**جامعة الملك سعود الاختبار النهائي**

 **كلية العلوم الفصل الثاني 1429 / 1430**

**قسم الإحصاء وبحوث العمليات مقرر 324 احص**

 **السبت 4/ 7 / 1430 هـ الوقت 8 – 11**

**اسم الطالبة :------------------------------------------------------------------------------------------**

**رقم الطالبة :------------------------------------------------------------------------------------------**

**رقم الشعبة : ----------------------------- رقم التسلسل ----------------------------------------------**

**أستاذة المقرر: ----------------------------------------------------------------------------------------**

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| ***Question*** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| ***Answer*** |  |  |  |  |  |  |  |  |  |  |

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| ***Question*** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| ***Answer*** |  |  |  |  |  |  |  |  |  |  |

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| ***Question*** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| ***Answer*** |  |  |  |  |  |  |  |  |  |  |

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| ***Question*** |  **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** |
| ***Answer*** |  |  |  |  |  |  |  |  |  |  |

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| ***Question*** | **41** | **42** | **43** | **44** | **45** | **46** | **47** | **48** | **49** | **50** |
| ***Answer*** |  |  |  |  |  |  |  |  |  |  |

***Best Wishes***

**Answer the following questions:**

For the following probability density function for random variable X



Then,

1-P(Y>2.5) =

(a) 0.91 (b) 0.5 (c) 0.09 (d) 0.0625 (e) none of these

2-P(Y1.5) =

(a) 1.5 (b) 0.83 (c) 0.278 (d) 0.5 (e) none of these

3-The expected value of Y , E(y) =

(a) 1 (b) 0.417 (c) 2.667 (d) 1.5 (e) none of these

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In a large population of students,16% of them are left-handed. If we randomly choose 10 student and let X = number of these student who are left-handed, then

4- The probability that there are exactly 3 students who are left-handed is

(a) 0.142 (b) 0.00019 (c) 0.000078 (d) 0.145 (e) none of these

5- The probability that there are at least two students who are left-handed is

(a) 0.508 (b) 0.2063 (c) 0.4919 (d) 0.2855 (e) none of these

6- The mean of left-handed students is

(a) 1.6 (b) 84 (c) 1.34 (d) 1.16 (e) none of these

7- The standard deviation of left-handed students is

(a) 1.6 (b) 84 (c) 1.34 (d) 1.16 (e) none of these

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| z | 0 | 1 | 2 | 3 | 4 |
| f(z) | 0.1 | 0.2 | 0.3 | 0.25 | 0.15 |

If Z is the number of times a child eat candy on a certain day which has the following probability distribution

8-P(Z 3) =

(a) 0.15 (b) 0.25 (c) 0.6

(d) 0.85 (e) none of these

9- P( 1< Z  3) =

(a) 0.25 (b) 0.75 (c) 0.55 (d) 0.5 (e) none of these

10- F (2.5) =

(a) 0 (b) 0.3 (c) 0.6 (d) 1 (e) none of these

11- E( Z + 1)2 =

(a) 9.2 (b) 3.15 (c) 9.92 (d) 11.35 (e) none of these

12- Var(2Z) =

(a) 2.86 (b) 5.71 (c) 15.6 (d) 1.43 (e) none of these

A family has two children, if the probability that the family have a boy is twice as likely to have a girl , then

13- The probability that the family have two boys is

(a) 0.4444 (b) 0.25 (c) 0.3333 (d) 0.1111 (e) none of these

14- The probability that the family have at most one girl is

(a) 0.75 (b) 0.5 (c) 0.8889 (d) 0.4444 (e) none of these

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If A, B are two events in S ,such that P() =0.6,P(∩B)=0.3,P(B/A)=0.25.Then

