

國立高雄海洋科技大學 101 學年度研究所入學考試  
 漁業生產與管理研究所—生物統計學試題 (※須使用計算機)

一、解釋名詞：(每題 5 分，共計 20 分)

1. 試述如何編製次數分配表(frequency distribution table)
2. 連續型隨機變數(continuous random variable)
3. 序位尺度 (Ordinal scale)
4. 期望值

二、求出下列數字的平均數、中位數、眾數及變異係數： (20 分)

39、50、45、47、51、33、40、40、51、66

三、兩組龍蝦餵以不同(高/低蛋白)飼料，4 週後所增重量(g)如下：

高蛋白	119	161	83	134	124	146	107	104	97	129	113
低蛋白	94	85	107	118	101	112	70				

請以  $\alpha=0.05$  檢驗以兩種不同飼料餵龍蝦，所增重量差異是否顯著? (10 分)

四、4 種不同水解蛋白(A~D)飼養紅甘鯪的增重效果如下：

水解蛋白	增重效果							
A	10	2	20	-16	2	-1	7	13
B	-11	-2	-25	-11	-12	-16	-3	-19
C	-6	-3	2	7	-3	-13	2	-8
D	17	11	11	13	29	20	19	14

請以  $\alpha=0.05$  對以上資料分析 4 種不同飼料對紅甘鯪的增重效果是否有顯著差異? (20 分)

五、台灣鮪延繩釣漁業漁船，過去在太平洋、大西洋、印度洋作業的比例約為 53%、25%及 22%。在資源減少及國際漁業管理後，在三大洋作業艘數分別為 183、132 及 102 艘，請問三大洋的鮪延繩釣漁船比例是否維持不變。(  $\alpha=0.05$  ) (10 分)

六、下表為 10 名小學五年級學生的智商和算術成績。

學生編號	智商(X)	算術成績(Y)
1	94	60
2	102	79
3	131	92
4	92	65
5	124	76
6	106	59
7	135	95
8	120	78
9	113	72
10	110	75

(1) 求迴歸直線。(15 分)

(2) 若有一五年級學生其智商為 122，試預測其算術可得幾分？(5 分)

< 試題結束 >

**F-分配表 (右尾機率值  $\alpha = 0.05$ )**

$df_2$	分子的自由度( $df_1$ )																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	161.446	199.499	215.707	224.583	230.160	233.988	236.767	238.884	240.543	241.882	242.981	243.905	244.690	245.363	245.949	246.466	246.917
2	18.513	19.000	19.164	19.247	19.296	19.329	19.353	19.371	19.385	19.396	19.405	19.412	19.419	19.424	19.429	19.433	19.437
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.785	8.763	8.745	8.729	8.715	8.703	8.692	8.683
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964	5.936	5.912	5.891	5.873	5.858	5.844	5.832
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735	4.704	4.678	4.655	4.636	4.619	4.604	4.590
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060	4.027	4.000	3.976	3.956	3.938	3.922	3.908
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637	3.603	3.575	3.550	3.529	3.511	3.494	3.480
8	5.318	4.459	4.066	3.838	3.688	3.581	3.500	3.438	3.388	3.347	3.313	3.284	3.259	3.237	3.218	3.202	3.187
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137	3.102	3.073	3.048	3.025	3.006	2.989	2.974
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978	2.943	2.913	2.887	2.865	2.845	2.828	2.812
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854	2.818	2.788	2.761	2.739	2.719	2.701	2.685
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753	2.717	2.687	2.660	2.637	2.617	2.599	2.583
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671	2.635	2.604	2.577	2.554	2.533	2.515	2.499
14	4.600	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602	2.565	2.534	2.507	2.484	2.463	2.445	2.428
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641	2.588	2.544	2.507	2.475	2.448	2.424	2.403	2.385	2.368
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494	2.456	2.425	2.397	2.373	2.352	2.333	2.317
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548	2.494	2.450	2.413	2.381	2.353	2.329	2.308	2.289	2.272
18	4.414	3.555	3.160	2.928	2.773	2.661	2.577	2.510	2.456	2.412	2.374	2.342	2.314	2.290	2.269	2.250	2.233
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477	2.423	2.378	2.340	2.308	2.280	2.256	2.234	2.215	2.198
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348	2.310	2.278	2.250	2.225	2.203	2.184	2.167
21	4.325	3.467	3.072	2.840	2.685	2.573	2.488	2.420	2.366	2.321	2.283	2.250	2.222	2.197	2.176	2.156	2.139
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297	2.259	2.226	2.198	2.173	2.151	2.131	2.114
23	4.279	3.422	3.028	2.796	2.640	2.528	2.442	2.375	2.320	2.275	2.236	2.204	2.175	2.150	2.128	2.109	2.091
24	4.260	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.300	2.255	2.216	2.183	2.155	2.130	2.108	2.088	2.070
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337	2.282	2.236	2.198	2.165	2.136	2.111	2.089	2.069	2.051
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.265	2.220	2.181	2.148	2.119	2.094	2.072	2.052	2.034
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305	2.250	2.204	2.166	2.132	2.103	2.078	2.056	2.036	2.018
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.190	2.151	2.118	2.089	2.064	2.041	2.021	2.003
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177	2.138	2.104	2.075	2.050	2.027	2.007	1.989
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266	2.211	2.165	2.126	2.092	2.063	2.037	2.015	1.995	1.976
40	4.085	3.232	2.839	2.606	2.449	2.336	2.249	2.180	2.124	2.077	2.038	2.003	1.974	1.948	1.924	1.904	1.885
50	4.034	3.183	2.790	2.557	2.400	2.286	2.199	2.130	2.073	2.026	1.986	1.952	1.921	1.895	1.871	1.850	1.831
100	3.936	3.087	2.696	2.463	2.305	2.191	2.103	2.032	1.975	1.927	1.886	1.850	1.819	1.792	1.768	1.746	1.726
$\infty$	3.842	2.996	2.605	2.372	2.214	2.099	2.010	1.939	1.880	1.831	1.789	1.752	1.720	1.692	1.666	1.644	1.623

