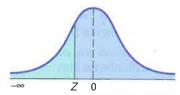
TABLE E.2

The Cumulative Standardized Normal Distribution

Entry represents area under the cumulative standardized normal distribution from $-\infty$ to ${\cal Z}$

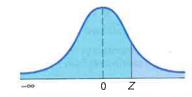


				Cumu	lative Pro	babilities				
Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-6.0	0.00000000			Kirgii		10170	100	1,000	U 10	
-5.5	0.0000000	19								
-5.0	0.00000028	87								
-4.5	0.00000339	98								
-4.0	0.00003163	71								
-3.9	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003
-3.8	0.00007	0.00007	0.00007	0.00006	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005
-3.7	0.00011	0.00010	0.00010	0.00010	0.00009	0.00009	0.00008	0.00008	0.00008	0.00008
-3.6	0.00016	0.00015	0.00015	0.00014	0.00014	0.00013	0.00013	0.00012	0.00012	0.00011
-3.5	0.00023	0.00022	0.00022	0.00021	0.00020	0.00019	0.00019	0.00018	0.00017	0.00017
-3.4	0.00034	0.00032	0.00031	0.00030	0.00029	0.00028	0.00027	0.00026	0.00025	0.00024
-3.3	0.00048	0.00047	0.00045	0.00043	0.00042	0.00040	0.00039	0.00038	0.00036	0.00035
-3.2	0.00069	0.00066	0.00064	0.00062	0.00060	0.00058	0.00056	0.00054	0.00052	0.00050
-3.1	0.00097	0.00094	0.00090	0.00087	0.00084	0.00082	0.00079	0.00076	0.00032	0.00030
-3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00103	0.00100
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.00111	0.0015	0.00103	0.00100
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0014	0.0014
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0021	0.0021	0.0027	0.0019
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0027	0.0026
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0037	0.0038
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0034	0.0052	0.0051	0.0049	0.0048
-2.3	0.0107	0.0104	0.0102	0.0079	0.0075	0.0071	0.0009	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0034	0.0031	0.0089	0.0087	
-2.1	0.0179	0.0174	0.0170	0.0125	0.0123	0.0122	0.0119	0.0110	0.0113	0.0110
-2.0	0.0228	0.0222	0.0217	0.0212	0.0102	0.0138	0.0134	0.0130		0.0143
-1.9	0.0287	0.0281	0.0274	0.0212	0.0262	0.0202	0.0157		0.0188	0.0183
-1.8	0.0359	0.0351	0.0274	0.0208	0.0202	0.0230	0.0230	0.0244	0.0239	0.0233
-1.7	0.0446	0.0436	0.0344	0.0330	0.0329	0.0322		0.0307	0.0301	0.0294
-1.6	0.0548	0.0430	0.0526	0.0416	0.0409		0.0392	0.0384	0.0375	0.0367
-1.5	0.0668	0.0557	0.0520	0.0310	0.0503	0.0495	0.0485	0.0475	0.0465	0.0455
-1.4	0.0808	0.0033	0.0043			0.0606	0.0594	0.0582	0.0571	0.0559
-1.3	0.0808	0.0793	0.0778	0.0764 0.0918	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.2	0.0308	0.0931	0.0934		0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.1	0.1151			0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.0	0.1587	0.1335 .	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
		0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2388	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2482	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

TABLE E.2

The Cumulative Standardized Normal Distribution (continued)

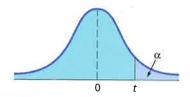
Entry represents area under the cumulative standardized normal distribution from $-\infty$ to Z



Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
								0.5270	0.5319	0.5359
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5519	0.5753
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5733
).2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064		0.6517
).3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	
).4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
).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	0.7518	0.7549
.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
8.0	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
).9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
.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
.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
.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	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889	0.99893	0.99897	0.9990
	0.99903	0.99906	0.99910	0.99913	0.99916	0.99918	0.99921	0.99924	0.99926	0.9992
3.1	0.99903	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.9995
3.2	0.99951	0.99953	0.99955	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.9996
3.3		0.99968	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.9997
3.4	0.99966		0.99978	0.99979	0.99980	0.99981	0.99981	0.99982	0.99983	0.9998
3.5	0.99977	0.99978		0.99979	0.99986	0.99987	0.99987	0.99988	0.99988	0.9998
3.6	0.99984	0.99985	0.99985	0.99990	0.99991	0.99991	0.99992	0.99992	0.99992	0.9999
3.7	0.99989	0.99990	0.99990			0.99994	0.99994	0.99995	0.99995	0.9999
3.8	0.99993	0.99993	0.99993	0.99994	0.99994	0.99994	0.99994	0.99996	0.99997	0.9999
3.9	0.99995	0.99995	0.99996	0.99996	0.99996	0.99990	0.99990	0.77770	0.77771	0.7777
4.0	0.999968329									
4.5	0.999996602									
5.0	0.999999713									
5.5 6.0	0.99999998									

TABLE E.3Critical Values of t

For a particular number of degrees of freedom, entry represents the critical value of t corresponding to the cumulative probability $(1-\alpha)$ and a specified upper-tail area (α) .



			Cumulativ	e Probabilities	The Table 14	
	0.75	0.90	0.95	0.975	0.99	0.995
Degrees of		1-61-3	Upper-	Tail Areas		
Freedom	0.25	0.10	0.05	0.025	0.01	0.005
1	1.0000	3.0777	6.3138	12.7062	31.8207	63.6574
2	0.8165	1.8856	2.9200	4.3027	6.9646	9.9248
3	0.7649	1.6377	2.3534	3.1824	4.5407	5.8409
4	0.7407	1.5332	2.1318	2.7764	3.7469	4.6041
5	0.7267	1.4759	2.0150	2.5706	3.3649	4.0322
6	0.7176	1.4398	1.9432	2.4469	3.1427	3.7074
7	0.7111	1.4149	1.8946	2.3646	2.9980	3.4995
8	0.7064	1.3968	1.8595	2.3060	2.8965	3.3554
9	0.7027	1.3830	1.8331	2.2622	2.8214	
10	0.6998	1.3722	1.8125	2.2281	2.7638	3.2498
	A. I					3.1693
11	0.6974	1.3634	1.7959	2.2010	2.7181	3.1058
12	0.6955	1.3562	1.7823	2.1788	2.6810	3.0545
13	0.6938	1.3502	1.7709	2.1604	2.6503	3.0123
14	0.6924	1.3450	1.7613	2.1448	2.6245	2.9768
15	0.6912	1.3406	1.7531	2.1315	2.6025	2.9467
16	0.6901	1.3368	1.7459	2.1199	2.5835	2.9208
17	0.6892	1.3334	1.7396	2.1098	2.5669	2.8982
18	0.6884	1.3304	1.7341	2.1009	2.5524	2.8784
19	0.6876	1.3277	1.7291	2.0930	2.5395	2.8609
20	0.6870	1.3253	1.7247	2.0860	2.5280	2.8453
21	0.6864	1.3232	1.7207	2.0796	2.5177	2.8314
22	0.6858	1.3212	1.7171	2.0739	2.5083	2.8188
23	0.6853	1.3195	1.7139	2.0687	2.4999	2.8073
24	0.6848	1.3178	1.7109	2.0639	2.4922	2.7969
25	0.6844	1.3163	1.7081	2.0595	2.4851	2.7874
26	0.6840	1.3150	1.7056			
27	0.6837	1.3137		2.0555 2.0518	2.4786	2.7787
28	0.6834	1.3137	1.7033		2.4727	2.7707
29	0.6830		1.7011	2.0484	2.4671	2.7633
30	0.6828	1.3114	1.6991	2.0452	2.4620	2.7564
		1.3104	1.6973	2.0423	2.4573	2.7500
31	0.6825	1.3095	1.6955	2.0395	2.4528	2.7440
32	0.6822	1.3086	1.6939	2.0369	2.4487	2.7385
33	0.6820	1.3077	1.6924	2.0345	2.4448	2.7333
34	0.6818	1.3070	1.6909	2.0322	2.4411	2.7284
35	0.6816	1.3062	1.6896	2.0301	2.4377	2.7238
36	0.6814	1.3055	1.6883	2.0281	2.4345	2.7195
37	0.6812	1.3049	1.6871	2.0262	2.4314	2.7154
38	0.6810	1.3042	1.6860	2.0244	2.4286	2.7116
39	0.6808	1.3036	1.6849	2.0227	2.4258	2.7079
40	0.6807	1.3031	1.6839	2.0211	2.4233	2.7045
41	0.6805	1.3025	1.6829	2.0195	2.4208	2.7012
42	0.6804	1.3020	1.6820	2.0181	2.4185	2.6981
43	0.6802	1.3016	1.6811	2.0167	2.4163	2.6951
44	0.6801	1.3011	1.6802	2.0154	2.4141	2.6923
45	0.6800	1.3006	1.6794	2.0134	2.4141	2.6896
46	0.6799					
47		1.3002	1.6787	2.0129	2.4102	2.6870
	0.6797	1.2998	1.6779	2.0117	2.4083	2.6846
48	0.6796	1.2994	1.6772	2.0106	2.4066	2.6822

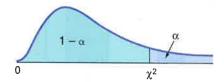
TABLE E.3
Critical Values of t (continued)

