106 BM 01

國立臺北科技大學 106 學年度碩士班招生考試

系所組別：4201、4202、4203、4204 經營管理系碩士班

第一節　統計學　試題

注意事項：

1. 本試題共十題，每題十分，共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. A random sample of size n is to be drawn from a population with $\mu = 800$ and $\sigma = 200$. What size sample would be necessary in order to reduce the standard error to 10?

2. An airline has requests for standby flights at half of the usual one-way air fare. Past experience has shown that these passengers have about a 1 in 5 chance of getting on the standby flight. When they fail to get on a flight as a standby, the only other choice is to fly first class on the next flight out. Suppose that the usual one-way air fare to a certain city is $100 and the cost of flying first class is $395. Should a passenger who wishes to fly to this city opt to fly as a standby?

3. Suppose x is a random variable for which a Poisson probability distribution with $\lambda = 3$ provides a good approximation. (a. 3 points, b. 4 points, c. 3 points)

a.Graph p(x) for x = 0, 1, 2, 3, 4, 5, 6.

b.Find μ and σ for x.

c.What is the probability that x will fall in the interval $\mu \pm \sigma$?

4. The printout below contains summary statistics of the heights of a sample of 200 adult men in the United States.

Descriptive Statistics: HT

Variable	N	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
HT	200	70.187	2.716	62.375	67.875	69.625	71.500	91.125

Use the information in the printout to determine whether the distribution of heights is approximately normal. Explain your reasoning.

5. According to an advertisement, a strain of soybeans planted on soil prepared with a specified fertilizer treatment has a mean yield of 567 bushels per acre. Twenty-five farmers who belong to a cooperative plant the soybeans in soil prepared as specified. Each uses a 40-acre plot and records the mean yield per acre. The mean and variance for the sample of 25 farms are 543 and 10150. Specify the null and alternative hypotheses used to determine if the mean yield for the soybeans is different than advertised.

6. The following data represent the scores of a sample of 50 students on a statistics exam. The mean score is 80.3 and the standard deviation is 11.37.

49 51 59 63 66 68 68 69 70 71
71 71 73 74 76 76 76 77 78 79
79 79 79 80 80 82 83 83 83 85
85 86 86 88 88 88 88 89 89 89
90 91 92 92 93 95 96 97 97 98

What percentage of the scores fall in each of the intervals $\bar{X} \pm s$, $\bar{X} \pm 2s$, and $\bar{X} \pm 3s$? Based on these percentages, do you believe that the distribution of scores is approximately normal? Explain.

7. The amount of time it takes a student to walk from her home to class has a skewed right distribution with a mean of 15 minutes and a standard deviation of 2.4 minutes. If times were collected from 50 randomly selected walks, describe the sampling distribution of the sample mean time.

8. Sales of a new line of athletic footwear are crucial to the success of a newly formed company. The company wishes to estimate the average weekly sales of the new footwear to within $350 with 98% reliability. The initial sales indicate that the standard deviation of the weekly sales figures is approximately $1575. How many weeks of data must be sampled for the company to get the information it desires?

9. A company reports that 80% of its employees participate in the company's stock purchase plan. A random sample of 50 employees was asked the question, "Do you participate in the stock purchase plan?" The answers are shown below.

yes no no yes no no yes yes no no
no yes yes yes no yes no no yes yes
no yes yes no yes yes no yes yes yes
yes no no yes yes yes yes yes no yes
no yes yes no yes yes yes yes ye syes

Perform the appropriate test of hypothesis to investigate your suspicion that fewer than 80% of the company's employees participate in the plan. Use $\alpha = .05$.

10. Various state and national automobile associations regularly survey gasoline stations to determine the current retail price of gasoline. Suppose one such national association contacts 200 stations in the United States to determine the price of regular unleaded gasoline at each station. In the context of this problem, define the following descriptive measures: $\mu, \sigma, \bar{x}, s$.

注意：背面尚有試題

常態分配表

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998