15-P(/A) =

(a) 0.75 (b) 0.7 (c) 0.65 (d) 0.10 (e) none of these

16-P(U ) =

(a) 0.5 (b) 0.3 (c) 0.9 (d) 0.36 (e) none of these

17- The two events A , B are

(a) independent (b) equally likely (c) disjoint (d) none of these

For the probability mass function

f(x) = 

18-The value of constant K is

(a) 5/6 (b) 1/2 (c) 1/3 (d) 5 (e) none of these

A nurse divide 25 patients according to there blood type and found that 6 has blood type A,8 has blood type B, 4 has blood type AB and the rest has blood type O . A random sample of size 4 was taken , then

19- The probability that the sample contains two of blood type B , one of blood type AB and one of blood type O is

(a) 0.106 (b) 0.06198 (c) 0.0332 (d) 12650 (e) none of these

20- The probability that the sample contain patients with different blood type is

(العينة تحوي مرضي بأنواع دم مختلفة)

(a) 0.106 (b) 0.06198 (c) 0.0332 (d) 12650 (e) none of these

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In a population of people , if X = the body mass index(in kg/m2) is normally distributed with μ = 25 and σ = 2.7. For a random sample of size 16 find

21- P( X< 19)

(a) 0.0132 (b) 0.1587 (c) 0.9868 (d) 0.2643 (e) none of these

22- P( 16 X24) =

(a) 0.9985 (b) 0.0099 (c) 0.1814 (d) 0.3553 (e) none of these

23- P( X = 30) =

(a) 0 (b) 0.9678 (c) 0.0322 (d) 0.8665 (e) none of these

24-P( X > a )=0.0901 , then a=

(a) -1.34 (b) 9.169 (c) 25.243 (d) 28.618 (e) none of these

25- P(<27) =

(a) 0.8665 (b) 0.9985 (c) 0.7704 (d) 0.0015 (e) none of these

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\*\*Suppose we have the following data 37,42,28,28,61,31,23,50,34,32. Then

26- The sample mean is

(a) 36.59 (b) 132.933 (c) 33.716 (d) 26.667 (e) none of these

27- The sample variance is

(a) 36.59 (b) 132.933 (c) 33.716 (d) 26.667 (e) none of these

28- The standard deviation is

(a) 3.59 (b) 11.53 (c) 3.716 (d) 6.667 (e) none of these

29- The sample median is

(a) 5.5 (b) 46 (c) 28 (d) 33 (e) none of these

30- The sample mode is

(a)37, 28 (b) no mode (c) 28 (d) 3 (e) none of these

31- The range is

(a) 5 (b) 38 (c) 24 (d) 29 (e) none of these

A sample of size 14 from health adult males is drawn to measured their body mass index (BMI) kg/$m^{2}$, with sample mean 30.5 and standard deviation 10.639. Assuming that the population is normally distributed, test whether the mean of (BMI) of the population is greater than 35. (Use α=0.01). Then

 32- The hypothesis is

(a)$H\_{0}:µ=35 H\_{1}:µ>$35 (b) $H\_{0}:µ=30.5 H\_{1}:µ>30.$5

(c)$H\_{0}:µ=35 H\_{1}:µ \ne $30.5 (d) none of these

 33- The test statistic is

(a)  (b)  (c)  (d) none of these

34- Is the test

(a) One side (b) two side (c) can't determine

35- The numerical value for the test statistic is

(a) 3.09 (b) 1.58 (c) -1.58 (d) -4.58 (e) none of these

36- The decision is

(a) We cannot reject  since μ < 35 (b) we accept  (c) we reject

A physical therapist wished to estimate, with 99% confidence the mean maximal strength of a particular muscle in a certain group of individuals. A sample of 50 subjects who participated in the experiment yielded a mean of 81.53 where population variance is 13.55. Then

37- The confidence interval is

(a) (80.19, 82.873) (b) (70.187, 72 .873) (c) (-60.17, 62.873)

(d) (-70.187, 72 .873) (e) none of these

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The heights of a random sample from the university students showed that the mean is 174.5 Cm , if we want to be 95% confidence that the error in estimating the population mean is within 1 Cm where the population standard deviation is 6.9 Cm. Then