			Cumulative	Probabilities		
	0.75	0.90	0.95	0.975	0.99	0.995
Degrees of			Upper-T	ail Areas		
Freedom	0.25	0.10	0.05	0.025	0.01	0.005
49	0.6795	1.2991	1.6766	2.0096	2.4049	2.6800
50	0.6794	1.2987	1.6759	2.0086	2.4033	2.6778
51	0.6793	1.2984	1.6753	2.0076	2.4017	2.6757
52	0.6792	1.2980	1.6747	2.0066	2.4002	2.6737 2.6718
53	0.6791	1.2977	1.6741	2.0057 2.0049	2.3988 2.3974	2.6700
54 55	0.6791 0.6790	1.2974 1.2971	1.6736 1.6730	2.0049	2.3961	2.6682
		1:2969	1.6725	2.0032	2.3948	2.6665
56 57	0.6789 0.6788	1.2966	1.6720	2.0025	2.3936	2.6649
58	0.6787	1.2963	1.6716	2.0017	2.3924	2.6633
59	0.6787	1.2961	1.6711	2.0010	2.3912	2.6618
60	0.6786	1.2958	1.6706	2.0003	2.3901	2.6603
61	0.6785	1.2956	1.6702	1.9996	2.3890	2.6589
62	0.6785	1.2954	1.6698	1.9990	2.3880	2.6575
63	0.6784	1.2951	1.6694	1.9983	2.3870	2.6561
64	0.6783	1.2949	1.6690	1.9977	2.3860	2.6549
65	0.6783	1.2947	1.6686	1.9971	2.3851	2.6536
66	0.6782	1.2945	1.6683	1.9966	2.3842	2.6524
67	0.6782	1.2943	1.6679	1.9960	2.3833	2.6512
68	0.6781	1.2941	1.6676	1.9955	2.3824	2.6501
69	0.6781	1.2939	1.6672	1.9949	2.3816	2.6490
70	0.6780	1.2938	1.6669	1.9944	2.3808	2.6479
71	0.6780	1.2936	1.6666	1.9939	2.3800	2.6469
72	0.6779	1.2934	1.6663	1.9935	2.3793	2.6459
73	0.6779	1.2933	1.6660	1.9930	2.3785	2.6449 2.6439
74	0.6778	1.2931	1.6657	1.9925 1.9921	2.3778 2.3771	2.6439
75	0.6778	1.2929	1.6654			
76	0.6777	1.2928	1.6652	1.9917	2.3764	2.6421 2.6412
77	0.6777	1.2926	1.6649	1.9913	2.3758 2.3751	2.6412
78	0.6776	1.2925	1.6646 1.6644	1.9908 1.9905	2.3745	2.6395
79 80	0.6776 0.6776	1.2924 1.2922	1.6641	1.9901	2.3739	2.6387
					2.3733	2.6379
81	0.6775 0.6775	1.2921 1.2920	1.6639 1.6636	1.9897 1.9893	2.3727	2.6371
82 83	0.6775	1.2920	1.6634	1.9890	2.3721	2.6364
84	0.6774	1.2917	1.6632	1.9886	2.3716	2.6356
85	0.6774	1.2916	1.6630	1.9883	2.3710	2.6349
86	0.6774	1.2915	1.6628	1.9879	2.3705	2.6342
87	0.6773	1.2914	1.6626	1.9876	2.3700	2.6335
88	0.6773	1.2912	1.6624	1.9873	2.3696	2.6329
89	0.6773	1.2911	1.6622	1.9870	2.3690	2.6322
90	0.6772	1.2910	1.6620	1.9867	2.3685	2.6316
91	0.6772	1.2909	1.6618	1.9864	2.3680	2.6309
92	0.6772	1.2908	1.6616	1.9861	2.3676	2.6303
93	0.6771	1.2907	1.6614	1.9858	2.3671	2.6297
94	0.6771	1.2906	1.6612	1.9855	2.3667	2.6291
95	0.6771	1.2905	1.6611	1.9853	2.3662	2.6286
96	0.6771	1.2904	1.6609	1.9850	2.3658	2.6280
97	0.6770	1.2903	1.6607	1.9847	2.3654	2.6275
98	0.6770	1.2902	1.6606	1.9845	2.3650	2.6269
99	0.6770	1.2902	1.6604	1.9842	2.3646	2.6264 2.6259
100	0.6770	1.2901	1.6602	1.9840	2.3642	
110	0.6767	1.2893	1.6588	1.9818	2.3607	2.6213
120	0.6765	1.2886	1.6577	1.9799	2.3578	2.6174
00	0.6745	1.2816	1.6449	1.9600	2.3263	2.5758

TABLE E.4

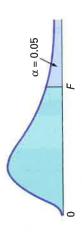
Critical Values of χ^2

For a particular number of degrees of freedom, entry represents the critical value of χ^2 corresponding to the cumulative probability $(1-\alpha)$ and a specified upper-tail area (α) .



					C	umulative	Probabili	ties				
	0.005	0.01	0.025	0.05	0.10	0.25	0.75	0.90	0.95	0.975	0.99	0.995
Degrees of						Upper-Ta	il Areas (a	r)				1
Freedom	0.995	0.99	0.975	0.95	0.90	0.75	0.25	0.10	0.05	0.025	0.01	0.005
1			0.001	0.004	0.016	0.102	1.323	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	0.575	2.773	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	1.213	4.108	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	1.923	5.385	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	2.675	6.626	9,236	11.071	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	3.455	7.841	10.645	12.592	14.449	16.812	18.458
7	0.989	1.239	1.690	2.167	2.833	4.255	9.037	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	5.071	10.219	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	5.899	11.389	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	6.737	12.549	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	7.584	13.701	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	8.438	14.845	18.549	21.026	23.337	26.217	28.299
13	3.565	4.107	5.009	5.892	7.042	9.299	15.984	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	10.165	17.117	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	11.037	18.245	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	11.912	19.369	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	12.792	20.489	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	13.675	21.605	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	14.562	22.718	27.204	30.144	32.852	36.191	38.582
20	7.434	8,260	9.591	10.851	12.443	15.452	23.828	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	16.344	24.935	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.042	17.240	26.039	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	18.137	27.141	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	19.037	28.241	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	19.939	29.339	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	20.843	30.435	35,563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	21.749	31.528	36.741	40.113	43.194	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	22.657	32.620	37.916	41.337	44.461	48.278	50.993
29	13.121	14.257	16.047	17.708	19.768	23.567	33.711	39.087	42.557	45.722	49.588	52.336
30	13.787	14.954	16.791	18.493	20.599	24,478	34.800	40.256	43.773	46.979	50.892	53.672

For larger values of degrees of freedom (df) the expression $Z = \sqrt{2\chi^2} - \sqrt{2(df) - 1}$ may be used and the resulting upper-tail area can be found from the cumulative standardized normal distribution (Table E.2).

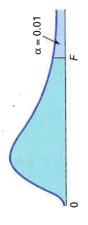


148LE E.5 Critical Values of F

For a particular combination of numerator and denominator degrees of freedom, entry represents the critical values of F corresponding to the cumulative probability $(1-\alpha)$ and a specified upper-tail area (α) .

				w				Cumulati	ve Probab	Cumulative Probabilities = 0.95				H		ı İ			1120
				Щ.			"	Uppe	Upper-Tail Areas = 0.05	38 = 0.05				N I N					343
								Z	Numerator, df,	: df.									
Denominator,	-	,	e	4	v	٧	۲	00	6	10	21	15	20	2	30	40	9	120	8
ay2	141 40	100 50	215.70	11.	230.20	234 00	236.80	12	240.50	241.90	243.90	245.90	248.00	249.10	250.10	251.10	252.20	253.30	254.30
,	18.51	19.00	19.16	•	19.30	19.33	19.35	•	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
۷ ۳	10.13	9.55	9.28		9.01	8.94	8.89		8.81	8.79	8.74	8.70	99.8	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	60.9	6.04	00.9	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	99.5	5.63
5	6.61	5.79	5.41		5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36
	5 99	5.14	4.76		4.39	4.28	4.21		4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
	5.59	4.74	4.35		3.97	3.87	3.79		3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
- 00	5.32	4.46	4.07		3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
6	5.12	4.26	3.86		3.48	3.37	3.29		3.18	3.14	3.07	3.01	2.8	2.90	2.86	2.83	2.79	2.75	2.71
01	4.96	4.10	3.71		3.33	3.22	3.14		3.02	2.98	2.91	2.85	2.77	2.74	2.70	5.66	2.62	2.58	2.54
2 -	4 84	3 08	3.59		3.20	3.09	3.01		2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49		3.11	3.00	2.91		2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41		3.03	2.92	2.83		2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34		2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2,31	2.27	2.22	2.18	2.13
15	4 54	3 68	3.29		2.90	2.79	2.71		2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
91	4.49	3.63	3.24		2.85	2.74	2.66		2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20		2.81	2.70	2.61		2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
. 2	4.41	3.55	3.16		2.77	2.66	2.58		2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13		2.74	2.63	2.54		2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10		2.71	2.60	2.51		2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.8
21	4.32	3.47	3.07		2.68	2.57	2.49		2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05		2.66	2.55	2.46		2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.91	1.89	<u>\$</u>	1.78
23	4.28	3.42	3.03		2.64	2.53	2.44		2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.70
24	4.26	3.40	3.01		2.62	2.51	2.42		2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1./3
25	4 74	3.39	2.99		2.60	2.49	2.40		2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4 23	3.37	2.98		2.59	2.47	2.39		2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3,35	2.96		2.57	2.46	2.37		2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95		2.56	2.45	2.36		2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
S3 13	4.18	3.33	2.93		2.55	2.43	2.35		2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	<u>2</u> .
30	4.17	3.32	2.92		2.53	2.42	2.33		2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
8 9	4 08	3.23	2.84		2.45	2.34	2.25		2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
9	4.00	3.15	2.76		2.37	2.25	2.17		2.04	1.99	1.92	1.8	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68		2.29	2.17	2.09		1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
8	3.84	3.00	2.60	2.37	2.21	2.10	2.01		1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00

