99.995*th* PERCENTILES FOR THE *F* DISTRIBUTION [F_{ν_1,ν_2}]

[Calculated with *qf* in **R** Version 3.2.2 using 17-digit arithmetic; the accuracy of all digits in the table entries has *not* been verified]

Each table entry is the value (y) of the random variable $Y \sim F_{\nu_1,\nu_2}$ such that $\Pr(Y \le y) = 0.99995$ (ν_1 is the numerator, ν_2 the denominator, degrees of freedom)

2017-02-20

University of Waterloo

W.H. Cherry

F_{ν_1,ν_2} .99995

$Df \rightarrow$ / ν_2 / ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	
1	162113893	200000000	216151858	225000000	230561982	234375000	237149467	239257812	240913744	242248535	244267273	246305607	248363209	249606871	250439721	251484949	252114288	252534758	252955952	253377868	253921385	254284386	254520617	1
2	19998.5	19999.0	19999.2	19999.2	19999.3	19999.3	19999.4	19999.4	19999.4	19999.4	19999.4	19999.4	19999.4	19999.5	19999.5	19999.5	19999.5	19999.5	19999.5	19999.5	19999.5	19999.5	19999.5	
3	1245.94	1103.71	1047.34	1016.86	997.71	984.57	974.98	967.67	961.92	957.27	950.23	943.09	935.86	931.47	928.52	924.82	922.59	921.09	919.59	918.09	916.15	914.86	914.01	
4	343.08	280.84	256.64	243.61	235.44	229.83	225.73	222.61	220.14	218.15	215.13	212.07	208.96	207.07	205.80	204.20	203.24	202.59	201.95	201.30	200.46	199.90	199.53	
5	166.225	128.826	114.472	106.771	101.943	98.626	96.204	94.356	92.899	91.720	89.930	88.111	86.262	85.138	84.381	83.428	82.852	82.466	82.079	81.690	81.188	80.852	80.632	5
6	105.286	78.433	68.220	62.754	59.329	56.975	55.255	53.943	52.907	52.069	50.794	49.498	48.179	47.375	46.834	46.151	45.738	45.462	45.183	44.904	44.543	44.302	44.144	
7	77.132	55.783	47.718	43.408	40.709	38.854	37.497	36.461	35.643	34.981	33.973	32.947	31.901	31.263	30.833	30.290	29.962	29.741	29.519	29.297	29.009	28.815	28.689	
8	61.633	43.568	36.777	33.154	30.885	29.324	28.183	27.311	26.622	26.064	25.214	24.348	23.463	22.923	22.559	22.098	21.819	21.632	21.443	21.254	21.008	20.844	20.736	
9	52.060	36.144	30.184	27.006	25.017	23.648	22.647	21.881	21.276	20.786	20.038	19.276	18.496	18.019	17.697	17.290	17.043	16.877	16.710	16.542	16.324	16.178	16.082	
10	45.654	31.239	25.857	22.990	21.195	19.959	19.055	18.364	17.817	17.373	16.697	16.006	15.299	14.867	14.574	14.203	13.978	13.827	13.674	13.521	13.322	13.188	13.101	10
11	41.108 3	27.794 2	22.835 3	20.195 5	18.542 3	17.404 5	16.571 3	15.933 6	15.429 3	15.020 1	14.395 8	13.757 5	13.103 3	12.702 1	12.430 7	12.086 6	11.877 4	11.736 7	11.595 0	11.452 1	11.266 9	11.142 3	11.060 8	
12	37.734 8	25.260 0	20.623 1	18.155 8	16.610 5	15.546 7	14.767 4	14.170 7	13.698 6	13.315 4	12.730 4	12.131 8	11.517 5	11.140 4	10.885 0	10.560 9	10.363 6	10.230 8	10.097 0	9.962 1	9.787 0	9.666 9	9.592 0	
