

Figure 13.13e. 90th PERCENTILES FOR THE F DISTRIBUTION $[F_{v_1, v_2}]$

[Calculated with qf in R Version 2.0.1 using 17-digit arithmetic;
the accuracy of all digits in the table entries has not been verified]

$\downarrow \frac{df}{v_2} \downarrow$		Each table entry is the value (y) of the random variable $Y \sim F_{v_1, v_2}$ such that $\Pr(Y \leq y) = 0.9$ (v_1 is the numerator, v_2 the denominator, degrees of freedom)																								
		1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000		
2017-02-20	1	39.863	49.500	53.593	55.833	57.240	58.204	58.906	59.439	59.858	60.195	60.705	61.220	61.740	62.055	62.265	62.529	62.688	62.794	62.901	63.007	63.145	63.236	63.296	1	
	2	8.5263	9.0000	9.1618	9.2434	9.2926	9.3255	9.3491	9.3668	9.3805	9.3916	9.4081	9.4247	9.4413	9.4513	9.4579	9.4662	9.4712	9.4746	9.4779	9.4812	9.4855	9.4884	9.4902	5	
	3	5.5383	5.4624	5.3908	5.3426	5.3092	5.2847	5.2662	5.2517	5.2400	5.2304	5.2156	5.2003	5.1845	5.1747	5.1681	5.1597	5.1546	5.1512	5.1477	5.1443	5.1398	5.1367	5.1348		
	4	4.5448	4.3246	4.1909	4.1072	4.0506	4.0097	3.9790	3.9549	3.9357	3.9199	3.8955	3.8704	3.8443	3.8283	3.8174	3.8036	3.7952	3.7896	3.7839	3.7782	3.7707	3.7657	3.7625		
	5	4.0604	3.7797	3.6195	3.5202	3.4530	3.4045	3.3679	3.3393	3.3163	3.2974	3.2682	3.2380	3.2067	3.1873	3.1741	3.1573	3.1471	3.1402	3.1333	3.1263	3.1172	3.1111	3.1072		
	6	3.7759	3.4633	3.2888	3.1808	3.1075	3.0546	3.0145	2.9830	2.9577	2.9369	2.9047	2.8712	2.8363	2.8147	2.8000	2.7812	2.7697	2.7620	2.7541	2.7463	2.7360	2.7291	2.7246		
	7	3.5894	3.2574	3.0741	2.9605	2.8833	2.8274	2.7849	2.7516	2.7247	2.7025	2.6681	2.6322	2.5947	2.5714	2.5555	2.5351	2.5226	2.5142	2.5057	2.4971	2.4859	2.4784	2.4735		
	8	3.4579	3.1131	2.9238	2.8064	2.7264	2.6683	2.6241	2.5893	2.5612	2.5380	2.5020	2.4642	2.4246	2.3999	2.3830	2.3614	2.3481	2.3391	2.3300	2.3208	2.3088	2.3007	2.2954		
	9	3.3603	3.0065	2.8129	2.6927	2.6106	2.5509	2.5053	2.4694	2.4403	2.4163	2.3789	2.3396	2.2983	2.2725	2.2547	2.2320	2.2180	2.2085	2.1989	2.1892	2.1765	2.1679	2.1623		
	10	3.2850	2.9245	2.7277	2.6053	2.5216	2.4606	2.4140	2.3772	2.3473	2.3226	2.2841	2.2435	2.2007	2.1739	2.1554	2.1317	2.1171	2.1072	2.0971	2.0869	2.0736	2.0646	2.0586	10	
	11	3.2252	2.8595	2.6602	2.5362	2.4512	2.3891	2.3416	2.3040	2.2735	2.2482	2.2087	2.1671	2.1230	2.0953	2.0762	2.0516	2.0364	2.0261	2.0157	2.0050	1.9911	1.9817	1.9755	15	
	12	3.1765	2.8068	2.6055	2.4801	2.3940	2.3310	2.2828	2.2446	2.2135	2.1878	2.1474	2.1049	2.0597	2.0312	2.0115	1.9861	1.9704	1.9597	1.9489	1.9379	1.9234	1.9136	1.9071		
	13	3.1362	2.7632	2.5603	2.4337	2.3467	2.2830	2.2341	2.1953	2.1638	2.1376	2.0966	2.0532	2.0070	1.9778	1.9576	1.9315	1.9153	1.9043	1.8931	1.8817	1.8667	1.8565	1.8498		