t-分配表 (右尾機率值  $\alpha$ )

<i>df</i>	$\alpha$						
	0.1000	0.0500	0.0250	0.0100	0.0050	0.0010	0.0005
1	3.0777	6.3137	12.7062	31.8210	63.6559	318.2888	636.5776
2	1.8856	2.9200	4.3027	6.9645	9.9250	22.3285	31.5998
3	1.6377	2.3534	3.1824	4.5407	5.8408	10.2143	12.9244
4	1.5332	2.1318	2.7765	3.7469	4.6041	7.1729	8.6101
5	1.4759	2.0150	2.5706	3.3649	4.0321	5.8935	6.8685
6	1.4398	1.9432	2.4469	3.1427	3.7074	5.2075	5.9587
7	1.4149	1.8946	2.3646	2.9979	3.4995	4.7853	5.4081
8	1.3968	1.8595	2.3060	2.8965	3.3554	4.5008	5.0414
9	1.3830	1.8331	2.2622	2.8214	3.2498	4.2969	4.7809
10	1.3722	1.8125	2.2281	2.7638	3.1693	4.1437	4.5868
11	1.3634	1.7959	2.2010	2.7181	3.1058	4.0248	4.4369
12	1.3562	1.7823	2.1788	2.6810	3.0545	3.9296	4.3178
13	1.3502	1.7709	2.1604	2.6503	3.0123	3.8520	4.2209
14	1.3450	1.7613	2.1448	2.6245	2.9768	3.7874	4.1403
15	1.3406	1.7531	2.1315	2.6025	2.9467	3.7329	4.0728
16	1.3368	1.7459	2.1199	2.5835	2.9208	3.6861	4.0149
17	1.3334	1.7396	2.1098	2.5669	2.8982	3.6458	3.9651
18	1.3304	1.7341	2.1009	2.5524	2.8784	3.6105	3.9217
19	1.3277	1.7291	2.0930	2.5395	2.8609	3.5793	3.8833
20	1.3253	1.7247	2.0860	2.5280	2.8453	3.5518	3.8496
25	1.3163	1.7081	2.0595	2.4851	2.7874	3.4502	3.7251
30	1.3104	1.6973	2.0423	2.4573	2.7500	3.3852	3.6460
40	1.3031	1.6839	2.0211	2.4233	2.7045	3.3069	3.5510
50	1.2987	1.6759	2.0086	2.4033	2.6778	3.2614	3.4960
100	1.2901	1.6602	1.9840	2.3642	2.6259	3.1738	3.3905
$\infty$	1.2816	1.6449	1.9600	2.3263	2.5758	3.0902	3.2905

卡方分配表 (右尾機率值  $\alpha$ )