13	35.142 6	23.327 0	18.942 5	16.610 3	15.149 6	14.143 8	13.406 6	12.842 0	12.395 1	12.032 2	11.478 0	10.910 3	10.327 1	9.968 6	9.725 7	9.417 0	9.229 0	9.102 4	8.974 6	8.845 8	8.678 4	8.565 6	8.491 8	
14	33.094 3	21.809 2	17.627 4	15.403 8	14.010 9	13.051 6	12.348 3	11.809 4	11.382 7	11.036 1	10.506 4	9.963 5	9.405 2	9.061 6	8.828 5	8.532 2	8.351 4	8.229 6	8.106 7	7.982 6	7.821 2	7.712 4	7.641 2	
15	31.438 3	20.588 7	16.573 2	14.438 5	13.101 3	12.180 0	11.504 4	10.986 7	10.576 5	10.243 2	9.733 6	9.210 9	8.672 8	8.341 3	8.116 3	7.829 8	7.655 0	7.537 0	7.418 0	7.297 7	7.141 1	7.035 5	6.966 3	15
16	30.073 8	19.587 9	15.711 0	13.650 5	12.359 6	11.470 1	10.817 6	10.317 4	9.921 0	9.598 7	9.105 9	8.600 0	8.078 6	7.757 1	7.538 7	7.260 4	7.090 3	6.975 6	6.859 7	6.742 5	6.589 8	6.486 7	6.419 1	
17	28.931 5	18.753 5	14.993 9	12.996 1	11.744 4	10.881 7	10.248 7	9.763 3	9.378 5	9.065 7	8.586 9	8.095 1	7.587 9	7.274 8	7.061 9	6.790 4	6.624 3	6.512 2	6.398 9	6.284 2	6.134 7	6.033 7	5.967 4	
18	27.961 9	18.048 0	14.388 9	12.444 8	11.226 6	10.386 9	9.770 6	9.297 8	8.923 0	8.618 1	8.151 4	7.671 7	7.176 4	6.870 5	6.662 2	6.396 5	6.233 8	6.123 9	6.012 7	5.900 1	5.753 3	5.654 0	5.588 7	
19	27.129 3	17.444 1	13.872 0	11.974 3	10.785 2	9.965 3	9.363 5	8.901 7	8.534	8.237 5	7.781 1	7.311 8	6.826 9	6.527 1	6.322 8	6.062 0	5.902 2	5.794 1	5.684 7	5.573 9	5.429 3	5.331 4	5.267 0	
20	26.406 9	16.921 7	13.425 6	11.568 6	10.404 8	9.602 3	9.013 0	8.560 8	8.202 0	7.910 1	7.462 8	7.002 6	6.526 7	6.232 1	6.031 3	5.774 7	5.617 3	5.510 8	5.403 0	5.293 7	5.150 9	5.054 1	4.990 5	20
22	25.216 5	16.064 2	12.694 5	10.905 0	9.783 3	9.009 6	8.441 3	8.004 9	7.658 6	7.376 7	6.944 5	6.499 2	6.038 1	5.752 2	5.557 1	5.307 3	5.153 9	5.049 9	4.944 5	4.837 6	4.697 6	4.602 6	4.540 0	
24	24.277 0	15.390 5	12.12 16	10.385 9	9.297 9	8.547 1	7.995 4	7.571 7	7.235 3	6.961 3	6.541 0	6.107 7	5.658 3	5.379 2	5.188 5	4.944 0	4.793 5	4.691 5	4.588 0	4.482 7	4.344 8	4.251 0	4.189 1	
26	23.517 3	14.847 9	11.661 2	9.969 3	8.908 7	8.176 6	7.638 6	7.225 1	6.896 8	6.629 3	6.218 7	5.794 9	5.355 0	5.081 4	4.894 1	4.653 8	4.505 7	4.405 2	4.303 0	4.199 1	4.062 6	3.969 6	3.908 2	
28	22.890 7	14.401 7	11.283 4	9.628 0	8.590 0	7.873 5	7.346 7	6.941 8	6.620 2	6.358 0	5.955 5	5.539 7	5.107 5	4.838 3	4.654 0	4.417 0	4.270 8	4.171 4	4.070 3	3.967 3	3.831 9	3.739 4	3.678 3	
30	22.365 3	14.028 6	10.967 9	9.343 3	8.324 5	7.621 1	7.103 8	6.706 2	6.390 1	6.132 5	5.736 7	5.327 6	4.901 8	4.636 4	4.454 4	4.220 2	4.075 5	3.977 0	3.876 7	3.774 5	3.639 8	3.547 7	3.486 7	30
35	21.361 2	13.318 5	10.368 9	8.803 5	7.821 7	7.143 5	6.644 5	6.260 7	5.955 5	5.706 5	5.323 7	4.927 3	4.514 0	4.255 6	4.077 9	3.848 7	3.706 6	3.609 7	3.510 7	3.409 6	3.275 8	3.184 0	3.123 0	35