	14	3.1022	2.7265	2.5222	2.3947	2.3069	2.2426	2.1931	2.1539	2.1220	2.0954	2.0537	2.0095	1.9625	1.9326	1.9119	1.8852	1.8686	1.8572	1.8457	1.8340	1.8185	1.8080	1.8011		
	15	3.0732	2.6952	2.4898	2.3614	2.2730	2.2081	2.1582	2.1185	2.0862	2.0593	2.0171	1.9722	1.9243	1.8939	1.8728	1.8454	1.8284	1.8168	1.8049	1.7929	1.7770	1.7661	1.7589		
	16	3.0481	2.6682	2.4618	2.3327	2.2438	2.1783	2.1280	2.0880	2.0553	2.0281	1.9854	1.9399	1.8913	1.8603	1.8388	1.8108	1.7934	1.7816	1.7694	1.7570	1.7407	1.7296	1.7222		
	17	3.0262	2.6446	2.4374	2.3077	2.2183	2.1524	2.1017	2.0613	2.0284	2.0009	1.9577	1.9117	1.8624	1.8309	1.8090	1.7805	1.7628	1.7506	1.7382	1.7255	1.7088	1.6973	1.6898		
	18	3.0070	2.6239	2.4160	2.2858	2.1958	2.1296	2.0785	2.0379	2.0040	1.9770	1.9333	1.8868	1.8368	1.8049	1.7827	1.7537	1.7356	1.7232	1.7106	1.6976	1.6805	1.6687	1.6609		
	19	2.9899	2.6056	2.3970	2.2663	2.1760	2.1094	2.0580	2.0171	1.9836	1.9557	1.9117	1.8647	1.8142	1.7818	1.7592	1.7298	1.7114	1.6988	1.6858	1.6726	1.6551	1.6431	1.6351		
20	2.9747	2.5893	2.3801	2.2489	2.1582	2.0913	2.0397	1.9985	1.9649	1.9367	1.8924	1.8449	1.7938	1.7611	1.7382	1.7083	1.6896	1.6768	1.6636	1.6501	1.6323	1.6200	1.6118	20		
F_{v_1, v_2} 90	22	2.9486	2.5613	2.3512	2.2193	2.1279	2.0605	2.0084	1.9668	1.9327	1.9043	1.8593	1.8111	1.7590	1.7255	1.7021	1.6714	1.6521	1.6393	1.6253	1.6113	1.5927	1.5799	1.5714	F_{v_1, v_2} 90	
	24	2.9271	2.5383	2.3274	2.1949	2.1030	2.0351	1.9826	1.9407	1.9073	1.8775	1.8319	1.7831	1.7302	1.6960	1.6721	1.6407	1.6209	1.6073	1.5933	1.5788	1.5596	1.5464	1.5375		
	26	2.9091	2.5191	2.3075	2.1745	2.0822	2.0139	1.9610	1.9188	1.8841	1.8550	1.8090	1.7596	1.7059	1.6712	1.6468	1.6147	1.5945	1.5805	1.5661	1.5513	1.5315	1.5178	1.5086		
	28	2.8938	2.5028	2.2906	2.1571	2.0645	1.9959	1.9427	1.9001	1.8652	1.8359	1.7895	1.7395	1.6852	1.6500	1.6252	1.5925	1.5718	1.5575	1.5428	1.5276	1.5072	1.4931	1.4836		
	30	2.8807	2.4887	2.2761	2.1422	2.0492	1.9803	1.9269	1.8841	1.8490	1.8195	1.7727	1.7223	1.6673	1.6316	1.6065	1.5732	1.5522	1.5376	1.5225	1.5069	1.4860	1.4715	1.4617		
	35	2.8547	2.4609	2.2474	2.1128	2.0191	1.9496	1.8957	1.8524	1.8168	1.7869	1.7394	1.6880	1.6317	1.5950	1.5691	1.5346	1.5127	1.4975	1.4817	1.4653	1.4431	1.4277	1.4172		
	40	2.8354	2.4404	2.2261	2.0909	1.9968	1.9269	1.8725	1.8289	1.7929	1.7627	1.7146	1.6624	1.6052	1.5677	1.5411	1.5056	1.4830	1.4672	1.4507	1.4336	1.4104	1.3941	1.3830		
	45	2.8205	2.4245	2.2097	2.0742	1.9796	1.9094	1.8547	1.8107	1.7745	1.7440	1.6954	1.6426	1.5846	1.5464	1.5193	1.4830	1.4597	1.4434	1.4264	1.4087	1.3845	1.3674	1.3558		
