**MAKERERE UNIVERSITY**

**COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES**

**SCHOOL OF BUSINESS**

**MASTER OF BUSINESS ADMINISTRATION**

**COURSE CODE: MBS 7103**

**COURSE NAME: QUANTITATIVE METHODS**

**COURSEWORK ASSIGNMENT**

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**2022/HD06/5380U**

Question 1

The normal distribution for daily output of workers in a factory has a mean of 50 and Standard Deviation of 10. Within what range from 50 upwards would 47.5% of the frequencies fall? Illustrate graphically

Z = $\frac{|x-μ|}{δ}$

SD or $δ$ =10

Mean or $μ$ = 50

Z value for 47.5% or 0.4750 from the normal distribution tables is 1.96

$x$ = Z\*$ δ$ + $μ$

 = (1.96 \* 10) + 50

 = 69.6

47.5% of the frequencies fall in the range of 50 - 69.6

Question 2

the normal frequency distribution is normal with the mean of 100 and a standard deviation of 10. What proportion of the total frequencies will be;

1. Above 80;
2. Above 90;
3. In the range of 80-110
4. In the range of 90-95

Illustrate graphically

SD or $δ$ =10

Mean or $μ$ = 100

1. Above 80;

Finding the z value

Z = $\frac{|x-μ|}{δ}$

At X= 80

 = |80-100|/10

 = 2

From the normal distribution tables at z= 2, probability value is 0.4772

Therefore, probability of proportion of the frequencies above 80 is;

0.5+0.4772 =0.9772

= 97.72%

1. Above 90;

At X= 90

 = |90-100|/10

 = 1

From the normal distribution tables at z= 1, probability value is 0.3413

Therefore, probability of proportion of the frequencies above 90 is;

0.5+ 0.3413= 0.8413

= 84.13%

1. In the range of 80-110

At X= 80

= |80-100|/10

 = 2

From the normal distribution tables at z= 2, probability value is 0.4772

At X= 110

= |110-100|/10

 = 1

From the normal distribution tables at z= 1, probability value is 0.3413

Therefore, probability of proportion of the frequencies in the range of 80-110 is;

= 0.4772 + 0.3413

= 0.8185

= 81.85%

1. In the range of 90-95

At X= 90

 = |90-100|/10

 = 1

From the normal distribution tables at z= 1, probability value is 0.3413

At X= 95

= |95-100|/10

= 0.5

From the normal distribution tables at z= 0.5, probability value is 0.1915

Therefore, probability of proportion of the frequencies in the range of 90-95 is;

= 0.3413 - 0.1915

= 0.1498

= 14.98%

Question 3

The probability that the company secretary will make a mistake filing in a company’s house form is 0.3. required; calculate the probability that fewer than 570 forms out of 2000 will be in error

Let the probability of making a mistake be p = 0.3

 probability of not making a mistake be q = 0.7

n = 2000

mean = n\*p

 = 2000 \* 0.3

 = 600

Standard deviation = √(n\*p\*q)

 = √(2000\* 0.3 \*0.7)

 = 20.5

Z = $\frac{|x-μ|}{δ}$

since it is binomial in normal distribution, let 570 be 569.5

Z = |569.5-600|/20.5

 = 1.49

From the normal distribution tables at Z = 1.49, probability value is 0.4319

Therefore, probability of that fewer than 570 will be in error is;

= 0.5 - 0.4319

= 0.0681

Question 4

In a random sample of 500, out of 100,000 employees, 320 were members of the trade union. Estimated the proportion of trade union members in the entire organization at a 95% confidence level.

Proportion of trade union members in the entire population = proportion of trade union members in the sample ± (approximate error in the sample \* Z value for the confidence level)

Approximate error in the sample = √ $(^{pq}/\_{n})$

n in the sample = 500

Probability of trade union members in the sample (p) = 320/500

= 0.64

Probability of non-trade union members in the sample (q) = 1- 0.64

= 0.36

Error = √ $(^{0.64\*0.36}/\_{500})$

= 0.0215

At 95% = 0.95 the z value is

0.95 – 0.5 = 0.45

Z value is 1.65

Proportion of trade union members in the entire population = 0.64 ± (0.0215 \* 1.65)

= 0.64 ± 0.0355

|  |  |
| --- | --- |
| Probability members in the trade union in the entire organisation | Number of members in the trade union in the entire organisation |
| = 0.64 + 0.0355= 0.6755 | 67550 |
| = 0.64 - 0.0355= 0.6045 | 60450 |