40	20.647 1	12.815 7	9.945 9	8.423 1	7.467 8	6.807 7	6.321 9	5.948 0	5.650 5	5.407 7	5.034 1	4.646 9	4.242 2	3.988 7	3.814 1	3.588 1	3.447 7	3.351 7	3.253 5	3.152 8	3.019 2	2.927 0	2.865 6	40
45	20.113 5	12.441 3	9.631 7	8.140 8	7.205 5	6.559 0	6.083 1	5.716 7	5.425 0	5.186 9	4.820 2	4.439 8	4.041 5	3.791 6	3.619 1	3.395 5	3.256 1	3.160 6	3.062 8	2.962 2	2.828 3	2.735 5	2.673 5	45
50	19.699 9	12.151 9	9.389 1	7.923 2	7.003 5	6.367 6	5.899 4	5.538 7	5.251 6	5.017 1	4.655 8	4.280 6	3.887 4	3.640 1	3.469 2	3.247 3	3.108 6	3.013 4	2.915 7	2.815 1	2.680 6	2.587 1	2.524 4	50
60	19.100 6	11.733 9	9.039 4	7.609 9	6.712 8	6.092 5	5.635 4	5.283 3	5.002 8	4.773 5	4.420 0	4.052 4	3.666 3	3.422 8	3.254 1	3.034 3	2.896 4	2.801 5	2.703 7	2.602 6	2.466 6	2.373 4	2.307 1	
70	18.687 5	11.446 7	8.799 6	7.395 4	6.514 0	5.904 4	5.455 1	5.108 8	4.832 8	4.607 2	4.259 1	3.896 8	3.515 5	3.274 5	3.107 2	2.888 7	2.751 2	2.656 2	2.558 2	2.456 4	2.318 8	2.222 7	2.155 7	
80	18.385 6	11.237 2	8.625 0	7.239 3	6.369 5	5.767 7	5.324 1	4.982 1	4.709 5	4.486 6	4.142 4	3.783 9	3.406 1	3.166 9	3.000 6	2.782 9	2.645 5	2.550 4	2.452 0	2.349 5	2.210 2	2.111 3	2.043 7	
90	18.155 4	11.077 8	8.492 2	7.120 7	6.259 7	5.664 0	5.224 7	4.886 0	4.616 0	4.395 1	4.054 0	3.698 3	3.323 1	3.085 3	2.919 7	2.702 5	2.565 1	2.469 9	2.371 0	2.267 8	2.126 9	2.026 3	1.957 0	
100	17.974 0	10.952 4	8.387 8	7.027 5	6.173 5	5.582 5	5.146 8	4.810 6	4.542 6	4.323 3	3.984 6	3.631 2	3.258 0	3.021 2	2.856 2	2.639 3	2.501 9	2.406 5	2.307 2	2.203 3	2.060 9	1.958 6	1.887 8	100
125	17.653 7	10.731 3	8.204 0	6.863 6	6.021 9	5.439 4	5.009 7	4.678 2	4.413 7	4.197 3	3.862 7	3.513 3	3.143 8	2.908 8	2.744 6	2.528 2	2.390 6	2.294 6	2.194 4	2.089 0	1.943 3	1.837 2	1.762 9	
150	17.444 5	10.587 1	8.084 3	6.756 9	5.923 4	5.346 4	4.920 7	4.592 2	4.330 0	4.115 4	3.783 6	3.436 8	3.069 6	2.835 7	2.672 0	2.455 8	2.317 9	2.221 5	2.120 6	2.014 0	1.865 5	1.756 1	1.678 5	
175	17.297 2	10.485 7	8.000 2	6.681 9	5.854 1	5.281 0	4.858 2	4.531 8	4.271 3	4.058 0	3.728 1	3.383 2	3.017 6	2.784 4	2.621 1	2.405 0	2.266 8	2.170 1	2.068 5	1.960 8	1.810 0	1.697 8	1.617 4	
200	17.187 8	10.410 5	7.937 8	6.626 4	5.802 9	5.232 7	4.811 9	4.487 1	4.227 8	4.015 5	3.687 1	3.343 5	2.979 1	2.746 5	2.583 4	2.367 3	2.228 9	2.131 8	2.029 7	1.921 2	1.768 3	1.653 8	1.570 7	
250	17.036 2	10.306 4	7.851 6	6.549 6	5.732 0	5.165 8	4.747 9	4.425 3	4.167 8	3.956 8	3.630 4	3.288 7	2.925 9	2.694 0	2.531 2	2.315 1	2.176 4	2.078 8	1.975 8	1.866 0	1.709 9	1.591 4	1.503 8	250
300	16.936 2	10.237 7	7.794 7	6.499 0	5.685 3	5.121 8	4.705 9	4.384 7	4.128 3	3.918 2	3.593 0	3.252 6	2.890 9	2.659 5	2.496 9	2.280 8	2.141 7	2.043 7	1.940 2	1.829 3	1.670 9	1.549 1	1.457 8	
350	16.865 3	10.189 1	7.754 4	6.463 2	5.652 2	5.090 6	4.676 1	4.355 9	4.100 3	3.890 9	3.566 6	3.227 0	2.866 1	2.635 1	2.472 6	2.256 4	2.117 1	2.018 8	1.914 8	1.803 1	1.642 8	1.518 5	1.424 0	