	50	2.8087	2.4120	2.1967	2.0608	1.9660	1.8954	1.8405	1.7963	1.7598	1.7291	1.6802	1.6269	1.5681	1.5294	1.5018	1.4648	1.4409	1.4242	1.4068	1.3885	1.3634	1.3456	1.3334	50	
	60	2.7911	2.3933	2.1774	2.0410	1.9457	1.8747	1.8194	1.7748	1.7380	1.7070	1.6574	1.6034	1.5435	1.5039	1.4755	1.4373	1.4126	1.3952	1.3769	1.3576	1.3311	1.3120	1.2988	100	
	70	2.7786	2.3800	2.1637	2.0269	1.9313	1.8600	1.8044	1.7596	1.7225	1.6913	1.6413	1.5866	1.5259	1.4857	1.4567	1.4176	1.3922	1.3742	1.3552	1.3352	1.3073	1.2871	1.2730		
	80	2.7693	2.3701	2.1535	2.0165	1.9206	1.8491	1.7933	1.7483	1.7110	1.6796	1.6292	1.5741	1.5128	1.4720	1.4426	1.4027	1.3767	1.3583	1.3388	1.3180	1.2890	1.2678	1.2530		
	90	2.7621	2.3625	2.1457	2.0084	1.9123	1.8406	1.7846	1.7395	1.7021	1.6705	1.6199	1.5644	1.5025	1.4613	1.4315	1.3911	1.3646	1.3457	1.3258	1.3044	1.2745	1.2524	1.2368		
	100	2.7564	2.3564	2.1394	2.0019	1.9057	1.8339	1.7778	1.7324	1.6949	1.6632	1.6124	1.5566	1.4943	1.4528	1.4227	1.3817	1.3548	1.3356	1.3153	1.2934	1.2626	1.2397	1.2235		
	125	2.7461	2.3455	2.1281	1.9904	1.8939	1.8218	1.7654	1.7199	1.6821	1.6502	1.5990	1.5427	1.4796	1.4374	1.4067	1.3648	1.3371	1.3173	1.2961	1.2732	1.2406	1.2160	1.1983		
	150	2.7393	2.3383	2.1207	1.9827	1.8861	1.8138	1.7572	1.7115	1.6736	1.6416	1.5901	1.5334	1.4698	1.4271	1.3960	1.3534	1.3251	1.3048	1.2831	1.2595	1.2255	1.1995	1.1805		
	175	2.7344	2.3331	2.1153	1.9773	1.8805	1.8081	1.7514	1.7056	1.6676	1.6354	1.5837	1.5268	1.4628	1.4197	1.3884	1.3452	1.3165	1.2959	1.2736	1.2494	1.2143	1.1872	1.1671		
	200	2.7308	2.3293	2.1114	1.9732	1.8763	1.8038	1.7470	1.7011	1.6630	1.6308															

Figure 13.13f. 95th PERCENTILES FOR THE F DISTRIBUTION $[F_{v_1, v_2}]$

[Calculated with qf in **R** Version 2.0.1 using 17-digit arithmetic;
the accuracy of all digits in the table entries has *not* been verified]

$\downarrow \begin{matrix} df \rightarrow \\ v_2 / v_1 \end{matrix}$		Each table entry is the value (y) of the random variable $Y \sim F_{v_1, v_2}$ such that $\Pr(Y \leq y) = 0.95$ (v_1 is the numerator, v_2 the denominator, degrees of freedom)																								
		1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000		
2017-02-20	1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.26	250.10	251.14	251.77	252.20	252.62	253.04	253.59	253.95	254.19	1	
	2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396	19.413	19.429	19.446	19.456	19.462	19.471	19.476	19.479	19.482	19.486	19.490	19.493	19.495		
	3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123	8.7855	8.7446	8.7029	8.6602	8.6341	8.6166	8.5944	8.5810	8.5720	8.5630	8.5539	8.5422	8.5343	8.5292		
	4	7.7086	6.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	5.9988	5.9644	5.9117	5.8578	5.8025	5.7687	5.7459	5.7170	5.6995	5.6877	5.6759	5.6641	5.6487	5.6384	5.6317		
