

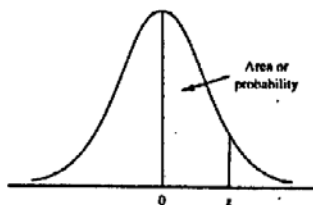
國立臺灣科技大學
八十八學年度碩士班招生考試試題

系所別：管理研究所碩士班
企業管理學程

組別：甲組、乙組

科目：統計學

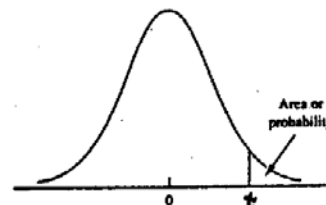
1. (25分) The manufacturer of Stay-White toothpaste maintains that by the addition of a certain chemical he can guarantee that (over a given period of time) people will have less dental decay if they clean their teeth regularly with Stay-White, than if they clean their teeth with ordinary toothpaste.
To test this theory, free tubes of Stay-White were given to 150 children at a school dental clinic, and at the same time, free tubes of ordinary toothpaste were given to a further 100 children at the clinic.
All the children guaranteed to clean their teeth regularly for 6 months and then return for a check-up.
At the end of 6 months it was found that 32 children using Stay-White had dental decay, whereas 28 children using the ordinary toothpaste had dental decay.
Dentists at the clinic believe that there is no real difference between the proportions of children who had no dental decay over the 6-month period. Use the sample results to test, at the 10% level, the dentists' theory. Please use two ways, the confidence interval and the P-value methods, to report the results of statistical tests. Also, state the reasons researchers report the p-values associated with statistical tests?
2. (25分) A lot acceptance sampling plan employs a random sample of size $n=25$ with acceptance number $a=1$.
 - (a) Find the probability of accepting a lot that contains $p=0.05$ fraction defective. Then calculate the probability of lot acceptance for $p=0.1, 0.2, 0.5, 0.7, 0$, and 1.0 .
 - (b) Graph the operating characteristic curve.
 - (c) What is the effect of increasing the acceptance number a when n is held constant? What is the effect of increasing the sample size n when a is held constant?
 - (d) If the producer specifies that the acceptable quality level is 0.05 and the purchaser of the product will want to accept lots only if the fraction defective is less than 0.1 . Please show the producer's and consumer's risks on the operating characteristic curve in part (b).



Entries in the table give the area under the curve between the mean and z standard deviations above the mean. For example, for $z = 1.25$ the area under the curve between the mean and z is .3944.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
7	.2580	.2612	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
10	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
11	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
12	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
13	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
14	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
15	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
16	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
17	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
18	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
19	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
20	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
21	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
22	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
23	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
24	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
25	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
26	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
27	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
28	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4980	.4981	.4981
29	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
30	.4986	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

TABLE 1 Standard Normal Distribution



Entries in the table give t values for an area or probability in the upper tail of the t distribution. For example, with 10 degrees of freedom and a .05 area in the upper tail, $t_{.05, 10} = 1.812$.

Degrees of Freedom	Area in Upper Tail				
	.10	.05	.025	.01	.005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
40	1.303	1.684	2.021	2.423	2.704
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.326	2.576

TABLE 2 t Distribution

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- 3、台科公司產品不良率向客戶保證在 5% 以內。而客戶則要求，其所訂購任何一批產品，使用後若發現其不良率超過 8% 時，則台科公司必須賠償其相關損失。台科公司評估其信譽，希望其保證之可信度在 95% 以上，同時希望其因產品不良率高於 8% 而必須賠償客戶損失之機率不超過 5%。品管部門根據公司政策擬定抽樣檢驗計畫。請問若採隨機抽樣檢驗方式，其每批產品出廠抽樣檢驗樣本數最少應為多少？（標準常態分配關鍵值 $Z_{0.05}=1.645$, $Z_{0.025}=1.96$ ）（12 分）
- 4、某高考補習班宣稱其學生上榜率為 20% 以上。今隨機抽取 8 位學生，發現只有一位考上，請以 0.05 之顯著水準檢定該補習班之宣稱是否屬實。若隨機抽取之 8 位學生均落榜，請以 0.05 之顯著水準檢定該補習班之宣稱是否屬實。請問此檢定有何問題？如何補救？（13 分）
5. For regression in observational studies, if X is the independent variable, and Y is the dependent variable, under what situations the results may be used when it is known that the X values will change from sample to sample? (25 分)