400	16.812 3	10.152 8	7.724 4	6.436 5	5.627 6	5.067 4	4.653 9	4.334 5	4.079 5	3.870 5	3.547 0	3.208 0	2.847 7	2.616 8	2.454 4	2.238 2	2.098 7	2.000 2	1.895 8	1.783 5	1.621 7	1.495 3	1.398 0	
450	16.771 3	10.124 7	7.701 1	6.415 8	5.608 5	5.049 4	4.636 7	4.317 9	4.063 3	3.854 7	3.531 7	3.193 3	2.833 4	2.602 7	2.440 4	2.224 1	2.084 5	1.985 8	1.881 1	1.768 3	1.605 2	1.477 0	1.377 3	
500	16.738 6	10.102 3	7.682 6	6.399 3	5.593 3	5.035 1	4.623 0	4.304 7	4.050 5	3.842 2	3.519 6	3.181 6	2.822 0	2.591 5	2.429 2	2.212 9	2.073 2	1.974 3	1.869 3	1.756 2	1.592 0	1.462 2	1.360 4	500
600	16.689 7	10.068 8	7.654 9	6.374 7	5.570 6	5.013 7	4.602 5	4.284 9	4.031 3	3.823 4	3.501 5	3.164 1	2.805 0	2.574 7	2.412 5	2.196 1	2.056 2	1.957 1	1.851 7	1.737 9	1.572 1	1.439 9	1.334 5	
700	16.654 9	10.044 9	7.635 2	6.357 2	5.554 5	4.998 5	4.588 0	4.270 9	4.017 6	3.810 1	3.488 6	3.151 6	2.792 9	2.562 8	2.400 6	2.184 2	2.044 1	1.944 8	1.839 2	1.724 9	1.557 8	1.423 7	1.315 4	
800	16.628 8	10.027 1	7.620 4	6.344 1	5.542 4	4.987 1	4.577 1	4.260 4	4.007 4	3.800 1	3.479 0	3.142 3	2.783 9	2.553 9	2.391 7	2.175 2	2.035 1	1.935 6	1.829 8	1.715 1	1.547 1	1.411 4	1.300 7	
900	16.608 6	10.013 3	7.609 0	6.333 9	5.533 0	4.978 3	4.568 7	4.252 3	3.999 5	3.792 4	3.471 5	3.135 1	2.776 9	2.546 9	2.384 8	2.168 3	2.028 1	1.928 5	1.822 5	1.707 5	1.538 7	1.401 8	1.289 0	
1,000	16.592 5	10.002 2	7.599 8	6.325 8	5.525 5	4.971 2	4.561 9	4.245 7	3.993 2	3.786 2	3.465 5	3.129 3	2.771 3	2.541 4	2.379 3	2.162 8	2.022 4	1.922 8	1.816 6	1.701 4	1.532 0	1.394 0	1.279 5	1,000
2,000	16.520 1	9.952 7	7.558 9	6.289 4	5.492 0	4.939 6	4.531 7	4.216 6	3.964 9	3.758 5	3.438 8	3.103 5	2.746 2	2.516 6	2.354 6	2.137 8	1.997 3	1.897 3	1.790 4	1.674 0	1.501 5	1.358 4	1.234 3	
3,000	16.496 0	9.936 3	7.545 3	6.277 4	5.480 9	4.929 2	4.521 7	4.207 0	3.955 5	3.749 3	3.429 9	3.094 9	2.737 9	2.508 4	2.346 5	2.129 7	1.988 9	1.888 8	1.781 7	1.664 9	1.491 3	1.346 2	1.218 1	
4,000	16.484 0	9.928 0	7.538 5	6.271 4	5.475 3	4.923 9	4.516 7	4.202 1	3.950 8	3.744 8	3.425 5	3.090 6	2.733 7	2.504 3	2.342 4	2.125 6	1.984 8	1.884 5	1.777 3	1.660 3	1.486 2	1.340 1	1.209 8	
5,000	16.476 8	9.923 1	7.534 5	6.267 7	5.472 0	4.920 8	4.513 7	4.199 2	3.948 0	3.742 0	3.422 9	3.088 1	2.731 2	2.501 9	2.339 9	2.123 1	1.982 3	1.882 0	1.774 7	1.657 6	1.483 1	1.336 4	1.204 7	
7,500	16.467 3	9.916 6	7.529 1	6.262 9	5.467 6	4.916 6	4.509 7	4.195 4	3.944 3	3.738 4	3.419 3	3.084 7	2.727 9	2.498 6	2.336 7	2.119 9	1.978 9	1.878 6	1.771 2	1.653 9	1.479 0	1.331 4	1.197 8	
10,000	16.462 5	9.913 3	7.526 4	6.260 5	5.465 4	4.914 5	4.507 7	4.193 5	3.942 4	3.736 5	3.417 6	3.083 0	2.726 3	2.497 0	2.335 0	2.118 2	1.977 3	1.876 9	1.769 4	1.652 1	1.476 9	1.329 8	1.194 3	10,000
