Department of Statistics and Operations Research

College of Science

King Saud University

STAT 145

H. W. 6

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Student Name	
Student Number	
Section	
Attendance_Number	

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Question No. 1

In a sample of 20 patients with a certain illness, the mean temperature (in C°) was 37.Assume that the population is normally distributed with variance 0.24 . Find a 95% confidence interval for the average temperature.

1-The value of α is
(a) 0.05 (b)0.025 (c) 0.95 (d)0.50 (e)none of these

2-The correct formula is
(a) $\bar{x} \pm z_{1-\frac{\alpha}{2}} \sigma^2 / \sqrt{n}$ (b) $\bar{x} \pm z_{1-\frac{\alpha}{2}} \sigma \sqrt{n}$ (c) $\bar{x} \pm z_{1-\frac{\alpha}{2}} s / \sqrt{n}$
(d) $\bar{x} \pm z_{1-\frac{\alpha}{2}} \sigma / \sqrt{n}$ (e)none of these

3-The confidence interval is
(a) (34.896,39.104) (b) (36.820,37.180) (c) (32.706,39.191)
(d) (36.785,37.215) (e) none of these

Question No. 2

The height of a random sample of 50 patient visit a hospital in a month showed a mean of 174.5 cm and standard deviation of 6.9 cm ,then

4- The point estimate of μ is
(a) 174.5 (b) 173.5 (c) 6.9 (d) 0.69 (e) 69

5- The correct formula is
(a) $\bar{x} \pm t_{n-1,1-\frac{\alpha}{2}} \sigma / \sqrt{n}$ (b) $\bar{x} \pm Z_{1-\frac{\alpha}{2}} \sigma / \sqrt{n}$ (c) $\bar{x} \pm t_{n-1,1-\frac{\alpha}{2}} s / \sqrt{n}$ (d) 0.69
(e) $\bar{x} \pm Z_{1-\frac{\alpha}{2}} s / \sqrt{n}$

6- The 98% confident interval for the mean height of patients μ equals to
(a) (171.23,176.77) (b) (172.23,176.77) (c) (72.23 , 76.77)
(d) (172.023,176.077) (e) (170.23,175.67)

Question No. 3

Suppose that random samples of college freshmen are selected from two schools: 31 students from school A and 36 students from school B. The sample from school A has an average test score of 80 point while the sample from school B has an average test score of 75 point. Assuming that test scores in school A and B came from normal distribution with standard deviations σ_1=5 and σ_2=3, respectively.

7-The point estimate of the difference between test scores ($\mu_A - \mu_B$) equals to:

(A)	6 points	(B)	5 points
(C)	10 points	(D)	20 point

8- If we want to be 95% confident that the sample mean of school B will be within one (1) point of the true mean μ_B, the sample size of the second population equals to:

(A)	35	(B)	6
(C)	85	(D)	138

9- The upper bound of the 99% confidence interval for the difference $\mu_A - \mu_B$ equals to:

(A)	5.02	(B)	2.35
(C)	7.65	(D)	2.99

10-If the value of α decrease (get smaller), then the interval estimate will:

(A)	Increase	(B)	Decrease
(C)	Still constant	(D)	Decrease and then increase

Question No. 4

A quality control engineer is interested in the proportion of defective items in the population of certain type of car tires produced by his manufactory. In a random sample of 1000 items 100 are found to be defective.

11-The point estimate for the true proportion of defective car tires is equals to:

(A)	0. 10	(B)	0.25
(C)	0.33	(D)	0.05

12 -The upper bound of the 95% confidence interval estimate for the true proportion equals to:

(A)	0.119	(B)	0.135
(C)	0.081	(D)	0.120

13-The length of the 95% confidence interval estimate for the true proportion equals to:

(A)	0.119	(B)	0.135
(C)	0.081	(D)	0.038

Question No. 5

The average life of an industrial machine is 6 years, with a standard deviation of 1 year. If a random sample of 4 of such machines is selected and assumes that the life of such machines follows approximately a normal distribution, then:

14-The expected value of the samples mean ($\overline{X}$) equals to:

(A)	5	(B)	6
(C)	7	(D)	8

15- The variance of the samples mean ($\overline{X}$) equals to:

(A)	1	(B)	0.5
(C)	0.25	(D)	0.75

16- $P(\overline{X} < 5.5)$ equals to:

(A)	0.1587	(B)	0.8413
(C)	0.4602	(D)	0.5398

17-If $P(\ \overline{X} > a\ ) =\ 0.1492$, then the numerical value of a equals to:

(A)	0.8508	(B)	1.04
(C)	0.2	(D)	6.52

Question No. 5

A random sample of size 25 is taken from a normal population having a mean of 80 and a standard deviation of 5. A second independent random sample of size 36 is taken from a different normal population having a mean of 75 and a standard deviation of 3, then,

18- $P(\overline{X}_1 - \overline{X}_2 < 2)$ equals to:

(A)	0.8508	(B)	0.2154
(C)	0.0037	(D)	0.2

19- $P(1.5 < \overline{X}_1 - \overline{X}_2 < 2)$ equals to:

(A)	0.9972	(B)	0.0028
(C)	0.3451	(D)	0.1254