38- The sample size is

 (a) 182.89 (b) 183 (c) 14 (d) 128 (e) none of these

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

39- P$\left(\overbar{X}\_{1}-\overbar{X}\_{2}>2\right)=$

(a) 0.0037 (b) 0.9963 (c) 0.9926 (d) 0.667 (e) none of these

Let T has t-distribution, then

40- P($T\_{(7)}$<2.3646) =

(a) 0.99 (b) 0.975 (c) 0.90 (d) 0.95 (e) none of these

41-The value of t which satisfies P($T\_{(20)}$<t)=0.05

(a) -1.7247 (b) 1.7247 (c) 1.729 (d) -1.729 (e) none of these

42- t-distribution depend on

(a) n, p (b) the degree of freedom (n-1) (c) p (d) µ,σ (e) none of these

43-The power of the test is

(a) Type I error, α (b) type II error, β (c)1- β (d) p (e) none of these

The following data represents the running times of films produced by two motion picture companies, assume equal variances ,find

|  |  |
| --- | --- |
| Company 1 | Company 2 |
| $n\_{1}^{}=$16 | $n\_{2}^{}=$16 |
| $\overbar{X\_{1}}=184.5$2 | =180.125 |
| $S\_{1}^{2}=$24.91 | $S\_{2}^{2}=$22.56 |

44- The 95% confidence interval for $\left(µ\_{1}-µ\_{2}\right)$ is

(a) (0.8772,7.9128) (b) (-13.034, 21 .284) (c) (2.353, 6.437)

(d) (-12.187, 20.873) (e) none of these

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A certain college claimed that 25% of the students or less drink milk in the morning, with α=0.05. If a random sample of 90 college students is drawn and found that 28 of them drink milk in the morning. Then

45- The hypothesis is

(a)$H\_{0}:p=0.25 H\_{1}:p>0.25 $ (b) $H\_{0}:p=0.25 H\_{1}:p<0.2$5

(c)$H\_{0}:µ=0.25 H\_{1}:µ \ne $0.25 (d) none of these

46- The numerical value for the test statistic is

(a) 3.09 (b) 1.339 (c) -1.58 (d) 1.315 (e) none of these

47- The decision is

(a) We reject  since P < 0.25 (b) we accept  (c) we reject

In the section of studying physics with labs, 11 students made an average grade of 85 with standard deviation 4.7, and in the section without labs 17 students made an average grade of 79 with standard deviation 6.1. Assuming that the populations to be approximately normally distributed with equal variances and the level of significance is α=0.01. To test the hypothesis that the laboratory course increases the average grade by as much as 8 points, then

48- The hypothesis is

(a) $H\_{0}:µ\_{1}-µ\_{2}=8 H\_{1}:µ\_{1}-µ\_{2}>$8 (b) $H\_{0}:µ\_{1}-µ\_{2}=8 H\_{1}:µ\_{1}-µ\_{2}$<8

(c) $H\_{0}:µ\_{1}-µ\_{2}=8 H\_{1}:µ\_{1}-µ\_{2}$≠8 (d) none of these

 49- The test statistic is

a)$ t=\frac{\overbar{(X}\_{1}-\overbar{X}\_{2})-d}{S\_{p}\sqrt{\frac{1}{n\_{1}}+\frac{1}{n\_{2}}}}$ b) $Z=\frac{\overbar{(X}\_{1}-\overbar{X}\_{2})-d}{\sqrt{\frac{S^{2}}{n\_{1}}+\frac{S^{2}}{n\_{2}}}}$ c)$ t=\frac{\overbar{X}\_{1}-\overbar{X}\_{2}}{S\_{p}\sqrt{\frac{1}{n\_{1}}+\frac{1}{n\_{2}}}}$ d) none of these

50- The decision is

(a) We reject  since Z < 1.645 (b) we accept 

(c) we reject

**End of the questions**