	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	

F_{ν_1,ν_2} .99995

99.999*th* PERCENTILES FOR THE *F* DISTRIBUTION [F_{ν_1,ν_2}]

[calculated with *qf* in **R** version 3.3.2 using 17-digit arithmetic;
the accuracy of all digits in the table entries has *not* been verified]

Each table entry is the value (y) of the random variable $Y \sim F_{\nu_1,\nu_2}$ such that $\Pr(Y \le y) = 0.999\,99$ (ν_1 is the numerator, ν_2 the denominator, degrees of freedom)

$Df \rightarrow$ / ν_2 \ ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	
1	4052847345	5000000000	5403796460	5625000000	5764049558	5859375000	5928736688	5981445312	6022843620	6056213379	6106681823	6157640175	6209080226	6240171780	6260993029	6287123725	6302857198	6313368946	6323898811	6334446708	6348034646	6357109661	6363015421	1
2	99998.5	99999.0	99999.2	99999.2	99999.3	99999.3	99999.4	99999.4	99999.4	99999.4	99999.4	99999.4	99999.4	99999.5	99999.5	99999.5	99999.5	99999.5	99999.5	99999.5	99999.5	99999.5	99999.5	2
3	3647.8	3230.2	3064.8	2975.3	2919.2	2880.6	2852.5	2831.1	2814.2	2800.6	2779.9	2759.0	2737.8	2724.9	2716.3	2705.4	2698.9	2694.5	2690.1	2685.7	2680.0	2676.2	2673.7	3
4	771.26	630.46	575.79	546.39	527.95	515.29	506.04	499.00	493.45	488.96	482.16	475.25	468.24	463.98	461.12	457.52	455.35	453.89	452.43	450.97	449.08	447.81	446.99	4
5	320.30	247.50	219.64	204.71	195.36	188.94	184.25	180.67	177.85	175.57	172.11	168.60	165.02	162.85	161.39	159.55	158.44	157.69	156.94	156.19	155.22	154.57	154.15	5
6	183.747	136.248	118.255	108.643	102.328	98.497	95.480	93.178	91.363	89.894	87.662	85.393	83.083	81.677	80.730	79.536	78.814	78.330	77.844	77.356	76.725	76.302	76.027	6
7	125.773	90.394	77.095	70.007	65.574	62.530	60.306	58.608	57.269	56.185	54.536	52.858	51.148	50.106	49.403	48.517	47.980	47.620	47.258	46.895	46.425	46.110	45.905	7
8	95.698	67.131	56.455	50.775	47.224	44.786	43.004	41.644	40.570	39.700	38.376	37.028	35.653	34.813	34.247	33.532	33.098	32.807	32.515	32.221	31.840	31.585	31.418	8
9	77.924	53.620	44.578	39.774	36.772	34.710	33.203	32.052	31.143	30.406	29.285	28.142	26.974	26.260	25.778	25.169	24.800	24.552	24.302	24.051	23.726	23.508	23.365	9
10	66.427	45.000	37.057	32.842	30.209	28.400	27.077	26.067	25.268	24.621	23.636	22.630	21.601	20.972	20.547	20.009	19.682	19.463	19.242	19.019	18.731	18.538	18.411	10
11	58.484	39.112	31.952	28.156	25.785	24.156	22.965	22.054	21.334	20.751	19.861	18.953	18.024	17.454	17.069	16.581	16.285	16.085	15.885	15.683	15.421	15.244	15.129	11
12	52.717	34.878	28.300	24.815	22.639	21.143	20.049	19.213	18.552	18.016	17.198	16.362	15.505	14.980	14.625	14.174	13.900	13.716	13.530	13.343	13.100	12.936	12.829	12