								Cumulati	ve Probab	Cumulative Probabilities = 0.975	175								
						12	7,	Uppe	Upper-Tail Areas = 0.025	18 = 0.025			E				Ī		
			1						Numerator, df.	; df1									
Denominator,														-					
dfz	-	2	3	4	5	9	7	90	6	10	12	15	20	24	30	40	09	120	8
1	647.80	799.50	864.20	899.60	921.80	937.10	948.20	956.70	963.30	968.60	976.70	984.90	993.10	997.20	1.001.00	1,006,00	1 010 00	1 014 00	1 018 00
7	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.39	39.39	39.40	39.41	39.43	39.45			39.47	39.48	39 49	39.50
3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.34	14.25	14.17	14.12	14.08	14.04	13 00	13.05	13 90
4	12.22	10.65	86.6	09.6	9.36	9.20	6.07	8.98	8.90	8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26
5	10.01	8.43	7.76	7.39	7.15	86.9	6.85	97.9	89.9	6.62	6.52	6.43	6.33	6.28	6.23	6.18	619	6.07	209
9	8.81	7.26	09.9	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.37	5.27	5.17	5.12	5.07	5.01	4 96	4 90	4 85
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.67	4.57	4.47	4.42	4.36	4.31	4.25	4.20	4.14
∞ .	7.57	90.9	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67
6	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33
10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3 14	3.08
==	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2 94	288
12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.72
13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2,66	2,60
14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49
15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.70	2.64	2 50	2 53	246	2.40
16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2 38	2 33
17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	225
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19
19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13
20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.68	2.57	2.46	2.41	2.35	2.29	222	2.16	2.09
21	5.83	4.42	3.82	3.48	3.25	3.09	2.97	2.87	2.80	2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	202
22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00
23	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73	2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97
47	5.72	4.32	3.72	3,38	3.15	2.99	2.87	2.78	2.70	2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94
25	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68	2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91
26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88
27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63	2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	5.69	2.61	2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83
29	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59	2.53	2.43	2.32	2.21	2.15	2.09	2.03	1.96	1.89	1.81
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79
40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	29.1
09	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	2.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48
120	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22	2.16	2.05	1.94	1.82	1.76	1.69	19.1	1.53	1.43	1.31
8	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00
																		9	Continued



