

1. Suppose at an intersection, motorcycles arriving follow a Poisson process with an average of 6 vehicles per minute. What is the probability that up to a minute will elapse by the time 2 motorcycles have come in to the intersection? [15 points]
2. Traveling between two areas in a city via shuttle bus is believed to take 18 minutes with a standard deviation of 5 minutes. During a period of time, the shuttle bus operated 30 times between this route. What is the probability that the average transport time was more than 25 minutes? Do you need to assume a certain probability distribution of the traveling time of the bus to calculate the probability? [25 points]
3. The traveling speed of 5 vehicles are 10.0, 12.5, 7.5, 9.0, and 9.5 km/h. Find a 95% confidence interval for the mean traveling speed. Do you need to assume a certain probability distribution of the traveling speed to find the confidence interval? [25 points]
4. A die is rolled 180 times with the following results. Is this a balanced die? Conduct a hypothesis test using a 0.01 level of significance. [15 points]
5. We estimate the regression line passing through the origin for the following data in Table 1. From the regression analysis' report in Table 2, is the regression line a good fit? [20 points]

Table 1. Data for Regression

x	0.5	1.5	3.2	4.2	5.1	6.5
y	1.3	3.4	6.7	8.0	10.0	13.2

Table 2. Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	f-value
Regression	93.53	1	93.53	953.03
Error	0.39	4	0.098	
Total	93.92	5		

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Table Areas under the Normal Curve

Table with 11 columns (z from .00 to .09) and 20 rows (z from -3.4 to -0.0). Values represent cumulative areas under the normal curve.

Table (continued) Areas under the Normal Curve

Table with 11 columns (z from .00 to .09) and 20 rows (z from 0.0 to 3.4). Values represent cumulative areas under the normal curve.

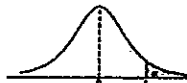


Table Critical Values of the t-Distribution

Table with 7 columns (alpha from 0.40 to 0.025) and 20 rows (nu from 1 to infinity). Values represent critical values for the t-distribution.

Table (continued) Critical Values of the t-Distribution

Table with 7 columns (alpha from 0.02 to 0.0005) and 20 rows (nu from 1 to infinity). Values represent critical values for the t-distribution.



Table Critical Values of the Chi-Squared Distribution

v	α									
	0.995	0.99	0.98	0.975	0.95	0.90	0.80	0.75	0.70	0.50
1	0.00493	0.01385	0.02008	0.02564	0.03342	0.04453	0.06064	0.07578	0.09348	0.15492
2	0.01000	0.02001	0.03004	0.04006	0.05009	0.06012	0.07015	0.08018	0.09021	0.15024
3	0.0717	0.115	0.185	0.216	0.252	0.288	0.324	0.360	0.396	0.452
4	0.207	0.297	0.429	0.484	0.571	0.658	0.745	0.832	0.919	0.975
5	0.412	0.554	0.732	0.831	1.014	1.201	1.388	1.575	1.762	1.875
6	0.676	0.872	1.134	1.237	1.635	2.204	3.070	3.655	4.348	4.751
7	0.989	1.239	1.584	1.690	2.167	2.833	3.822	4.355	4.971	5.348
8	1.344	1.647	2.032	2.180	2.733	3.490	4.594	5.071	5.627	6.000
9	1.735	2.068	2.532	2.700	3.325	4.168	5.380	5.899	6.393	6.744
10	2.156	2.558	3.039	3.247	3.940	4.865	6.179	6.737	7.207	7.542
11	2.603	3.053	3.609	3.816	4.575	5.578	6.989	7.584	8.148	8.471
12	3.074	3.571	4.178	4.404	5.226	6.304	7.807	8.438	9.034	9.348
13	3.565	4.107	4.765	5.000	5.892	7.041	8.634	9.299	9.926	10.221
14	4.078	4.660	5.368	5.629	6.571	7.790	9.467	10.165	10.821	11.106
15	4.601	5.229	5.985	6.262	7.261	8.547	10.307	11.007	11.721	12.006
16	5.142	5.812	6.614	6.906	7.962	9.312	11.152	11.912	12.624	12.916
17	5.697	6.408	7.265	7.564	8.672	10.065	12.002	12.792	13.531	13.834
18	6.265	7.015	7.906	8.231	9.390	10.865	12.857	13.675	14.440	14.754
19	6.844	7.693	8.657	8.997	10.117	11.651	13.716	14.562	15.352	15.678
20	7.434	8.280	9.237	9.591	10.851	12.443	14.578	15.492	16.298	16.634
21	8.034	8.887	9.915	10.283	11.691	13.240	15.445	16.344	17.182	17.528
22	8.643	9.542	10.600	10.982	12.538	14.041	16.314	17.240	18.101	18.457
23	9.260	10.196	11.293	11.689	13.001	14.848	17.187	18.137	19.021	19.361
24	9.886	10.856	11.992	12.401	13.848	15.659	18.062	19.037	19.943	20.277
25	10.520	11.524	12.697	13.120	14.611	16.473	18.940	19.939	20.867	21.193
26	11.160	12.198	13.409	13.844	15.379	17.292	19.820	20.843	21.792	22.109
27	11.808	12.878	14.125	14.573	16.151	18.114	20.703	21.749	22.719	23.025
28	12.461	13.565	14.847	15.308	16.928	18.939	21.588	22.657	23.647	23.941
29	13.121	14.266	15.574	16.047	17.708	19.768	22.475	23.567	24.577	24.857
30	13.787	14.983	16.308	16.791	18.493	20.599	23.384	24.478	25.508	25.773
40	20.707	22.164	23.838	24.433	26.509	28.051	32.345	33.56	34.872	35.935
50	27.991	29.707	31.664	32.357	34.784	37.589	41.449	42.942	44.313	45.335
60	36.534	37.485	39.999	40.482	43.188	46.459	50.641	52.294	53.809	54.935