13	48.364	31.707	25.578	22.333	20.306	18.913	17.894	17.115	16.498	15.998	15.236	14.455	13.655	13.164	12.831	12.409	12.152	11.978	11.804	11.628	11.400	11.246	11.145	13
14	44.976 5	29.256 3	23.482 0	20.425 9	18.517 6	17.206 0	16.246 2	15.511 9	14.931 1	14.459 7	13.740 1	13.003 7	12.247 6	11.783 0	11.468 1	11.068 1	10.824 3	10.660 1	10.494 6	10.327 5	10.110 3	9.964 0	9.868 2	14
15	42.272 7	27.311 9	21.824 7	18.921 8	17.109 1	15.863 2	14.951 3	14.253 3	13.701 1	13.252 9	12.568 3	11.867 3	11.146 8	10.703 7	10.403 1	10.021 0	9.787 9	9.630 9	9.472 4	9.312 3	9.104 1	8.963 8	8.871 8	15
16	40.069 5	25.735 7	20.485 2	17.708 5	15.974 8	14.782 9	13.910 4	13.242 4	12.713 8	12.284 6	11.629 9	10.956 9	10.265 7	9.840 2	9.551 4	9.183 9	8.959 5	8.808 2	8.655 5	8.501 1	8.300 2	8.164 7	8.075 8	16
17	38.242 7	24.434 7	19.382 5	16.711 5	15.043 8	13.897 3	13.057 7	12.414 8	11.906 0	11.492 6	10.861 0	10.213 3	9.546 6	9.135 8	8.856 7	8.501 3	8.284 2	8.137 7	7.989 6	7.840 0	7.645 1	7.513 4	7.427 1	17
18	36.705 2	23.344 3	18.460 5	15.879 2	14.267 6	13.159 4	12.347 8	11.726 2	11.234 1	10.834 3	10.223 1	9.596 0	8.949 9	8.551 5	8.280 6	7.935 4	7.724 4	7.581 9	7.437 8	7.292 1	7.102 1	6.973 7	6.889 4	18
19	35.394 8	22.418 3	17.679 1	15.174 9	13.611 4	12.536 2	11.748 6	11.145 3	10.667 5	10.279 3	9.685 6	9.076 1	8.447 8	8.059 9	7.796 1	7.459 6	7.253 6	7.114 5	6.973 8	6.831 4	6.645 6	6.519 9	6.437 3	19
20	34.265 4	21.622 8	17.009 1	14.571 8	13.050 1	12.003 5	11.236 7	10.649 3	10.183 9	9.805 7	9.227 2	8.633 0	8.019 9	7.641 2	7.383 4	7.054 4	6.852 9	6.716 6	6.578 8	6.439 2	6.256 9	6.133 5	6.052 4	20
22	32.420 0	20.328 4	15.921 7	13.594 6	12.141 7	11.142 2	10.409 7	9.844 8	9.403 5	9.041 9	8.488 3	7.919 1	7.331 2	6.967 4	6.719 5	6.402 6	6.208 2	6.076 6	5.943 3	5.808 2	5.631 5	5.511 6	5.432 8	22
24	30.977 9	19.321 9	15.078 6	12.838 5	11.439 8	10.477 5	9.772 1	9.231 3	8.802 6	8.454 0	7.920 0	7.370 6	6.802 3	6.450 2	6.210 0	5.902 4	5.713 5	5.585 5	5.455 7	5.324 0	5.151 4	5.034 2	4.957 0	24
26	29.821 4	18.518 0	14.407 0	12.237 2	10.882 3	9.950 1	9.266 5	8.742 3	8.326 7	7.988 5	7.470 4	6.936 9	6.384 4	6.041 7	5.807 5	5.507 5	5.322 9	5.197 7	5.070 5	4.941 4	4.771 9	4.656 6	4.580 6	26
28	28.874 0	17.861 8	13.859 9	11.748 1	10.429 4	9.521 9	8.856 4	8.345 9	7.941 0	7.611 5	7.106 4	6.586 0	6.046 4	5.711 3	5.482 2	5.188 1	5.007 0	4.884 0	4.759 0	4.631 9	4.464 8	4.351 0	4.275 8	28
30	28.084 2	17.316 5	13.406 0	11.342 9	10.054 5	9.167 8	8.517 4	8.018 4	7.622 5	7.300 2	6.806 0	6.296 5	5.767 8	5.439 0	5.214 0	4.924 9	4.746 5	4.625 3	4.502 1	4.376 5	4.211 3	4.098 6	4.024 0	30
35	26.587 1	16.287 2	12.551 6	10.581 3	9.351 0	8.503 9	7.882 3	7.405 2	7.026 5	6.718 0	6.244 7	5.755 9	5.247 6	4.930 8	4.713 5	4.433 5	4.260 3	4.142 3	4.022 0	3.899 2	3.737 0	3.625 8	3.552 1	35