Particulativity Particulat									Cumminger		Communication of the communica						l	ŀ		
Numeration, 4 2 3 4 5 6 7 8 9 10 12 15 10 24 3 3 4 5 6 7 8 9 10 12 15 10 24 3 3 4 5 6 7 8 9 10 12 15 10 24 3 3 4 3 3 4 3 3 4 3 3								1	Uppe	r-Tail Area	s = 0.01				34			H		
March Conditionatory									Z	umerator,	df1							-		
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96.20 99.20 99.21 99.22 99.23 99.24 99.23 99.24 <th< td=""><td>100</td><td>4 052 00</td><td>4 000 50</td><td>5 402 00</td><td>00 569 5</td><td>5 764 00</td><td>1</td><td>5 978 00</td><td>5 982 00</td><td>6.022.00</td><td>6.056.00</td><td>I _</td><td></td><td></td><td>II _</td><td></td><td>6,287.00</td><td>6,313.00</td><td>6,339.00</td><td>6,366.00</td></th<>	100	4 052 00	4 000 50	5 402 00	00 569 5	5 764 00	1	5 978 00	5 982 00	6.022.00	6.056.00	I _			II _		6,287.00	6,313.00	6,339.00	6,366.00
34,12 36,82 29,46 28,71 28,24 27,91 77,61 77,49 77,23 27,13 76,70 78,79 78,70 <th< td=""><td>- (</td><td>98.50</td><td>00 00</td><td>99 17</td><td>99 25</td><td>99.30</td><td>í</td><td>99.36</td><td>99.37</td><td>99.39</td><td>99.40</td><td></td><td></td><td></td><td></td><td>99.47</td><td>99.47</td><td>99.48</td><td>99.49</td><td>99.50</td></th<>	- (98.50	00 00	99 17	99 25	99.30	í	99.36	99.37	99.39	99.40					99.47	99.47	99.48	99.49	99.50
11.25 18.00 16.69 15.98 15.22 15.21 14.89 14.80 14.66 14.57 14.71 14.90 14.80 <th< td=""><td>4 (*</td><td>34.12</td><td>30.82</td><td>29.46</td><td>28.71</td><td>28.24</td><td></td><td>27.67</td><td>27.49</td><td>27.35</td><td>27.23</td><td>27.05</td><td>26.87</td><td>56.69</td><td>26.60</td><td>26.50</td><td>26.41</td><td>26.32</td><td>26.22</td><td>26.13</td></th<>	4 (*	34.12	30.82	29.46	28.71	28.24		27.67	27.49	27.35	27.23	27.05	26.87	56.69	26.60	26.50	26.41	26.32	26.22	26.13
1626 1327 1206 1139 1097 1046 1029 1016 1005 989 977 955 947 1327 1029 8,78 13,28 8,14 826 810 602 662 662 662 662 677 578 771 676 678 677 578 778 778 777 778 478	4	21.20	18.00	16.69	15.98	15.52		14.98	14.80	14.66	14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46
1377 1032 9.78 9.15 8.75 8.47 8.26 8.10 798 777 775 776 777 778 778 771 6.08 6.04 6.04 6.04 6.07 6.04 6.07 6.04 6.07 <td>۷</td> <td>16.26</td> <td>13.27</td> <td>12.06</td> <td>11.39</td> <td>10.97</td> <td></td> <td>10.46</td> <td>10.29</td> <td>10.16</td> <td>10.05</td> <td>68.6</td> <td>9.72</td> <td>9.55</td> <td>9.47</td> <td>9.38</td> <td>9.29</td> <td>9.20</td> <td>9.11</td> <td>9.02</td>	۷	16.26	13.27	12.06	11.39	10.97		10.46	10.29	10.16	10.05	68.6	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02
12.55 9.55 8.45 7.86 7.46 7.19 6.99 6.84 6.72 6.47 6.31 6.16 6.07 11.26 8.65 7.93 7.04 6.63 6.37 6.18 6.03 5.94 6.75 5.89 6.18 6.73 6.18 6.73 5.89 6.18 6.73 6.18 6.73 5.26 5.11 6.52 5.99 5.64 5.29 5.04 4.89 4.85 4.71 4.95 4.71 4.96 4.70 4.85 4.71 4.96 4.89 4.74 4.99 4.79 4.79 4.79 4.70 4.79 4.70	. 4	13.75	10.92	9.78	9.15	8.75		8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88
1126 8.65 7.59 7.01 6.63 6.37 6.18 6.03 5.91 5.81 5.67 5.36 5.28 5.28 5.61 5.81 5.67 5.35 5.26 5.71 5.83 5.64 5.81 6.66 5.80 6.61 5.80 5.64 5.81 5.67 5.82 5.64 5.83 5.64 4.94 4.85 4.71 4.65 4.81 4.71 4.65 4.81 4.71 4.65 4.81 4.71 4.66 4.81 4.71 4.66 4.81 4.71 4.66 4.81 4.71 4.69 4.74 4.60 4.84 4.70 4.72 4.71 4.60 4.84 4.70 4.72 4.14 4.00 3.89 3.80 3.61 3.73 3.84 3.71 3.64 3.81 3.74 4.70 4.89 4.74 4.00 3.89 3.80 3.61 3.70 3.89 3.89 3.80 3.61 3.71 3.82 3.71 <th< td=""><td>7</td><td>12.25</td><td>9.55</td><td>8.45</td><td>7.85</td><td>7.46</td><td></td><td>66.9</td><td>6.84</td><td>6.72</td><td>6.62</td><td>6.47</td><td>6.31</td><td>91.9</td><td>6.07</td><td>5.99</td><td>5.91</td><td>5.82</td><td>5.74</td><td>5.65</td></th<>	7	12.25	9.55	8.45	7.85	7.46		66.9	6.84	6.72	6.62	6.47	6.31	91.9	6.07	5.99	5.91	5.82	5.74	5.65
10.56 8.02 6.99 6.42 6.06 5.80 5.41 5.35 5.26 5.11 4.96 4.81 4.73 10.04 7.56 6.55 5.99 5.64 5.39 5.64 5.90 4.94 4.85 4.71 4.96 4.41 4.33 9.37 6.23 5.99 5.64 5.39 5.64 4.90 4.90 4.85 4.71 4.90 4.25 4.41 4.30 4.90 4.75 4.40 4.25 4.41 4.90 4.93 4.40 4.25 4.41 4.90 4.93 4.41 4.01 3.96 3.89 3.79 4.40 4.01 3.89 3.78 3.96 3.89 3.78 3.96 3.89 3.78 3.96 3.89 3.78 3.96 3.89 3.78 3.99 3.89 3.78 3.99 3.89 3.78 3.99 3.89 3.78 3.99 3.89 3.78 3.99 3.89 3.78 3.99 3.8	. 60	11.26	8.65	7.59	7.01	6.63		6.18	6.03	5.91	5.81	2.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86
1004 756 655 599 564 839 520 506 494 485 471 456 471 456 471 456 471 456 479 480 474 460 489 474 460 489 474 460 489 471 460 480 471 460 480 470 <td>6</td> <td>10.56</td> <td>8.02</td> <td>6.99</td> <td>6.42</td> <td>90.9</td> <td></td> <td>5.61</td> <td>5.47</td> <td>5:35</td> <td>5.26</td> <td>5.11</td> <td>4.96</td> <td>4.81</td> <td>4.73</td> <td>4.65</td> <td>4.57</td> <td>4.48</td> <td>4.40</td> <td>4.31</td>	6	10.56	8.02	6.99	6.42	90.9		5.61	5.47	5:35	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31
9.65 7.21 6.22 5.67 5.32 5.07 4.89 4.74 4.63 4.34 4.40 4.25 4.10 4.00 4.01 4.02 4.01 4.02 4.01 4.02 4.40 4.50 4.30 4.30 4.10 4.10 4.10 4.01 3.06 3.88 3.78 8.86 6.31 5.56 5.40 4.66 4.62 4.44 4.00 3.89 3.80 3.60 3.69 3.59 3.69 3.69 3.69 3.69 3.69 3.69 3.69 3.69 3.69 3.69 3.79 3.69 3.69 3.69 3.69 3.79 3.69 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.69 3.79 3.79 3.70 3.89 3.78 3.69 3.79 3.	10	10.04	7.56	6.55	5.99	5.64		5.20	5.06	4.94	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91
933 693 595 541 506 482 464 450 430 416 401 386 378 378 907 670 574 521 486 462 444 430 410 396 382 366 359 886 651 556 594 469 446 428 414 430 410 396 389 369 367 352 343 346 359 368 359 369 366 359 368 359 369 366 389 368 369	2 =	9.65	7.21	6.22	5.67	5.32		4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60
9.07 6.70 5.74 5.21 4.86 4.62 4.44 4.30 4.19 4.10 3.96 3.82 3.66 3.59 8.86 6.51 5.56 5.04 4.69 4.46 4.28 4.14 4.03 3.94 3.86 3.67 3.51 3.41 3.49 3.89 3.	12	9.33	6.93	5.95	5.41	5.06		4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36
8.86 6.51 5.56 5.04 4.69 4.46 4.28 4.14 4.03 3.94 3.80 3.66 3.51 3.43 3.43 8.68 6.36 5.42 4.89 4.56 4.32 4.14 4.00 3.89 3.89 3.67 3.52 3.31 3.29 8.53 6.23 5.29 4.77 4.44 4.20 4.03 3.89 3.78 3.69 3.59 3.61 3.50 3.31 3.16 3.18 3.29 3.89 3.69 3.69 3.59 3.49 3.69 3.89 3.69 3.69 3.49 3.71 3.69 3.89 3.69 3.49 3.71 3.69 3.79<	13	9.07	6.70	5.74	5.21	4.86		4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.59	3.51	3,43	3.34	3.25	3.17
8.68 6.36 5.42 4.89 4.56 4.32 4.14 4.00 3.89 3.80 3.67 3.52 3.71 3.29 8.53 6.23 5.29 4.77 4.44 4.20 4.03 3.89 3.78 3.69 3.55 3.41 3.26 3.18 3.69 3.55 3.41 3.26 3.18 3.69 3.69 3.55 3.41 3.26 3.18 3.69 3.78 3.69 3.55 3.41 3.26 3.89 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.69 3.78 3.79 3.78 3.79 3.78 3.79 3.78 3.79 3.78 3.79 3.78 3.79 3.78 3.79 3.78 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.79 3.	14	8.86	6.51	5.56	5.04	4.69		4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00
8.53 6.23 5.29 4.77 4.44 4.20 4.03 3.89 3.78 3.69 3.55 3.41 3.26 3.18 3.18 3.18 3.18 3.19 3.19 3.79 3.69 3.79 3.69 3.59 3.79 3.69 3.59 3.79 3.69 3.59 3.46 3.31 3.16 3.08 3.00 8.10 5.83 4.94 4.43 4.10 3.84 3.71 3.69 3.54 3.31 3.15 3.09 2.94 3.89 3.79 3.69 3.59 3.46 3.51 3.46 3.31 3.31 3.10 3.08 3.08 3.08 3.09 3.09 3.76 3.69 3.46 3.31 3.49 3.71 3.46 3.31 3.46 3.31 3.46 3.31 3.46 3.31 3.17 3.09 2.89 2.89 3.70 2.89 2.89 3.70 3.78 3.89 3.72 3.12 3.09 2.89 2.	15	898	6.36	5.42	4.89	4.56		4.14	4.00	3.89	3.80	3.67	3,52	3.37	3.29	3.21	3.13	3.05	2.96	2.87
8.40 6.11 5.18 4.67 4.34 4.10 3.93 3.79 3.68 3.59 3.46 3.31 3.16 3.08 8.29 6.01 5.09 4.58 4.25 4.01 3.84 3.71 3.60 3.51 3.73 3.23 3.08 3.00 2.92 8.18 5.93 5.01 4.50 4.17 3.84 3.71 3.60 3.51 3.73 3.23 3.09 2.94 3.00 8.10 5.83 4.94 4.43 4.10 3.81 3.64 3.31 3.73 3.03 3.99 3.09 2.94 3.71 3.40 3.31 3.17 3.03 3.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 3.00 3.01 3.02 3.03 3.12 3.03 3.12 3.03 3.12 3.03 3.12 3.03 3.12 3.89 2.89 2.89 <td>91</td> <td>8.53</td> <td>6.23</td> <td>5.29</td> <td>4.77</td> <td>4.44</td> <td></td> <td>4.03</td> <td>3.89</td> <td>3.78</td> <td>3.69</td> <td>3.55</td> <td>3.41</td> <td>3.26</td> <td>3.18</td> <td>3.10</td> <td>3.02</td> <td>2.93</td> <td>2.81</td> <td>2.75</td>	91	8.53	6.23	5.29	4.77	4.44		4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.81	2.75
