the state they live in, income or education level etc.

**Q5:**

**SOLUTION:**

μ = 240sec

σ = 40sec

1. P(x<180sec)= P(z<180-240 )

40

=P(z<-1.5)

=0.5-p(-1.5<z<0)

=0.5-0.4332

=**0.0668 ANS**

1. P(110sec<x<200sec) =P(110-240 <z<200-240 )

40 40

=P(-3.25 < z< -1.0 )

=P(-3.25 < x< 0) – P(-1.0 < z < 0)

=0.4994 – 0.3413

=**0.1581 ANS**

Hence, the probability that a call will last less than 180 sec = 0.0668

The probability that call will lasted between 110 and 200 sec = 0.1581.

**Q6:** Past record for the mean lowest temperatures and their respective standard deviations during the month of January in 3 cities are given as:

|  |  |  |  |
| --- | --- | --- | --- |
| **City** | A | B | C |
| **Mean temp.** | 4°C | 7.5°C | 3.8°C |
| **Std.deviation** | 1.5 | 2 | 0.75 |

Compute the z scores for the 3 cities if average temperatures this year are found to be 6°C for city A ,7°C for city B and 3.5°C for city C.

* Analyze that which city has experienced the coldest temperature this year.
* Rank them in an order from lowest temperature to the highest temperature.

**SOLUTION:**

|  |  |  |  |
| --- | --- | --- | --- |
| CITY | X | (x-μ) | (x-μ)2 |
| A | 6°C | 6-5.5=0.5 | 0.25 |
| B | 7°C | 7-5.5=1.5 | 2.25 |
| C | 3.5°C | 3.5-5.5=-2 | 4 |
| Σ | 16.5°C |  | 6.5 |

μ = ΣX

N

= 16.5

3

= 5.5

σ = √Σ(x-μ)

N

= √6.5

3

= √2.166

= 1.47

**z Score For city A**

z= x-μ

σ

=6 - 5.5

1.47

**= 0.340°C**

**For city B**

z = 7- 5.5

1.47

**= 1.020°C**

**For city C**

z = 3.5 – 5.5

1.47

**= -1.360°C**

**PART-l**

City C has the coldest temperatures this year

**PART-ll**

**RANKING**

|  |  |
| --- | --- |
| **C** | **-1.360**°C |
| **A** | **0.340**°C |
| **B** | **1.020**°C |

**Q7:** How the field of ***“statistics”*** is helpful in the business world?

**Answer:** Business Statistics helps a business to: Deal with uncertainties by forecasting seasonal, cyclic and general economic fluctuations. Helps in Sound Decision making by providing accurate estimates about costs, demand, prices, sales etc.