

國立高雄第一科技大學 97 學年度 碩士班 招生考試 試題紙

系 所 別：風險管理與保險系

組 別：風險管理組

考科代碼：4211

考 科：統計學

注意事項：

- 1、本科目可使用本校提供之電子計算器。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

請依題號順序作答，否則不予計分

第一部份：共 7 題，每題 8 分。

1. An urn contains 1 white and 9 red marbles. A marble is drawn from the urn 100 times in succession with replacement. Find the probability of drawing more than 14 red marbles. Approximately, use the central limit theorem.
2. A pair of fair dice is tossed 6 times in succession. What is the probability of observing no 4's and no 7's in any of the 6 tosses?
3. In rolling a pair of fair dice, what is the probability that a sum of 7 is rolled before a sum of 9 is rolled?
4. A bin of 6 light bulbs contains 2 that are defective. If 3 bulbs are chosen without replacement from the bin, what is the probability that exactly 1 of the bulbs in the sample are defective?

5. A die was rolled 30 times with the results shown below.

Number of Spots	1	2	3	4	5	6
Frequency	2	3	10	8	3	4

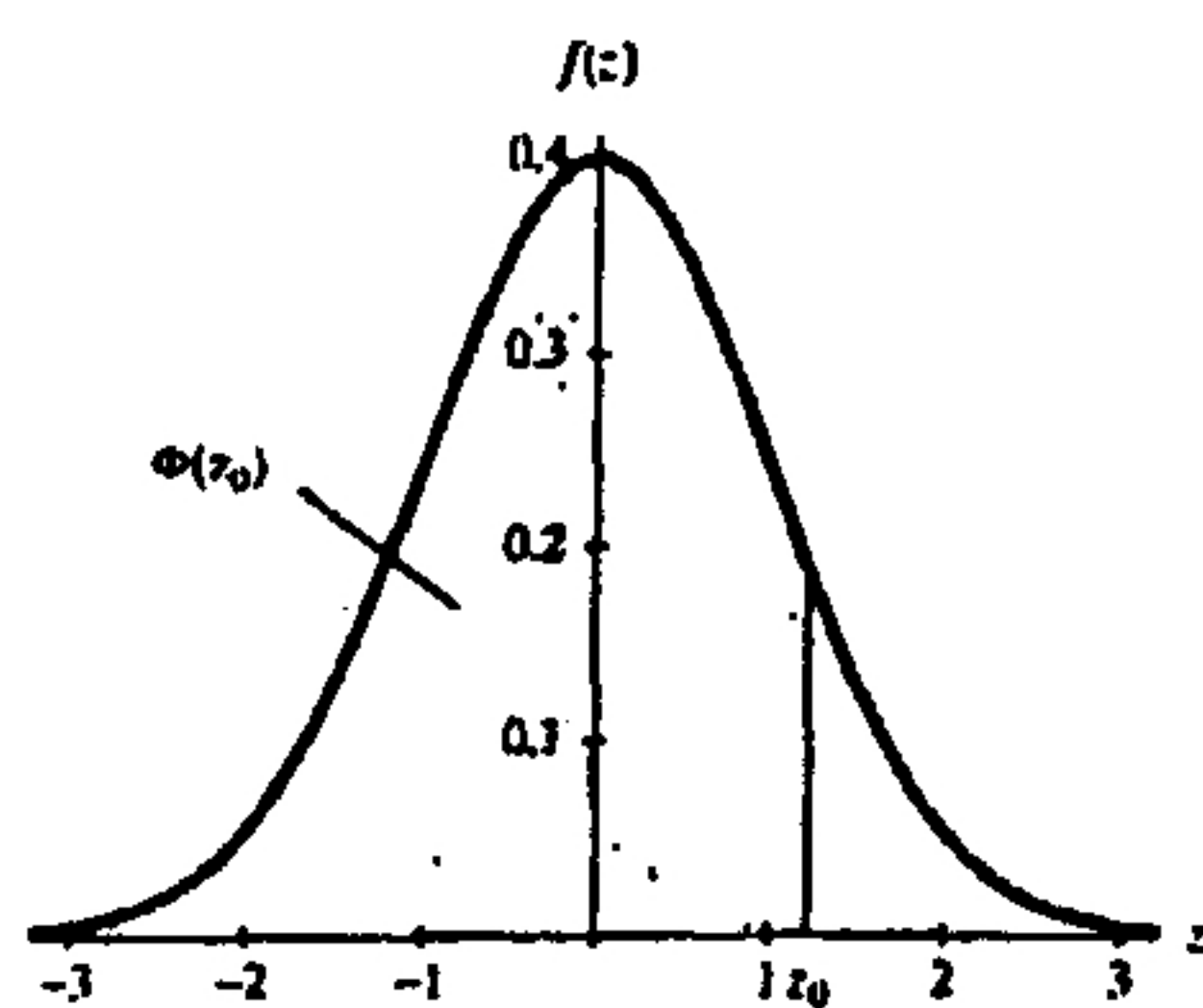
If a chi-square goodness-of-fit test is used to test the hypothesis that the die is fair, then what is the value of the chi-square statistic?

6. A random sample of size nine is taken from a normal distribution with unknown mean μ and variance $\sigma^2 > 0$. To test $H_0 : \mu = 0$ versus $H_1 : \mu < 0$ the following test is used: Reject H_0 if and only if $X_1 + X_2 + \cdots + X_9 < -30$. What is the value of σ is the significance level (size) of this test equal to 0.1401?
7. Let X be the number of independent Bernoulli trials performed until a success occurs. Let Y be the number of independent Bernoulli trials performed until 4 success occurs. A success occurs with probability p and $Var(X) = \frac{2}{3}$. Calculate $Var(Y)$.

第二部份：共 4 題，每題 11 分。

1. Let X_1, X_2, X_3 , and X_4 be a random sample from the discrete distribution X such that $P(X = x) = e^{-\theta^2} \frac{\theta^{2x}}{x!}$ for $x = 0, 1, 2, \dots$, and 0 otherwise, where $\theta > 0$. If the data are 40, 18, 33, and 9, what is the maximum likelihood estimate of θ ?
2. Let X be a discrete random variable with probability function $P(X = x) = \frac{3}{4^x}$ for $x = 1, 2, 3, \dots$. What is the probability that X is odd?

3. Let the random variable X have the density function $f(x) = kx^2$ for $0 \leq x \leq \sqrt{\frac{2}{k}}$, and zero elsewhere. What is the median of the distribution?
4. Let X be the number of successes in n independent trials with the probability of success on each trial equal to p . The null hypothesis $H_0 : p = 0.5$ is to be tested against the alternative hypothesis $H_1 : p > 0.5$. The null hypothesis is rejected if $X = n$. For what value of p is the power function of this test equal to 0.9?



$$P(Z \leq z) = \Phi(z) = \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} e^{-w^2/2} dw$$

$$\Phi(-z) = 1 - \Phi(z)$$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7703	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
α	0.400	0.300	0.200	0.100	0.050	0.025	0.020	0.010	0.005	0.001
z _α	0.253	0.524	0.842	1.282	1.645	1.960	2.054	2.326	2.576	3.090
z _{α/2}	0.842	1.036	1.282	1.645	1.960	2.240	2.326	2.576	2.807	3.291