8.29 6.01 5.09 4.58 4.25 4.01 3.84 3.71 3.60 3.51 3.73 3.23 3.08 3.00 2.92 8.18 5.93 5.01 4.50 4.17 3.94 3.77 3.63 3.52 3.43 3.37 3.15 3.09 2.94 2.92 8.10 5.85 4.94 4.43 4.10 3.81 3.64 3.37 3.37 3.15 3.09 2.94 2.86 8.02 5.78 4.87 4.04 3.81 3.64 3.31 3.17 3.09 2.94 2.88 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 <td>17</td> <td>8.40</td> <td>6.11</td> <td>5.18</td> <td>4.67</td> <td>4.34</td> <td>_</td> <td></td> <td>3.79</td> <td>3.68</td> <td>3.59</td> <td>3.46</td> <td>3.31</td> <td>3.16</td> <td>3.08</td> <td>3.00</td> <td>2.92</td> <td>2.83</td> <td>2.75</td> <td>2.65</td>	17	8.40	6.11	5.18	4.67	4.34	_		3.79	3.68	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65
8.18 5.93 5.01 4.50 4.17 3.94 3.77 3.63 3.52 3.43 3.30 3.15 3.00 2.92 8.10 5.85 4.94 4.43 4.10 3.87 3.70 3.56 3.46 3.31 3.17 3.03 2.94 2.86 8.02 5.78 4.87 4.31 3.99 3.76 3.59 3.46 3.31 3.17 3.03 2.98 2.89 2.89 7.95 5.72 4.82 4.31 3.99 3.76 3.59 3.46 3.31 3.17 3.03 2.98 2.89 2.89 7.82 5.64 4.76 4.26 3.94 3.71 3.59 3.26 3.17 3.07 2.98 2.89 2.89 2.79 7.82 5.64 4.71 3.85 3.63 3.46 3.23 3.13 3.09 2.99 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79	. 62	8.29	6.01	5.09	4.58	4.25			3.71	3.60	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57
8.10 5.85 4.94 4.43 4.10 3.87 3.76 3.46 3.37 3.23 3.09 2.94 2.86 8.02 5.78 4.87 4.37 4.04 3.81 3.64 3.51 3.40 3.31 3.17 3.03 2.98 2.89 2.86 7.95 5.72 4.82 4.31 3.99 3.76 3.54 3.41 3.30 3.12 2.98 2.89 2.85 2.89 7.88 5.66 4.76 4.26 3.94 3.71 3.56 3.17 3.03 2.93 2.78 2.78 2.75 7.82 5.61 4.72 4.22 3.96 3.42 3.26 3.13 3.03 2.93 2.78 2.70 2.66 7.77 5.57 4.64 4.14 3.82 3.59 3.26 3.13 3.06 2.96 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89	19	8.18	5.93	5.01	4.50	4.17	_		3.63	3.52	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49
8.02 5.78 4.87 4.37 4.04 3.81 3.64 3.51 3.40 3.31 3.17 3.03 2.88 2.80 7.95 5.72 4.82 4.31 3.99 3.76 3.59 3.45 3.55 3.26 3.12 2.98 2.83 2.75 7.82 5.66 4.76 4.26 3.94 3.71 3.59 3.26 3.17 3.07 2.93 2.78 2.70 7.82 5.61 4.72 4.22 3.90 3.64 3.26 3.17 3.03 2.89 2.74 2.66 7.82 5.61 4.72 4.22 3.96 3.42 3.22 3.13 3.09 2.89 2.74 2.66 7.77 5.57 4.64 4.14 3.82 3.59 3.26 3.15 3.09 2.96 2.81 2.76 2.56 7.64 5.45 4.07 3.75 3.53 3.26 3.15 3.09 2.96	20	8 10	5.85	4.94	4.43	4.10			3.56	3.46	3.37	3.23	3.09	2.94	2.86	2.78	5.69	2.61	2.52	2.42
7.95 5.72 4.82 4.31 3.99 3.76 3.54 3.35 3.26 3.12 2.98 2.83 2.75 7.88 5.66 4.76 4.26 3.94 3.71 3.54 3.41 3.30 3.21 3.07 2.93 2.78 2.70 7.82 5.61 4.72 4.26 3.94 3.71 3.50 3.26 3.17 3.03 2.89 2.78 2.70 2.70 7.72 5.57 4.68 4.18 3.85 3.63 3.46 3.22 3.13 2.99 2.85 2.70 2.60 7.72 5.53 4.64 4.14 3.82 3.59 3.26 3.18 3.09 2.96 2.81 2.60 2.58 7.64 5.49 4.04 3.75 3.53 3.20 3.19 3.09 2.96 2.81 2.60 2.52 7.60 5.42 4.04 3.73 3.50 3.09 2.80 2.89	21	8.02	5.78	4.87	4.37	4.04	ł		3.51	3.40	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36
7.88 5.66 4.76 4.26 3.94 3.71 3.54 3.41 3.30 3.21 3.07 2.93 2.78 2.70 7.82 5.61 4.72 4.22 3.90 3.67 3.50 3.46 3.26 3.17 3.03 2.89 2.78 2.70 2.06 7.77 5.57 4.68 4.18 3.82 3.63 3.46 3.22 3.13 2.99 2.85 2.70 2.66 7.72 5.57 4.64 4.14 3.82 3.59 3.29 3.13 3.09 2.96 2.81 2.70 2.66 7.64 5.49 4.57 4.07 3.75 3.53 3.23 3.12 3.09 2.90 2.77 2.66 2.57 7.60 5.42 4.04 3.73 3.50 3.09 3.00 2.97 2.79 2.79 2.79 2.79 2.79 2.79 2.79 2.79 2.73 2.71 2.49 2.70	22	7.95	5.72	4.82	4.31	3.95			3.45	3.35	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31
7.82 5.61 4.72 4.22 3.90 3.67 3.50 3.36 3.26 3.17 3.03 2.89 2.74 2.66 7.77 5.57 4.68 4.18 3.85 3.63 3.46 3.32 3.13 2.99 2.85 2.70 2.62 7.72 5.53 4.64 4.14 3.82 3.59 3.29 3.18 3.09 2.96 2.81 2.66 2.58 7.64 5.49 4.60 4.11 3.78 3.59 3.29 3.18 3.09 2.96 2.81 2.66 2.58 7.64 5.45 4.07 3.75 3.53 3.23 3.12 3.09 2.90 2.77 2.63 2.52 7.60 5.42 4.04 3.73 3.50 3.39 3.09 3.00 2.77 2.69 2.87 2.77 2.60 2.52 2.77 2.49 7.56 5.39 4.51 4.02 3.70 3.44	23	7.88	5.66	4.76	4.26	3.94	_		3.41	3.30	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26
7.77 5.57 4.68 4.18 3.85 3.64 3.32 3.22 3.13 2.99 2.85 2.70 2.62 7.72 5.53 4.64 4.14 3.82 3.59 3.42 3.29 3.18 3.09 2.96 2.81 2.66 2.88 7.68 5.49 4.60 4.11 3.78 3.56 3.29 3.18 3.09 2.96 2.81 2.66 2.88 7.64 5.45 4.67 4.07 3.75 3.33 3.20 3.09 2.90 2.75 2.60 2.52 7.60 5.42 4.57 4.04 3.73 3.50 3.09 3.09 2.87 2.77 2.73 2.57 2.49 7.56 5.39 4.51 4.02 3.70 3.47 3.09 2.89 2.89 2.89 2.89 2.84 2.70 2.55 2.47 7.31 5.18 4.13 3.65 3.34 3.12 2.99	24	7.82	5.61	4.72	4.22	3.90	Ŀ		3.36	3.26	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21
7.72 5.53 4.64 4.14 3.82 3.59 3.42 3.29 3.18 3.09 2.96 2.81 2.66 2.58 7.68 5.49 4.60 4.11 3.78 3.56 3.39 3.26 3.15 3.06 2.93 2.78 2.63 2.55 7.64 5.45 4.57 4.07 3.75 3.33 3.20 3.09 3.00 2.77 2.60 2.52 7.60 5.42 4.54 4.04 3.73 3.30 3.17 3.09 3.09 2.80 2.87 2.73 2.57 2.49 7.56 5.39 4.51 4.02 3.70 3.47 3.30 3.17 3.09 2.89 2.89 2.89 2.89 2.84 2.70 2.55 2.47 7.08 4.98 4.13 3.65 3.34 3.12 2.99 2.89 2.80 2.66 2.56 2.57 2.39 2.39 2.39 2.39 2.39	25	7777	5 57	4.68	4.18	3.85			3.32	3.22	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17
7.68 5.49 4.60 4.11 3.78 3.56 3.39 3.26 3.15 3.06 2.93 2.78 2.63 2.55 7.64 5.45 4.57 4.07 3.75 3.35 3.26 3.23 3.12 3.06 2.93 2.78 2.60 2.52 7.60 5.42 4.54 4.04 3.73 3.30 3.17 3.09 3.00 2.87 2.73 2.57 2.49 7.56 5.39 4.51 4.02 3.70 3.47 3.30 3.17 3.07 2.98 2.84 2.70 2.55 2.47 7.31 5.18 4.31 3.83 3.51 3.29 2.89 2.89 2.80 2.66 2.56 2.56 2.57 2.71 2.96 2.79 2.66 2.56 2.57 2.39 2.31 2.29 6.85 4.79 3.95 3.48 3.17 2.96 2.56 2.56 2.47 2.34 2.19	3 %	7.72	5.53		4.14	3.8%			3.29	3.18	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13
7.64 5.45 4.57 4.07 3.75 3.33 3.20 3.03 2.90 2.75 2.60 2.52 7.60 5.42 4.54 4.04 3.73 3.50 3.39 3.09 3.09 2.87 2.73 2.57 2.49 7.56 5.39 4.51 4.02 3.70 3.47 3.30 3.17 3.07 2.98 2.84 2.70 2.55 2.47 7.31 5.18 4.31 3.83 3.51 3.29 3.12 2.99 2.89 2.80 2.66 2.52 2.37 2.29 7.08 4.98 4.13 3.65 3.34 3.12 2.99 2.89 2.80 2.66 2.56 2.57 2.50 2.37 2.29 6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 2.80	2 5	7.68	5 49		4.11	3.78			3.26	3.15	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10
7.60 5.42 4.54 4.04 3.73 3.50 3.33 3.20 3.09 3.00 2.87 2.73 2.57 2.49 7.56 5.39 4.51 4.02 3.70 3.47 3.30 3.17 3.07 2.98 2.84 2.70 2.55 2.47 7.31 5.18 4.31 3.83 3.51 3.29 3.12 2.99 2.89 2.80 2.66 2.52 2.37 2.29 7.08 4.98 4.13 3.65 3.34 3.12 2.95 2.82 2.72 2.63 2.50 2.35 2.20 2.12 6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.79	2 %	49.7	5.45		4.07	3.75			3.23	3.12	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06
7.56 5.39 4,51 4,02 3.70 3.47 3.30 3.17 3.07 2.98 2.84 2.70 2.55 2.47 7.31 5.18 4,31 3.83 3.51 3.29 3.12 2.99 2.89 2.80 2.66 2.52 2.37 2.29 7.08 4,98 4,13 3.65 3.34 3.12 2.95 2.82 2.72 2.63 2.35 2.20 2.12 6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79	23	7.60	5.42		40.4	3.73			3.20	3.09	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03
7.31 5.18 4.31 3.83 3.51 3.29 3.12 2.99 2.89 2.80 2.66 2.52 2.37 2.29 7.08 4.98 4.13 3.65 3.34 3.12 2.95 2.82 2.72 2.63 2.50 2.35 2.20 2.12 6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79	30	7.56	5 39		4.02	3.70			3.17	3.07	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01
7.08 4.98 4.13 3.65 3.34 3.12 2.95 2.82 2.72 2.63 2.50 2.35 2.20 2.12 6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79	8 8	7.31	5.18		3.83	3.51			2.99	2.89	2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80
6.85 4.79 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 6.63 4.61 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79	90	7.08	4.98		3.65	3.34	_		2.82	2.72	2.63	2.50	2.35	2.20	2.12	2.03	1. 2.	1.84	1.73	1.60
6.63 4.61 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79	120	6.85	4.79	_	3.48	3.1.	_		2.66	2.56	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38
	8	6.63	4.61		3.32	3.0.	• 1		2.51	2.41	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00

