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STAT 324
Supplementary Examination
Second Semester
1427 – 1428

			أسم الطالب
	رقم الشعبة		رقم الطالب
	الرقم المتسلسل		أسم المدرس

- Mobile Telephones are not allowed in the classrooms.
- Time allowed is 2 hours.
- Answer all questions.
- Choose the nearest number to your answer.
- WARNING: Do not copy answers from your neighbors. They have different questions forms.
- For each question, put the code of the correct answer in the following table beneath the question number:

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

21	22	23	24	25	26	27	28	29	30

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Let the random variable X have a discrete uniform with parameter k=3 and with values 0, 1, and 2.

(1)	The mean of X is							
	(A)	1.0	(B)	2.0	(C)	1.5	(D)	0.0
(2)	The variance of X is							
	(A)	0.0	(B)	1.0	(C)	0.67	(D)	1.33

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Suppose that the percentage of females in a certain population is 50%. A sample of 3 people is selected randomly from this population.

(3)	The probability that no females are selected is							
	(A)	0.000	(B)	0.500	(C)	0.375	(D)	0.125
(4)	The expected number of females in the sample is							
	(A)	3.0	(B)	1.5	(C)	0.0	(D)	0.50
(5)	The variance of the number of females in the sample is							
	(A)	3.75	(B)	2.75	(C)	1.75	(D)	0.75

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Suppose that a family has 5 children, 3 of them are girls and the rest are boys. A sample of 2 children is selected randomly and without replacement.

(6)	The probability that no girls are selected is							
	(A)	0.0	(B)	0.3	(C)	0.6	(D)	0.1
(7)	The expected number of girls in the sample is							
	(A)	2.2	(B)	1.2	(C)	0.2	(D)	3.2
(8)	The variance of the number of girls in the sample is							
	(A)	36.0	(B)	3.6	(C)	0.36	(D)	0.63

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Suppose that the number of telephone calls received per day has a Poisson distribution with mean of 4 calls per day.

(9)	The probability that 2 calls will be received in a given day is							
	(A)	0.546525	(B)	0.646525	(C)	0.146525	(D)	0.746525
(10)	The expected number of telephone calls received in a given week is							
	(A)	4	(B)	7	(C)	28	(D)	14
(11)	The probability that at least 2 calls will be received in a period of 12 hours is							
	(A)	0.59399	(B)	0.19399	(C)	0.09399	(D)	0.29399

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Given a standard normal distribution. The area under the curve which lies:

(12)	to the left of $Z = 1.39$ (Hint: $Z \leq 1.39$) is							
	(A)	0.7268	(B)	0.9177	(C)	0.2732	(D)	0.0832
(13)	between $Z = -2.16$ and $Z = 0.65$ is							
	(A)	0.9177	(B)	0.2732	(C)	0.0294	(D)	0.7268

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The weight of a large number of fat persons is nicely modeled with a normal distribution with mean of 128 kg and a standard deviation of 9 kg.

(14)	The percentage of those fat persons with weights at most 110 kg is							
	(A)	0.09 %	(B)	90.3 %	(C)	99.82 %	(D)	2.28 %
(15)	The percentage of those fat persons with weights more than 149 kg is							
	(A)	0.09 %	(B)	0.99 %	(C)	9.7 %	(D)	99.82 %
(16)	The weight x above which 86% of those persons will be							
	(A)	118.28	(B)	128.28	(C)	137.72	(D)	81.28

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Suppose that a system contains a certain type of components whose lifetime is given by T. The random variable T is modeled nicely by an exponential distribution with mean of 6 years. If a random sample of four of these components are installed in different systems. Then,

(17)	the variance of the random variable T is							
	(A)	136	(B)	$(36)^2$	(C)	6	(D)	36
(18)	the probability that at most one of the components in the sample will be functioning more than 6 years is							
	(A)	0.4689	(B)	0.6321	(C)	0.5311	(D)	0.3679
(19)	the probability that at least two of the components in the sample will be functioning more than 6 years is							
	(A)	0.4689	(B)	0.6321	(C)	0.5311	(D)	0.3679
(20)	the expected number of components in the sample which will be functioning more than 6 years is approximately							
	(A)	3.47	(B)	1.47	(C)	4.47	(D)	3

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The amount of time that customers using ATM (Automatic Teller Machine) is a random variable with the mean 3.0 minutes and the standard deviation of 1.4 minutes. If a random sample of 49 customers is observed, then

(21)	the probability that their mean time will be at least 3 minutes is							
	(A)	1.0	(B)	0.8413	(C)	0.50	(D)	0.4468
(22)	the probability that their mean time will be between 2.7 and 3.2 minutes is							
	(A)	0.7745	(B)	0.2784	(C)	0.9973	(D)	0.0236
(23)	if we wish to be 96% confident that the sample mean will be within 0.3 minutes of the population mean, then the sample size needed is							
	(A)	98	(B)	100	(C)	92	(D)	85

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A random sample of size 25 is taken from a normal population (first population) having a mean of 100 and a standard deviation of 6. A second random sample of size 36 is taken from a different normal population (second population) having a mean of 97 and a standard deviation of 5.

(24)	the probability that the sample mean of the first population will exceed the sample mean of the second population by at least 6 is

	(A)	0.0013	(B)	0.9147	(C)	0.0202	(D)	0.9832

(25)	the probability that the difference between the two sample means will be less than 2 is

	(A)	0.099	(B)	0.2483	(C)	0.8499	(D)	0.9499

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(26)	From the table of t-distribution with degrees of freedom $\nu = 15$, the value of $t_{0.025}$ equals to

	(A)	2.131	(B)	1.753	(C)	3.268	(D)	0.0

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(27)	The following measurements were recorded for lifetime, in years, of certain type of machine: 3.4, 4.8, 3.6, 3.3, 5.6, 3.7, 4.4, 5.2, and 4.8. Assuming that the measurements represent a random sample from a normal population, then 99% confidence interval for the mean life time of the machine is

	(A)	$-5.37 \le \mu \le 3.25$	(B)	$4.72 \le \mu \le 9.1$
	(C)	$4.01 \le \mu \le 5.99$	(D)	$3.37 \le \mu \le 5.25$

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A survey of 500 students from a college of science shows that 275 students own computer of type A. In another survey of 400 students from a college of engineering shows that 240 students own the same type of computer.

(28)	a 99% confidence interval for the true proportion of the first population is

	(A)	$-0.59 \le p_1 \le 0.71$	(B)	$0.49 \le p_1 \le 0.61$
	(C)	$2.49 \le p_1 \le 6.61$	(D)	$0.3 \le p_1 \le 0.7$

(29)	a 95% confidence interval for the difference between the proportion of students owning type A computers

	(A)	$0.015 \le p_1 - p_2 \le 0.215$	(B)	$-0.515 \le p_1 - p_2 \le 0.215$
	(C)	$-0.450 \le p_1 - p_2 \le -0.015$	(D)	$-0.115 \le p_1 - p_2 \le 0.015$

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The following data show the number of defects of code of particular type of software program made in two different countries (assuming normal populations)

Country A	48	39	42	52	40	48	54
Country B	50	40	43	45	50	38	36

(30)	a 90% confidence interval for the difference between the two population means $\mu_A - \mu_B$ is

	(A)	$-2.46 \le \mu_A - \mu_B \le 8.46$	(B)	$1.42 \le \mu_A - \mu_B \le 6.42$
	(C)	$-1.42 \le \mu_A - \mu_B \le -0.42$	(D)	$2.42 \le \mu_A - \mu_B \le 10.42$