

國立交通大學 103 學年度碩士班考試入學試題

科目：工程經濟與工程統計(3072)

考試日期：103 年 2 月 15 日 第 2 節

系所班別：土木工程學系

組別：土木系乙組一般生

第 1 頁, 共 2 頁

【可使用計算機】*作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符!!

- Suppose you deposit \$12,000 in a savings account that earns 8% interest compounded yearly. How many years will it take now to double your balance? (10%)
- Suppose that you invest \$1,500 in stock. Two years later, your investment becomes to be \$2,500. What is the rate of return of your investment? (20%)
- The government is considering undertaking four projects. These projects are mutually exclusive, and the estimated present worth of their costs and the present worth of their benefits are shown in millions of dollars in the following table:

Projects	A1	A2	A3	A4
PW of benefits	\$ 40	\$ 150	\$ 70	\$ 120
PW of costs	\$ 85	\$ 110	\$ 25	\$ 73

Please use the benefit-cost analysis (B/C(i)) to determine which project would be the best alternative?

(20%)

- 某施工機具製造廠商代理兩款拖斗挖泥機，A 款挖泥機其平均無重大故障使用時數為 10000 小時，標準差為 1000 小時之常態分配。B 款挖泥機其平均無重大故障使用時數為 9000 小時，標準差為 500 小時之常態分配。現某家營造廠同時購買此兩款機具，並在同樣的工地環境施工使用，試問：
 - A 款挖泥機首次遇重大故障之時數至少超過 B 款 200 小時的機率？ (5%)
 - A、B 款中至少有一款首次遇重大故障之時數超過 9500 小時的機率？ (10%)
- 某營造公司於年終檢討大會中，得知機具管理部門評估目前公司傾卸車的使用量大，於平日皆有 90% 以上的傾卸車皆派有任務，因此有必要再增購新的傾卸車。今在某平日隨機抽樣調查 50 輛，發現其中有 42 輛確委有任務，而另外 8 輛則為閒置狀態。
 - 以 $\alpha=0.05$ 檢定該機具管理部門之宣稱是否為真？ (7%)
 - 試求 p-value。 (8%)
 - 若實際只有 80% 的車輛委有任務，試問樣本數應至少抽取幾個，始能有 0.2 以下的型 II 誤差？ (10%)
- 某建設公司想瞭解大眾是否能接受在高層住宅頂樓裝設小型風力發電，隨機抽樣男性 500 人，女性 300 人。結果發現男性受訪者有 210 贊成，女性受訪者有 150 贊成，請以 $\alpha=0.05$ 檢定男女的支持度是否有異？ (10%)

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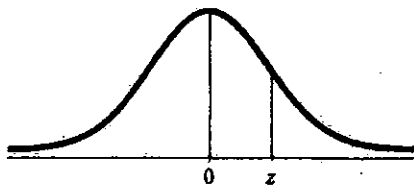
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第 2 頁, 共 2 頁

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標準常態機率表



標準常態 (z) 分配

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990