Critical Values of F (continued)



Parentement Pare									Upp	Upper-Tail Areas = 0.005	s = 0.005									
1.1. 1. 2. 3 4 5 6 7 8 9 10 12 13. 13. 14 15 15 15 15 15 15 15										Numerato	r, df.									
1,11, 1,1,	Denominato df ₂		и	m	4	ĸ	9	7	- 20	0	10	12	15	20	7.	30	40	8	120	8
198.3 198.3 199.3 199.3 199.3 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 199.4 149.4 149.3 149.4 159.4 149.4 <th< td=""><td>_</td><td>16,211.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>75 465 07</td></th<>	_	16,211.00																		75 465 07
31.33 40.39 47.47 46.19 46.29 <th< td=""><td>7</td><td>198.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>100 50</td></th<>	7	198.50																		100 50
41.33 26.32 24.36 21.94 21.13 21.13 26.32 24.36 21.94 21.14 21.13 26.32 24.36 21.94 21.14 21.14 21.04 21.04 21.04 21.04 21.04 21.04 21.04 21.04 21.04 21.04 11.04 <th< td=""><td>3</td><td>55.55</td><td>49.80</td><td>47.47</td><td>46.19</td><td>45.39</td><td>44.84</td><td>44.43</td><td>44.13</td><td>43.88</td><td>43.69</td><td>43.39</td><td>43.08</td><td>42.78</td><td>42.62</td><td>42.47</td><td>42.31</td><td>42.15</td><td>41.99</td><td>41.83</td></th<>	3	55.55	49.80	47.47	46.19	45.39	44.84	44.43	44.13	43.88	43.69	43.39	43.08	42.78	42.62	42.47	42.31	42.15	41.99	41.83
15.24 18.34 18.25 18.26 <th< td=""><td>4</td><td>31.33</td><td>26.28</td><td>24.26</td><td>23.15</td><td>22.46</td><td>21.97</td><td>21.62</td><td>21.35</td><td>21.14</td><td>20.97</td><td>20.70</td><td>20.44</td><td>20.17</td><td>20.03</td><td>19.89</td><td>19.75</td><td>19.61</td><td>19.47</td><td>19.32</td></th<>	4	31.33	26.28	24.26	23.15	22.46	21.97	21.62	21.35	21.14	20.97	20.70	20.44	20.17	20.03	19.89	19.75	19.61	19.47	19.32
18.54 14.54 11.04 10.05 11.04 11.05 10.0	5	22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77	13.62	13.38	13.15	12.90	12.78	12.66	12.53	12.40	12.27	12.11
1504 1104 960 960 1008 1004 972 916 839 836 849 841 941 940	9	18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39	10.25	10.03	9.81	9.59	9.47	9.36	9.24	9.12	9.00	888
14.69 11.104 96.0 88.8 3.90 7.59 7.69 7.59 7.50 7.59 7.69 7.50 7.50 7.50 6.00 6.50 6.00	7	16.24	12.40	10.88	10.05	9.52	9.16	8.89	89.8	8.51	8.38	8.18	7.97	7.75	7.65	7.53	7.42	7.31	7.19	7.08
136 10,11 877 796 747 713 688 669 654 642 642 643 549 579 585 579 585 549 530 549 589 544 549 54	00	14.69	11.04	9.60	8.81	8.30	7.95	49.7	7.50	7.34	7.21	7.01	6.81	19.9	6.50	6.40	6.29	6.18	90.9	5.95
11.23 9.43 8.08 1.34 6.87 6.83 6.84 5.45 6.87 6.89 6.34 6.87 6.89 6.34 6.89 6.47 6.49 6.47 6.42 6.42 6.42 6.42 <t< td=""><td>6</td><td>13.61</td><td>10.11</td><td>8.72</td><td>7.96</td><td>7.47</td><td>7.13</td><td>6.88</td><td>69.9</td><td>6.54</td><td>6.42</td><td>6.23</td><td>6.03</td><td>5.83</td><td>5.73</td><td>5.62</td><td>5.52</td><td>5.41</td><td>5.30</td><td>5.19</td></t<>	6	13.61	10.11	8.72	7.96	7.47	7.13	6.88	69.9	6.54	6.42	6.23	6.03	5.83	5.73	5.62	5.52	5.41	5.30	5.19
1123 891 760 688 642 610 586 558 558 558 558 549 549 489 475 486 475 481 475 446 475 446 447 447 447 447 447 449 447 <td>10</td> <td>12.83</td> <td>9.43</td> <td>8.08</td> <td>7.34</td> <td>6.87</td> <td>6.54</td> <td>6.30</td> <td>6.12</td> <td>5.97</td> <td>5.85</td> <td>5.66</td> <td>5.47</td> <td>5.27</td> <td>5.17</td> <td>5.07</td> <td>4.97</td> <td>4.86</td> <td>4.75</td> <td>4.61</td>	10	12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97	5.85	5.66	5.47	5.27	5.17	5.07	4.97	4.86	4.75	4.61
11/7 8,51 6,52 607 576 535 530 491 472 445 443 443 443 443 443 443 443 443 443 446 446 447 447 447 447 447 446<	11	12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54	5.42	5.24	5.05	4.86	4.75	4.65	4.55	4.4	4.34	4.23
1137 819 693 623 579 548 5.25 508 494 482 446 447 417 407 397 387 376 1137 819 693 623 526 526 526 486 442 443 446 447 449 388 379 378 378 378 378 378 470 447 449 449 444 448 448 447 449 <td>12</td> <td>11.75</td> <td>8.51</td> <td>7.23</td> <td>6.52</td> <td>6.07</td> <td>5.76</td> <td>5.52</td> <td>5.35</td> <td>5.20</td> <td>5.09</td> <td>4.91</td> <td>4.72</td> <td>4.53</td> <td>4.43</td> <td>4.33</td> <td>4.23</td> <td>4.12</td> <td>4.01</td> <td>3.90</td>	12	11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20	5.09	4.91	4.72	4.53	4.43	4.33	4.23	4.12	4.01	3.90
1106 792 668 608 5.56 5.05 4.05 4.55 4.05 4.65 4.05 4.86 4.72 4.60 4.43 4.05 4.85 4.75 4.60 4.85 4.75 4.67 4.85 4.75 4.07 4.85 3.79 3.89 3.79 3.86 3.59 3.78 3.79 3.86 3.79 3.89 3.	13	11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94	4.82	4.64	4.46	4.27	4.17	4.07	3.97	3.87	3.76	3.65
10.80 7.70 6.48 5.80 5.37 5.07 4.85 4.67 4.24 4.25 4.07 3.88 3.79 3.79 3.54 3.74 3.49 3.75 3.49 3.37 3.79 4.09 4.69 4.27 4.14 4.10 3.79 3.79 3.74 3.44 3.24 3.79 3.74 3.44 3.20 10.22 7.21 6.03 5.37 4.96 4.66 4.44 4.28 4.14 4.01 3.86 3.69 3.79 3.40 3.30 3.20 3.40 3.30 3.20 3.50 3.60 4.77 4.04 4.78 4.14 4.04 3.89 3.89 3.80	14	11.06	7.92	99.9	00.9	5.56	5.26	5.03	4.86	4.72	4.60	4.43	4.25	4.06	3.96	3.86	3.76	3.66	3.55	3.41