40	25.532 3	15.565 6	11.954 3	10.050 2	8.861 1	8.042 2	7.441 1	6.979 5	6.613 0	6.314 4	5.855 7	5.381 6	4.887 8	4.579 2	4.367 2	4.093 5	3.923 6	3.807 7	3.689 3	3.568 1	3.407 4	3.296 8	3.223 3	40
45	24.749 8	15.032 3	11.514 0	9.659 2	8.500 9	7.703 0	7.117 3	6.667 3	6.309 9	6.018 5	5.570 9	5.107 7	4.624 5	4.322 0	4.113 9	3.844 5	3.677 1	3.562 5	3.445 3	3.325 0	3.165 1	3.054 5	2.980 8	45
50	24.146 5	14.622 3	11.176 2	9.359 7	8.225 2	7.443 7	6.869 7	6.428 8	6.078 4	5.792 7	5.353 5	4.898 7	4.423 7	4.125 9	3.920 7	3.654 6	3.488 9	3.375 3	3.258 8	3.139 0	2.979 3	2.868 5	2.794 3	50
60	23.277 7	14.034 0	10.692 3	8.931 2	7.831 3	7.073 4	6.516 6	6.088 7	5.748 5	5.471 0	5.044 1	4.601 5	4.138 1	3.847 0	3.645 8	3.384 2	3.220 6	3.108 2	2.992 5	2.873 1	2.712 9	2.601 0	2.525 6	60
70	22.682 6	13.632 3	10.362 7	8.639 9	7.563 7	6.822 1	6.277 2	5.858 2	5.525 0	5.253 1	4.834 7	4.400 3	3.945 0	3.658 3	3.459 8	3.201 1	3.038 8	2.926 9	2.811 5	2.692 0	2.530 8	2.417 4	2.340 5	70
80	22.249 6	13.340 9	10.123 8	8.428 9	7.370 2	6.640 5	6.104 2	5.691 8	5.363 7	5.096 0	4.683 6	4.255 3	3.805 8	3.522 2	3.325 6	3.068 9	2.907 4	2.795 8	2.680 5	2.560 6	2.398 2	2.283 2	2.204 8	80
90	21.920 5	13.119 7	9.942 8	8.269 3	7.223 8	6.503 2	5.973 5	5.566 0	5.241 9	4.977 2	4.569 6	4.145 9	3.700 7	3.419 5	3.224 3	2.969 0	2.808 0	2.696 5	2.581 1	2.460 9	2.297 2	2.180 6	2.100 6	90
100	21.662 0	12.946 3	9.801 0	8.144 2	7.109 2	6.395 7	5.871 2	5.467 7	5.146 6	4.884 4	4.480 4	4.060 4	3.618 6	3.339 3	3.145 2	2.890 8	2.730 2	2.618 8	2.503 2	2.382 5	2.217 6	2.099 4	2.017 8	100
125	21.206 9	12.641 5	9.552 1	7.925 0	6.908 4	6.207 6	5.692 2	5.295 6	4.980 0	4.722 1	4.324 6	3.910 9	3.475 1	3.199 0	3.006 7	2.754 0	2.593 8	2.482 4	2.366 3	2.244 5	2.076 5	1.954 7	1.869 4	125
150	20.910 7	12.443 6	9.390 7	7.782 9	6.778 4	6.085 8	5.576 4	5.184 3	4.872 3	4.617 2	4.223 9	3.814 3	3.382 4	3.108 4	2.917 2	2.665 5	2.505 5	2.393 9	2.277 3	2.154 4	1.983 8	1.858 7	1.770 2	150
175	20.702 5	12.304 7	9.277 5	7.683 3	6.687 3	6.000 5	5.495 3	5.106 5	4.796 9	4.543 9	4.153 5	3.746 8	3.317 6	3.045 0	2.854 6	2.603 5	2.443 5	2.331 7	2.214 7	2.090 9	1.918 1	1.790 1	1.698 6	175
200	20.548 3	12.201 8	9.193 7	7.609 7	6.620 0	5.937 5	5.435 4	5.049 0	4.741 2	4.489 7	4.101 5	3.697 0	3.269 8	2.998 2	2.808 3	2.557 7	2.397 7	2.285 7	2.168 3	2.043 7	1.869 0	1.739 5	1.644 3	200
250	20.335 0	12.059 8	9.078 1	7.508 1	6.527 1	5.850 6	5.352 9	4.969 7	4.664 5	4.411 5	4.029 9	3.628 3	3.203 9	2.933 7	2.744 6	2.494 5	2.334 4	2.222 1	2.104 0	1.978 2	1.800 4	1.665 8	1.566 7	250
300	20.194 4	11.966 3	9.002 1	7.441 3	6.466 1	5.793 5	5.298 6	4.917 6	4.614 1	4.365 9	3.982 9	3.583 3	3.160 6	2.891 3	2.702 7	2.452 9	2.292 8	2.180 2	2.061 6	1.934 9	1.754 6	1.616 7	1.513 7	300
