

招生學年度	106	招生類別	碩士班
系所班別	企業管理學系碩士班(經營分析組)、運籌管理研究所碩士班、財務金融學系碩士班(財務金融組、金融大數據組)		
科目名稱	統計學		
注意事項	本考科可使用掌上型計算機		

1. (10 points) The personnel manager of Cumberland Pig Iron Company is studying the number of on-the-job accidents over a period of one month. He developed the following probability distribution. Compute the mean and standard deviation of the number of accidents in a month.

Number of Accidents	Probability
0	0.4
1	0.2
2	0.2
3	0.1
4	0.1

2. (10 points) In recent years, due to low interest rates, many homeowners refinanced their home mortgages. Linda Lahey is a mortgage officer at Down River Federal Savings and Loan. Below is the amount refinanced for 20 loans she processed last week. The data are reported in thousands of dollars and arranged from smallest to largest.

59.2	59.5	61.6	65.5	66.6	72.9	74.8	77.3	79.2
83.7	85.6	85.8	86.6	87.0	87.1	90.2	93.3	98.6
100.2	100.7							

- (5 points) Find third quartile.
- (5 points) Find the 5th percentile.

3. (10 points) Horwege Electronics Inc. purchases TV picture tubes from four different suppliers. Tyson Wholesale supplies 20 percent of the tubes, Fuji Importers 30 percent, Kirkpatrick's 25 percent, and Parts Inc. 25 percent. Tyson Wholesale tends to have the best quality, as only 3 percent of its tubes arrive defective. Fuji Importers' tubes are 4 percent defective, Kirkpatrick's 7 percent, and Parts Inc. are 6.5 percent defective.

- (5 points) What is the overall percent defective?
- (5 points) A defective picture tube was discovered in the latest shipment. What is the probability that it came from Tyson Wholesale?

4. (10 points) A portfolio manager holds three bonds in one of his portfolios and each bond has a 1-year default probability of 15%. The event of default for each of the bonds is independent.

- (5 points) What is the mean and variance of the number of bonds defaulting over the next year?
- (5 points) What is the probability of exactly two bonds defaulting over the next year?

5. (5 points) Customers arrive at a department store checkout counter according to a Poisson distribution with a mean of 1 per minute. In a given 2-minute period, what is the probability that one or more customers will arrive at the counter?

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6. (20 points) The annual commissions earned by sales representatives of Machine Products Inc., a manufacturer of light machinery, follow the normal probability distribution. The mean yearly amount earned is \$40,000 and the standard deviation is \$5,000.

- (5 points) What percent of the sales representatives earn more than \$42,000 per year?
- (5 points) What percent of the sales representatives earn between \$32,000 and \$42,000?
- (5 points) What percent of the sales representatives earn between \$32,000 and \$35,000?
- (5 points) The sales manager wants to award the sales representatives who earn the largest commissions a bonus of \$1,000. He can award a bonus to 20 percent of the representatives. What is the cutoff point between those who earn a bonus and those who do not?

7. (10 points) Using the prior 12 monthly returns, an analyst estimates the mean monthly return of stock XYZ to be -0.75% with a standard error of 2.70%. The monthly returns follow the normal probability distribution.

Degrees of Freedom	$\alpha$		
	0.10	0.05	0.025
8	1.397	1.860	2.306
9	1.383	1.833	2.262
10	1.372	1.812	2.228
11	1.363	1.796	2.201
12	1.356	1.782	2.179

Using the t-table above, compute the 95% confidence interval for the mean return.

8. (10 points) The owners of the Westfield Mall wished to study customer shopping habits. From earlier studies, the owners were under the impression that a typical shopper spends 0.75 hours at the mall, with a standard deviation of 0.10 hours. Recently the mall owners added some specialty restaurants designed to keep shoppers in the mall longer. The consulting firm, Brunner and Swanson Marketing Enterprises, was hired to evaluate the effects of the restaurants. A sample of 45 shoppers by Brunner and Swanson revealed that the mean time spent in the mall had increased to 0.80 hours. Develop a test of hypothesis to determine if the mean time spent in the mall is more than 0.75 hours. Use the 0.05 significance level.

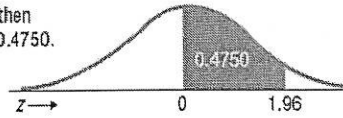
9. (15 points) The following is an ANOVA table.

Source	S.S.	d.f.	M.S.	F
Treatment	a	2	d	e
Error	b	c	20	
Total	500	11		

Compute the values of a, b, c, d, and e.

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Example:  
if  $z = 1.96$ , then  
 $P(0 \text{ to } z) = 0.4750$ .



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