10.58 7.51 6.30 5.64 5.21 4.91 4.82 4.37 4.10 3.92 3.73 3.64 3.54 3.54 3.54 3.54 3.54 3.41 3.31 3.22 1.0.28 7.35 6.16 5.50 5.77 4.78 4.56 4.24 4.14 4.03 3.69 3.61 3.41 3.31 3.20 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 4.70 4.70 4.70 4.00 3.00 3.80 3.20 3.40 3.10 3.00 3.00 3.00 4.00 4.00 3.00 3.80 3.70 3.00 3.00 4.80 4.70 4.70 4.00 3.80 3.70 3.00 3.00 4.80 4.70 4.10 3.80 3.70 3.20 3.00 3.80 4.80 4.40 4.00 3.80 <td< td=""><td>15</td><td>10.80</td><td>7.70</td><td>6.48</td><td>5.80</td><td>5.37</td><td>5.07</td><td>4.85</td><td>4.67</td><td>4.54</td><td>4.42</td><td>4.25</td><td>4.07</td><td>3.88</td><td>3.79</td><td>3.69</td><td>3.58</td><td>3.48</td><td>3.37</td><td>3.26</td></td<>	15	10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54	4.42	4.25	4.07	3.88	3.79	3.69	3.58	3.48	3.37	3.26
10.38 7.35 6.16 5.50 5.07 4.78 4.26 4.14 3.97 3.79 3.61 3.51 3.10 3.91 3.10 3.91 3.10 3.91 3.10 3.91 3.10 3.91 3.10 3.91 3.10 3.92 3.10 3.92 3.70 4.86 4.44 4.28 4.14 3.93 3.86 3.50 3.40 3.11 3.11 3.10 2.99 9.94 6.89 5.37 5.27 4.86 4.47 4.26 4.09 3.86 3.86 3.50 3.24 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 3.12 4.47 4.26 4.99 3.86 3.77 3.69 3.88 3.77 3.60 3.89 3.77 3.60 3.89 3.77 3.60 3.89 3.79 3.18 3.20 3.11 3.20 3.11 3.11 3.10 3.99 3	16	10.58	7.51	6.30	5.64	5.21	4.91	4.69	4.52	4.38	4.27	4.10	3.92	3.73	3.64	3.54	3.44	3.33	3.22	3.11
1022 7.21 6.03 5.37 4.96 4.44 4.28 4.14 4.03 3.68 3.68 3.68 3.68 3.68 3.68 3.68 3.69 3.76 3.30 3.10 3.10 2.99 1007 7.09 5.92 5.87 4.86 4.47 4.26 4.34 4.18 4.04 3.95 3.86 3.50 3.40 3.31 3.21 3.11 3.00 2.89 2.89 2.92 3.82 3.17 3.06 3.89 3.70 3.69 3.80 3.26 3.89 3.70 3.69 3.89 3.70 3.69 3.89 3.70 3.69 3.89 3.70 3.69 3.89 3.70 3.69 3.89 3.70 3.69 3.80 3.70 3.69 3.89 3.70 3.80 3.70 3.80 3.70 3.80 3.70 3.80 3.80 3.70 3.80 3.80 3.80 3.80 3.80 3.80 3.80 3.80 3.	17	10.38	7.35	6.16	5.50	5.07	4.78	4.56	4.39	4.25	4.14	3.97	3.79	3.61	3.51	3.41	3.31	3.21	3.10	2.98
1007 7.09 5.92 5.27 4.85 4.56 4.34 4.18 4.04 3.93 3.76 3.31 3.11 3.11 3.00 2.89 9.94 6.99 5.82 5.17 4.76 4.47 4.26 4.09 3.96 3.85 3.77 3.69 3.87 3.77 3.69 3.77 3.69 3.87 3.77 3.69 3.77 3.69 3.77 3.69 3.77 3.69 3.77 3.69 3.77 3.69 3.77 3.69 3.79 3.	18	10.22	7.21	6.03	5.37	4.96	4.66	4.44	4.28	4.14	4.03	3.86	3.68	3.50	3.40	3.30	3.20	3.10	2.99	2.87
9.94 6.99 5.82 5.17 4.76 4.47 4.26 4.09 3.68 3.68 3.68 3.68 3.68 3.69 3.78 4.79 4.79 4.79 4.79 4.79 4.09 3.96 3.84 3.79 3.68 3.69 3.77 3.60 3.43 3.18 3.02 3.98 2.79 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.89 2.79 2.89 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89 3.79 3.79 3.49 3.89 3.79 3.49 3.49 3.89 3.79 3.49 3.49 3.79 3.49 3.79 3.49 3.79 3.49 3.79 <th< td=""><td>19</td><td>10.07</td><td>7.09</td><td>5.92</td><td>5.27</td><td>4.85</td><td>4.56</td><td>4.34</td><td>4.18</td><td>4.04</td><td>3.93</td><td>3.76</td><td>3.59</td><td>3.40</td><td>3.31</td><td>3.21</td><td>3.11</td><td>3.00</td><td>2.89</td><td>2.78</td></th<>	19	10.07	7.09	5.92	5.27	4.85	4.56	4.34	4.18	4.04	3.93	3.76	3.59	3.40	3.31	3.21	3.11	3.00	2.89	2.78
983 689 5.73 5.69 4.68 4.39 4.18 4.02 3.88 3.77 3.60 3.43 3.15 3.94 3.15 3.04 3.15 3.04 3.15 3.04 3.18 3.07 3.49 3.18 3.70 3.44 3.16 3.18 3.06 3.58 4.07 4.05 3.88 3.75 3.64 3.47 3.06 3.18 3.06 3.59 3.18 3.06 3.28 2.97 2.87 2.77 2.66 2.57 9.43 6.60 5.46 4.89 4.49 4.20 3.99 3.78 3.64 3.47 3.20 3.07 2.87 2.77 2.66 2.56 2.57 3.69 3.78 3.79 3.49 3.78 3.49 3.78 3.49 3.78 3.49 3.78 3.49 3.78 3.49 3.78 3.49 3.78 3.49 3.79 3.79 2.89 2.79 2.89 2.79 2.89 2.79 2.89	20	9.94	66.9	5.82	5.17	4.76	4.47	4.26	4.09	3.96	3.85	3.68	3.50	3.32	3.22	3.12	3.02	2.92	2.81	2.69
9.73 6.81 5.65 5.02 4.61 4.32 4.11 3.94 3.81 3.70 3.54 3.36 3.18 3.08 2.98 2.78 2.89 2.77 2.66 9.63 6.73 5.58 4.95 4.49 4.20 3.99 3.83 3.75 3.40 3.12 3.02 2.97 2.87 2.77 2.66 2.55 9.63 6.73 5.58 4.99 4.49 4.20 3.99 3.83 3.75 3.40 3.75 3.60 3.40 3.75 3.60 3.40 3.73 3.60 3.79 3.89 3.73 3.60 3.79 3.89 3.73 3.60 3.49 3.73 3.60 3.49 3.73 3.60 3.49 3.73 3.60 3.49 3.73 3.60 3.49 3.73 3.70 2.89 2.77 2.60 2.77 2.67 2.89 2.77 2.60 2.79 2.87 2.71 2.60 2.79 2.81<	21	9.83	6.89	5.73	5.09	4.68	4.39	4.18	4.02	3.88	3.77	3.60	3.43	3.24	3.15	3.05	2.95	2.84	2.73	2.61
9.63 6.73 5.58 4.95 4.54 4.26 4.05 3.88 3.75 3.64 3.47 3.10 3.12 3.02 2.92 2.82 2.71 2.60 4 4.55 4.59 4.89 4.05 3.89 3.75 3.42 3.25 3.06 2.97 2.87 2.77 2.67 2.67 2.50 2.55 9.48 6.60 5.46 4.84 4.43 4.15 3.94 3.78 3.64 3.75 3.01 2.92 2.87 2.77 2.67 2.77 2.67 2.69 2.45 2.45 3.49 3.73 3.15 2.97 2.87 2.77 2.67 2.67 2.67 2.67 2.69 2.45 2.47 2.69 2.45 2.47 3.69 3.73 3.41 3.25 3.11 2.93 2.73 2.73 2.73 2.73 2.73 2.74 2.75 2.74 2.75 2.41 2.75 2.41 3.75 3.41 <td>77</td> <td>9.73</td> <td>6.81</td> <td>5.65</td> <td>5.02</td> <td>4.61</td> <td>4.32</td> <td>4.11</td> <td>3.94</td> <td>3.81</td> <td>3.70</td> <td>3.54</td> <td>3.36</td> <td>3.18</td> <td>3.08</td> <td>2.98</td> <td>2.88</td> <td>2.77</td> <td>2.66</td> <td>2.55</td>	77	9.73	6.81	5.65	5.02	4.61	4.32	4.11	3.94	3.81	3.70	3.54	3.36	3.18	3.08	2.98	2.88	2.77	2.66	2.55
4.55 6.66 5.52 4.89 4.49 4.20 3.83 3.69 3.42 3.25 3.06 2.97 2.87 2.77 2.66 2.55 9.48 6.60 5.46 4.84 4.43 4.15 3.94 3.78 3.64 3.54 3.37 3.01 2.97 2.87 2.77 2.67 2.56 2.45 9.41 6.54 5.41 4.79 4.38 4.10 3.89 3.73 3.60 3.49 3.33 3.15 2.97 2.87 2.77 2.67 2.56 2.45 2.45 9.24 6.69 5.44 4.79 4.34 4.06 3.85 3.69 3.75 3.41 3.25 3.71 3.25 3.41 3.25 3.71 3.25 3.41 3.25 3.41 3.25 3.41 3.25 3.41 3.25 3.41 3.25 3.41 3.25 3.42 3.75 3.84 3.34 3.34 3.34 3.34 3.34 <td>23</td> <td>9.63</td> <td>6.73</td> <td>5.58</td> <td>4.95</td> <td>4.54</td> <td>4.26</td> <td>4.05</td> <td>3.88</td> <td>3.75</td> <td>3.64</td> <td>3.47</td> <td>3.30</td> <td>3.12</td> <td>3.02</td> <td>2.92</td> <td>2.82</td> <td>2.71</td> <td>2.60</td> <td>2.48</td>	23	9.63	6.73	5.58	4.95	4.54	4.26	4.05	3.88	3.75	3.64	3.47	3.30	3.12	3.02	2.92	2.82	2.71	2.60	2.48