	5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725	4.7351	4.6777	4.6188	4.5581	4.5209	4.4957	4.4638	4.4444	4.4314	4.4183	4.4051	4.3880	4.3765	4.3690	5	
	6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990	4.0600	3.9999	3.9381	3.8742	3.8348	3.8082	3.7743	3.7537	3.7398	3.7258	3.7117	3.6935	3.6812	3.6732		
	7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767	3.6365	3.5747	3.5107	3.4445	3.4036	3.3758	3.3404	3.3189	3.3043	3.2897	3.2749	3.2557	3.2428	3.2343		
	8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881	3.3472	3.2839	3.2184	3.1503	3.1081	3.0794	3.0428	3.0204	3.0053	2.9901	2.9747	2.9547	2.9412	2.9324		
	9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789	3.1373	3.0729	3.0061	2.9365	2.8932	2.8637	2.8259	2.8028	2.7872	2.7715	2.7556	2.7348	2.7208	2.7116		
	10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204	2.9782	2.9130	2.8450	2.7740	2.7298	2.6996	2.6609	2.6371	2.6211	2.6048	2.5884	2.5670	2.5525	2.5430	10	
	11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962	2.8536	2.7876	2.7186	2.6464	2.6014	2.5705	2.5309	2.5066	2.4901	2.4734	2.4566	2.4345	2.4196	2.4098		
	12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964	2.7534	2.6866	2.6169	2.5436	2.4977	2.4663	2.4259	2.4010	2.3842	2.3671	2.3498	2.3271	2.3118	2.3017		
	13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144	2.6710	2.6037	2.5331	2.4589	2.4123	2.3803	2.3392	2.3138	2.2966	2.2791	2.2614	2.2382	2.2224	2.2121		
	14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458	2.6022	2.5342	2.4630	2.3879	2.3407	2.3082	2.2664	2.2405	2.2229	2.2051	2.1870	2.1632	2.1471	2.1365		
	15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876	2.5437	2.4753	2.4034	2.3275	2.2797	2.2468	2.2043	2.1780	2.1601	2.1419	2.1234	2.0992	2.0826	2.0718	15	
	16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377	2.4935	2.4247	2.3522	2.2756	2.2272	2.1938	2.1507	2.1240	2.1058	2.0873	2.0685	2.0437	2.0268	2.0157		
	17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943	2.4499	2.3807	2.3077	2.2304	2.1815	2.1477	2.1040	2.0769	2.0584	2.0396	2.0204	1.9952	1.9779	1.9666		
	18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563	2.4117	2.3421	2.2686	2.1906	2.1413	2.1071	2.0629	2.0354	2.0166	1.9975	1.9780	1.9523	1.9348	1.9232		
	19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227	2.3779	2.3080	2.2341	2.1555	2.1057	2.0712	2.0264	1.9986	1.9795	1.9601	1.9403	1.9142	1.8963	1.8845		
F_{v_1, v_2} 0.95	20	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928	2.3479	2.2776	2.2033	2.1242	2.0739	2.0391	1.9938	1.9656	1.9464	1.9267	1.9066	1.8800	1.8618	1.8497	20	