Table (continued) Critical Values of the Chi-Squared Distribution

v	α									
	0.30	0.25	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.001
1	1.074	1.323	1.642	2.706	3.841	5.024	5.412	6.635	7.879	10.827
2	2.408	2.773	3.219	4.605	5.991	7.378	7.824	9.210	10.597	13.815
3	3.665	4.108	4.642	6.251	7.815	9.348	9.837	11.345	12.838	16.266
4	4.878	5.385	5.989	7.779	9.488	11.143	11.658	13.277	14.860	18.460
5	6.064	6.626	7.289	9.238	11.070	12.832	13.388	15.086	16.750	20.515
6	7.231	7.841	8.558	10.645	12.592	14.449	15.033	16.812	18.548	22.457
7	8.383	9.037	9.803	12.017	14.067	16.013	16.622	18.475	20.278	24.321
8	9.524	10.219	11.030	13.362	15.507	17.535	18.166	20.090	21.955	26.124
9	10.655	11.380	12.242	14.684	16.919	19.023	19.870	21.866	23.589	27.877
10	11.781	12.549	13.442	16.017	18.307	20.483	21.161	23.209	25.188	29.588
11	12.899	13.701	14.631	17.275	19.675	21.920	22.018	24.725	26.757	31.264
12	14.011	14.845	15.812	18.549	21.020	23.337	23.054	26.217	28.300	32.909
13	15.119	15.984	16.965	19.812	22.362	24.736	24.173	27.688	29.819	34.527
14	16.222	17.117	18.181	21.064	23.685	26.119	25.373	29.141	31.319	36.124
15	17.322	18.246	19.311	22.307	24.996	27.488	26.650	30.578	32.801	37.696
16	18.418	19.369	20.466	23.542	26.296	28.845	28.033	32.000	34.267	39.252
17	19.511	20.489	21.615	24.769	27.587	30.191	30.095	33.409	35.718	40.791
18	20.591	21.605	22.760	25.989	28.800	31.526	32.340	34.805	37.156	42.312
19	21.660	22.718	23.900	27.204	30.144	32.852	33.687	36.191	38.582	43.810
20	22.775	23.828	25.038	28.412	31.410	34.170	35.020	37.566	39.997	45.314
21	23.858	24.935	26.171	29.615	32.671	35.479	36.343	38.932	41.401	46.796
22	24.939	26.039	27.301	30.813	33.924	36.768	37.660	40.289	42.796	48.268
23	26.018	27.141	28.429	32.007	35.172	38.076	38.968	41.638	44.181	49.728
24	27.096	28.241	29.553	33.196	36.415	39.364	40.270	42.980	45.558	51.179
25	28.172	29.339	30.676	34.382	37.652	40.646	41.566	44.314	46.926	52.619
26	29.246	30.435	31.795	35.565	38.885	41.923	42.856	45.642	48.290	54.051
27	30.319	31.528	32.912	36.741	40.118	43.196	44.140	46.063	49.645	55.475
28	31.391	32.620	34.027	37.918	41.337	44.461	45.419	47.278	50.994	56.892
29	32.461	33.711	35.139	39.087	42.567	45.722	46.693	48.588	52.336	58.301
30	33.530	34.800	36.250	40.256	43.773	46.970	47.962	50.822	53.672	59.702
40	44.185	45.616	47.269	51.806	53.758	59.342	60.436	63.691	68.706	73.403
50	54.726	55.334	58.184	63.167	67.505	71.420	72.013	76.154	79.490	84.800
60	65.226	66.981	69.972	74.397	79.082	83.298	84.58	88.370	91.952	98.008

v ₂	f _{0.05} (v ₁ , v ₂)							
	v ₁							
	1	2	3	4	5	6	7	8
1	161.448	199.500	215.707	224.583	230.162	233.986	238.768	238.883
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041
5	6.608	5.786	5.409	5.182	5.060	4.960	4.876	4.818
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.725
8	5.318	4.459	4.068	3.838	3.687	3.581	3.500	3.438
9	5.117	4.256	3.863	3.633	3.482	3.375	3.293	3.230
10	4.964	4.103	3.708	3.478	3.326	3.217	3.135	3.072
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767
14	4.600	3.730	3.344	3.112	2.958	2.848	2.764	2.699
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548
18	4.414	3.555	3.160	2.928	2.773	2.661	2.576	2.510
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447
21	4.323	3.467	3.072	2.840	2.685	2.573	2.488	2.420
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397
23	4.279	3.422	3.028	2.795	2.640	2.528	2.442	2.375
24	4.260	3.403	3.008	2.776	2.621	2.508	2.423	2.355
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266
40	4.085	3.232	2.839	2.606	2.449	2.330	2.249	2.180
50	4.001	3.150	2.758	2.525	2.368	2.254	2.167	2.097
60	3.920	3.072	2.680	2.447	2.290	2.175	2.087	2.016
∞	3.841	2.996	2.605	2.372	2.214	2.099	2.010	1.938

v ₂	f _{0.01} (v ₁ , v ₂)							
	v ₁							
	1	2	3	4	5	6	7	8
1	4052.181	4999.500	5403.332	5624.683	5793.650	5858.986	5928.356	5981.070
2	88.503	99.000	99.166	99.249	99.299	99.333	99.356	99.374
3	34.116	30.817	29.457	28.710	28			