948 6.60 5.46 4.84 4.43 4.15 3.94 3.78 3.64 3.54 3.77 3.20 3.01 2.92 2.82 2.77 2.61 2.50 9.41 6.54 5.41 4.79 4.38 4.10 3.89 3.73 3.60 3.49 3.33 3.15 2.97 2.87 2.77 2.67 2.56 2.45 9.41 6.54 5.41 4.79 4.38 4.10 3.89 3.73 3.69 3.73 3.11 2.97 2.89 2.77 2.67 2.73 2.63 2.44 9.28 6.44 5.32 4.70 4.90 3.89 3.77 3.61 3.45 3.29 3.71 3.61 3.45 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74 3.89 3.74	47	9.55	99.9	5.52	4.89	4.49	4.20	3.99	3.83	3.69	3.59	3.42	3.25	3.06	2.97	2.87	2.77	2.66	2.55	2.43
941 6.54 5.41 4.79 4.38 4.10 3.89 3.73 3.69 3.33 3.15 2.97 2.87 2.77 2.67 2.55 2.41 9.34 6.49 5.36 4.74 4.49 4.86 4.86 3.69 3.69 3.69 3.69 3.71 2.93 2.89 2.73 2.69 2.89 2.79 2.69 2.59 2.44 2.71 2.69 2.79 2.69 2.59 2.41 2.71 2.89 2.79 2.69 2.59 2.49 2.71 2.71 2.71 2.71 2.71 2.71 3.74 2.77 2.79 2.7	25	9.48	09'9	5.46	4.84	4.43	4.15	3.94	3.78	3.64	3.54	3.37	3.20	3.01	2.92	2.82	2.72	2.61	2.50	2.38
7 9.34 6.49 5.36 4.74 4.34 4.06 3.85 3.69 3.65 3.45 3.11 2.93 2.83 2.73 2.63 2.52 2.41 9.28 6.44 5.32 4.70 4.30 4.02 3.81 3.65 3.41 3.25 3.07 2.89 2.79 2.69 2.59 2.48 2.37 9.28 6.44 5.28 4.66 4.26 3.98 3.77 3.61 3.48 3.31 3.04 2.86 2.76 2.66 2.56 2.59 2.43 2.31 2.31 2.88 3.11 3.45 3.34 3.18 3.01 2.86 2.77 2.66 2.56 2.42 2.33 2.31 2.32 3.12 2.95 2.78 2.60 2.73 2.42 2.42 2.30 2.41 2.66 2.50 2.49 2.79 2.69 2.49 2.79 2.69 2.49 2.30 2.42 2.31 2.30 2.42 <td>26</td> <td>9.41</td> <td>6.54</td> <td>5.41</td> <td>4.79</td> <td>4.38</td> <td>4.10</td> <td>3.89</td> <td>3.73</td> <td>3.60</td> <td>3.49</td> <td>3.33</td> <td>3.15</td> <td>2.97</td> <td>2.87</td> <td>2.77</td> <td>2.67</td> <td>2.56</td> <td>2.45</td> <td>2.33</td>	26	9.41	6.54	5.41	4.79	4.38	4.10	3.89	3.73	3.60	3.49	3.33	3.15	2.97	2.87	2.77	2.67	2.56	2.45	2.33
3 9.28 6.44 5.32 4.70 4.30 4.02 3.81 3.65 3.62 3.41 3.25 3.07 2.89 2.79 2.69 2.59 2.48 2.37 9.23 6.40 5.28 4.66 4.26 3.98 3.77 3.61 3.48 3.38 3.21 3.04 2.86 2.76 2.66 2.56 2.56 2.57 2.33 2.33 9.18 6.35 5.24 4.62 4.25 3.74 3.58 3.45 3.34 3.18 3.01 2.82 2.73 2.63 2.52 2.42 2.57 2.93 2.78 2.60 2.78 2.60 2.79 2.79 2.71 2.95 2.78 2.79 <td>27</td> <td>9.34</td> <td>6.49</td> <td>5.36</td> <td>4.74</td> <td>4.34</td> <td>4.06</td> <td>3.85</td> <td>3.69</td> <td>3.56</td> <td>3.45</td> <td>3.28</td> <td>3.11</td> <td>2.93</td> <td>2.83</td> <td>2.73</td> <td>2.63</td> <td>2.52</td> <td>2.41</td> <td>2.29</td>	27	9.34	6.49	5.36	4.74	4.34	4.06	3.85	3.69	3.56	3.45	3.28	3.11	2.93	2.83	2.73	2.63	2.52	2.41	2.29
9.23 6.40 5.28 4.66 4.26 3.98 3.77 3.61 3.48 3.38 3.21 3.04 2.86 2.76 2.66 2.56 2.45 2.33 9.31 9.18 6.35 5.24 4.62 4.23 3.95 3.74 3.58 3.45 3.34 3.18 3.01 2.82 2.73 2.63 2.52 2.42 2.30 2.30 8.83 6.07 4.98 4.37 3.99 3.71 3.51 3.35 3.22 3.12 2.95 2.78 2.60 2.50 2.40 2.30 2.18 2.06 9.80 6.79 4.73 4.14 3.76 3.49 3.29 3.13 3.01 2.90 2.74 2.57 2.39 2.29 2.19 2.08 1.96 1.83 8.18 5.54 4.50 3.92 3.55 3.28 3.09 2.93 2.81 2.71 2.54 2.37 2.19 2.09 1.98 1.87 1.75 1.61 9.80 9.30 9.30 2.30 2.32 2.35 2.35 2.30 9.30 9.30 9.30 2.34 2.52 2.35 2.35 2.39 2.39 1.30 1.35 1.35	28	9.28	6.44	5.32	4.70	4.30	4.02	3.81	3.65	3.52	3.41	3.25	3.07	2.89	2.79	5.69	2.59	2.48	2.37	2.25
9.18 6.35 5.24 4.62 4.23 3.95 3.74 3.58 3.45 3.18 3.18 3.01 2.82 2.73 2.63 2.52 2.30 2.30 8.83 6.07 4.98 4.37 3.99 3.71 3.51 3.35 3.12 2.95 2.78 2.60 2.50 2.40 2.30 2.18 2.06 8.49 5.79 4.73 4.14 3.76 3.49 3.29 3.13 3.01 2.90 2.74 2.57 2.39 2.29 2.19 2.09 1.83 1.83 8.18 5.54 4.50 3.92 3.55 3.29 2.93 2.81 2.71 2.54 2.37 2.19 2.09 1.98 1.87 1.75 1.61 7.88 5.30 4.28 3.75 3.35 3.09 2.90 2.75 2.36 2.19 2.00 1.90 1.79 1.67 1.53 1.36	29	9.23	6.40	5.28	4.66	4.26	3.98	3.77	3.61	3.48	3.38	3.21	3.04	2.86	2.76	2.66	2.56	2.45	2.33	2.21
8.83 6.07 4.98 4.37 3.99 3.71 3.51 3.35 3.22 3.12 2.95 2.78 2.60 2.50 2.40 2.30 2.18 2.06 8.49 5.79 4.73 4.14 3.76 3.49 3.29 3.13 3.01 2.90 2.74 2.57 2.39 2.29 2.19 2.08 1.96 1.83 8.18 5.54 4.50 3.92 3.55 3.28 3.09 2.93 2.81 2.71 2.54 2.37 2.19 2.09 1.98 1.87 1.75 1.61 7.88 5.30 4.28 3.72 3.35 3.09 2.90 2.74 2.62 2.52 2.36 2.19 2.00 1.90 1.79 1.67 1.53 1.36	30	9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45	3.34	3.18	3.01	2.82	2.73	2.63	2.52	2:42	2.30	2.18
8.49 5.79 4.73 4.14 3.76 3.49 3.29 3.13 3.01 2.90 2.74 2.57 2.39 2.29 2.19 2.08 1.96 1.83 8.18 5.54 4.50 3.92 3.55 3.28 3.09 2.90 2.74 2.62 2.52 2.36 2.19 2.00 1.90 1.79 1.67 1.55 1.61 7.88 5.30 4.28 3.72 3.35 3.09 2.90 2.74 2.62 2.52 2.36 2.19 2.00 1.90 1.79 1.67 1.53 1.36	40	8.83	6.07	4.98	4.37	3.99	3.71	3.51	3.35	3.22	3.12	2.95	2.78	2.60	2.50	2.40	2.30	2.18	2.06	1.93
8.18 5.54 4.50 3.92 3.55 3.28 3.09 2.93 2.81 2.71 2.54 2.37 2.19 2.09 1.98 1.87 1.75 1.61 7.88 5.30 4.28 3.72 3.35 3.09 2.90 2.74 2.62 2.52 2.36 2.19 2.00 1.90 1.79 1.67 1.53 1.36	9 ;	8.49	5.79	4.73	4.14	3.76	3.49	3.29	3.13	3.01	2.90	2.74	2.57	2.39	2.29	2.19	2.08	1.96	1.83	1.69
/.88 5.30 4.28 3.72 3.35 3.09 2.90 2.74 2.62 2.52 2.36 2.19 2.00 1.90 1.79 1.67 1.53 1.36	120	8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81	2.71	2.54	2.37	2.19	2.09	1.98	1.87	1.75	1.61	1.43
	8	7.88	5.30	4.28	3.72	3.35	3.09	2.90	2.74	2.62	2.52	2.36	2.19	2.00	1.90	1.79	1.67	1.53	1.36	1.00

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