df	$\alpha$											
	0.9950	0.9900	0.9750	0.9500	0.9000	0.1000	0.0500	0.0250	0.0100	0.0050	0.0010	0.0005
1	0.0000	0.0002	0.0010	0.0039	0.0158	2.7055	3.8415	5.0239	6.6349	7.8794	10.8274	12.1153
2	0.0100	0.0201	0.0506	0.1026	0.2107	4.6052	5.9915	7.3778	9.2104	10.5965	13.8150	15.2014
3	0.0717	0.1148	0.2158	0.3518	0.5844	6.2514	7.8147	9.3484	11.3449	12.8381	16.2660	17.7311
4	0.2070	0.2971	0.4844	0.7107	1.0636	7.7794	9.4877	11.1433	13.2767	14.8602	18.4662	19.9977
5	0.4118	0.5543	0.8312	1.1455	1.6103	9.2363	11.0705	12.8325	15.0863	16.7496	20.5147	22.1057
6	0.6757	0.8721	1.2373	1.6354	2.2041	10.6446	12.5916	14.4494	16.8119	18.5475	22.4575	24.1016
7	0.9893	1.2390	1.6899	2.1673	2.8331	12.0170	14.0671	16.0128	18.4753	20.2777	24.3213	26.0179
8	1.3444	1.6465	2.1797	2.7326	3.4895	13.3616	15.5073	17.5345	20.0902	21.9549	26.1239	27.8674
9	1.7349	2.0879	2.7004	3.3251	4.1682	14.6837	16.9190	19.0228	21.6660	23.5893	27.8767	29.6669
10	2.1558	2.5582	3.2470	3.9403	4.8652	15.9872	18.3070	20.4832	23.2093	25.1881	29.5879	31.4195
11	2.6032	3.0535	3.8157	4.5748	5.5778	17.2750	19.6752	21.9200	24.7250	26.7569	31.2635	33.1382
12	3.0738	3.5706	4.4038	5.2260	6.3038	18.5493	21.0261	23.3367	26.2170	28.2997	32.9092	34.8211
13	3.5650	4.1069	5.0087	5.8919	7.0415	19.8119	22.3620	24.7356	27.6882	29.8193	34.5274	36.4768
14	4.0747	4.6604	5.6287	6.5706	7.7895	21.0641	23.6848	26.1189	29.1412	31.3194	36.1239	38.1085
15	4.6009	5.2294	6.2621	7.2609	8.5468	22.3071	24.9958	27.4884	30.5780	32.8015	37.6978	39.7173
16	5.1422	5.8122	6.9077	7.9616	9.3122	23.5418	26.2962	28.8453	31.9999	34.2671	39.2518	41.3077
17	5.6973	6.4077	7.5642	8.6718	10.0852	24.7690	27.5871	30.1910	33.4087	35.7184	40.7911	42.8808
18	6.2648	7.0149	8.2307	9.3904	10.8649	25.9894	28.8693	31.5264	34.8052	37.1564	42.3119	44.4337
19	6.8439	7.6327	8.9065	10.1170	11.6509	27.2036	30.1435	32.8523	36.1908	38.5821	43.8194	45.9738
20	7.4338	8.2604	9.5908	10.8508	12.4426	28.4120	31.4104	34.1696	37.5663	39.9969	45.3142	47.4977
21	8.0336	8.8972	10.2829	11.5913	13.2396	29.6151	32.6706	35.4789	38.9322	41.4009	46.7963	49.0096
22	8.6427	9.5425	10.9823	12.3380	14.0415	30.8133	33.9245	36.7807	40.2894	42.7957	48.2676	50.5105
23	9.2604	10.1957	11.6885	13.0905	14.8480	32.0069	35.1725	38.0756	41.6383	44.1814	49.7276	51.9995
24	9.8862	10.8563	12.4011	13.8484	15.6587	33.1962	36.4150	39.3641	42.9798	45.5584	51.1790	53.4776
25	10.5196	11.5240	13.1197	14.6114	16.4734	34.3816	37.6525	40.6465	44.3140	46.9280	52.6187	54.9475
26	11.1602	12.1982	13.8439	15.3792	17.2919	35.5632	38.8851	41.9231	45.6416	48.2898	54.0511	56.4068
27	11.8077	12.8785	14.5734	16.1514	18.1139	36.7412	40.1133	43.1945	46.9628	49.6450	55.4751	57.8556
28	12.4613	13.5647	15.3079	16.9279	18.9392	37.9159	41.3372	44.4608	48.2782	50.9936	56.8918	59.2990
29	13.1211	14.2564	16.0471	17.7084	19.7677	39.0875	42.5569	45.7223	49.5878	52.3355	58.3006	60.7342
30	13.7867	14.9535	16.7908	18.4927	20.5992	40.2560	43.7730	46.9792	50.8922	53.6719	59.7022	62.1600
40	20.7066	22.1642	24.4331	26.5093	29.0505	51.8050	55.7585	59.3417	63.6908	66.7660	73.4029	76.0963
50	27.9908	29.7067	32.3574	34.7642	37.6886	63.1671	67.5048	71.4202	76.1538	79.4898	86.6603	89.5597
60	35.5344	37.4848	40.4817	43.1880	46.4589	74.3970	79.0820	83.2977	88.3794	91.9518	99.6078	102.6971
70	43.2753	45.4417	48.7575	51.7393	55.3289	85.5270	90.5313	95.0231	100.4251	104.2148	112.3167	115.5766
80	51.1719	53.5400	57.1532	60.3915	64.2778	96.5782	101.8795	106.6285	112.3288	116.3209	124.8389	128.2636
90	59.1963	61.7540	65.6669	73.2607	81.2911	107.5650	113.1452	118.1359	124.1162	128.2987	137.2082	140.7804
100	67.3275	70.0650	74.2219	82.9248	95.3581	118.4980	124.3421	129.5613	135.8069	140.1697	149.4488	153.1638