	22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419	2.2967	2.2258	2.1508	2.0707	2.0196	1.9842	1.9380	1.9092	1.8894	1.8692	1.8486	1.8212	1.8024	1.7899		
	24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002	2.2547	2.1834	2.1077	2.0267	1.9750	1.9390	1.8920	1.8625	1.8424	1.8217	1.8005	1.7723	1.7529	1.7401		
	26	4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655	2.2197	2.1479	2.0716	1.9898	1.9375	1.9010	1.8533	1.8233	1.8027	1.7816	1.7599	1.7310	1.7111	1.6978		
	28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360	2.1900	2.1179	2.0411	1.9586	1.9057	1.8687	1.8203	1.7898	1.7689	1.7473	1.7251	1.6956	1.6752	1.6615		
	30	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107	2.1646	2.0921	2.0148	1.9317	1.8782	1.8409	1.7918	1.7609	1.7396	1.7176	1.6950	1.6648	1.6439	1.6299	30	
	35	4.1213	3.2674	2.8742	2.6415	2.4851	2.3718	2.2852	2.2167	2.1608	2.1143	2.0411	1.9629	1.8784	1.8239	1.7856	1.7351	1.7032	1.6811	1.6583	1.6347	1.6030	1.5809	1.5661		
	40	4.0847	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240	2.0772	2.0035	1.9245	1.8389	1.7835	1.7444	1.6928	1.6600	1.6373	1.6137	1.5892	1.5562	1.5331	1.5175		
	45	4.0566	3.2043	2.8115	2.5787	2.4221	2.3083	2.2212	2.1521	2.0958	2.0487	1.9745	1.8949	1.8084	1.7522	1.7126	1.6599	1.6264	1.6031	1.5789	1.5536	1.5194	1.4953	1.4790		
	50	4.0343	3.1826	2.7900	2.5572	2.4004	2.2864	2.1992	2.1299	2.0734	2.0261	1.9515	1.8714	1.7841	1.7273	1.6872	1.6337	1.5995	1.5757	1.5508	1.5249	1.4896	1.4647	1.4477	50	
	60	4.0012	3.1504	2.7581	2.5252	2.3683	2.2541	2.1665	2.0970	2.0401	1.9926	1.9174	1.8364	1.7480	1.6902	1.6491	1.5943	1.5590	1.5343	1.5085	1.4814	1.4442	1.4176	1.3994		
	70	3.9778	3.1277	2.7355	2.5027	2.3456	2.2312	2.1435	2.0737	2.0166	1.9689	1.8932	1.8117	1.7232	1.6658	1.6220	1.5661	1.5300	1.5046	1.4779	1.4498	1.4110	1.3831	1.3638		
	80	3.9604	3.1108	2.7188	2.4859	2.3287	2.2142	2.1263	2.0564	1.9991	1.9512	1.8753	1.7932	1.7032	1.6440	1.6017	1.5449	1.5081	1.4821	1.4548	1.4259	1.3857	1.3565	1.3362		
	90	3.9469	3.0977	2.7058	2.4729	2.3157	2.2011	2.1131	2.0430	1.9856	1.9376	1.8613	1.7789	1.6883	1.6286	1.5859	1.5284	1.4910	1.4645	1.4366	1.4070	1.3656	1.3353	1.3140		
	100	3.9361	3.0873	2.6955	2.4626	2.3053	2.1906	2.1025	2.0323	1.9748	1.9267	1.8503	1.7675	1.6764	1.6163	1.5733	1.5151	1.4772	1.4504	1.4220	1.3917	1.3492	1.3179	1.2958	100	
	125	3.9169	3.0687	2.6771	2.4442	2.2868	2.1719	2.0836	2.0133	1.9556	1.9072	1.8304	1.7471	1.6551	1.5943	1.5505	1.4912	1.4524	1.4247	1.3953	1.3638	1.3191	1.2856	1.2616		
	150	3.9042	3.0564	2.6649	2.4320	2.2745	2.1595	2.0711	2.0006	1.9428	1.8943	1.8172	1.7335	1.6410	1.5796	1.5354	1.4752	1.4357	1.4074	1.3773	1.3448	1.2984	1.2631	1.2375		
	175	3																								