350	20.094 9	11.900 1	8.948 3	7.394 1	6.422 9	5.753 1	5.260 3	4.880 8	4.578 5	4.331 3	3.949 7	3.551 4	3.130 0	2.861 4	2.673 1	2.423 5	2.263 3	2.150 5	2.031 5	1.904 1	1.721 9	1.581 3	1.474 9	350
400	20.020 6	11.850 7	8.908 2	7.358 9	6.390 8	5.723 1	5.231 7	4.853 4	4.552 0	4.305 5	3.924 9	3.527 7	3.107 3	2.839 1	2.651 1	2.401 6	2.241 3	2.128 4	2.009 0	1.881 1	1.697 3	1.554 5	1.445 1	400
450	19.963 2	11.812 6	8.877 1	7.331 6	6.365 9	5.699 8	5.209 7	4.832 2	4.531 5	4.285 6	3.905 8	3.509 4	3.089 7	2.821 9	2.634 1	2.384 7	2.224 3	2.111 3	1.991 6	1.863 2	1.678 2	1.533 4	1.421 4	450
500	19.917 3	11.782 1	8.852 4	7.309 9	6.346 1	5.681 3	5.192 1	4.815 3	4.515 2	4.269 7	3.890 6	3.494 8	3.075 7	2.808 2	2.620 5	2.371 2	2.210 8	2.097 6	1.977 7	1.848 9	1.662 8	1.516 5	1.402 2	500
600	19.848 9	11.736 7	8.815 5	7.277 6	6.316 6	5.653 7	5.165 8	4.790 1	4.490 8	4.246 0	3.867 9	3.473 0	3.054 8	2.787 7	2.600 2	2.351 1	2.190 6	2.077 2	1.957 0	1.827 5	1.639 8	1.490 8	1.372 6	600
700	19.800 2	11.704 4	8.789 3	7.254 5	6.295 5	5.634 0	5.147 2	4.772 2	4.473 5	4.229 1	3.851 7	3.457 6	3.039 9	2.773 2	2.585 9	2.336 7	2.176 2	2.062 6	1.942 2	1.812 2	1.623 2	1.472 2	1.350 9	700
800	19.763 8	11.680 2	8.769 7	7.237 3	6.279 8	5.619 3	5.133 3	4.758 9	4.460 6	4.216 5	3.839 7	3.446 0	3.028 9	2.762 3	2.575 1	2.326 0	2.165 4	2.051 8	1.931 1	1.800 8	1.610 8	1.458 2	1.334 2	800
900	19.735 5	11.661 5	8.754 4	7.224 0	6.267 7	5.607 9	5.122 4	4.748 5	4.450 5	4.206 8	3.830 3	3.437 1	3.020 2	2.753 9	2.566 8	2.317 7	2.157 0	2.043 3	1.922 5	1.791 9	1.601 1	1.447 1	1.321 0	900
1,000	19.712 9	11.646 5	8.742 3	7.213 3	6.257 9	5.598 9	5.113 8	4.740 2	4.442 5	4.199 0	3.822 8	3.429 9	3.013 4	2.747 2	2.560 1	2.311 1	2.150 4	2.036 6	1.915 6	1.784 8	1.593 4	1.438 3	1.310 2	1,000
2,000	19.611 8	11.579 5	8.687 9	7.165 6	6.214 4	5.558 2	5.075 2	4.703 2	4.406 7	4.164 1	3.789 4	3.397 9	2.982 7	2.717 1	2.530 3	2.281 4	2.120 5	2.006 4	1.884 8	1.752 9	1.558 3	1.397 7	1.259 3	2,000
3,000	19.578 3	11.557 2	8.669 8	7.149 8	6.200 0	5.544 7	5.062 4	4.690 9	4.394 8	4.152 6	3.777 4	3.387 3	2.972 5	2.707 1	2.520 4	2.271 6	2.110 6	1.996 4	1.874 6	1.742 2	1.546 5	1.383 9	1.241 1	3,000
4,000	19.561 5	11.546 1	8.660 8	7.141 9	6.192 8	5.538 0	5.056 0	4.684 8	4.388 9	4.146 8	3.772 9	3.382 0	2.967 4	2.702 1	2.515 5	2.266 7	2.105 6	1.991 3	1.869 5	1.736 9	1.540 6	1.376 9	1.231 8	4,000
5,000	19.551 5	11.539 5	8.655 5	7.137 2	6.188 5	5.533 9	5.052 2	4.681 1	4.385 3	4.143 4	3.769 5	3.378 8	2.964 4	2.699 2	2.512 6	2.263 7	2.102 7	1.988 3	1.866 4	1.733 7	1.537 1	1.372 7	1.226 1	5,000
7,500	19.538 1	11.530 6	8.648 3	7.130 9	6.182 7	5.528 6	5.047 1	4.676 2	4.380 6	4.138 8	3.765 1	3.374 6	2.960 3	2.695 2	2.508 6	2.259 8	2.098 7	1.984 3	1.862 3	1.729 5	1.532 3	1.367 0	1.218 3	7,500
10,000	19.531 4	11.526 2	8.644 7	7.127 7	6.179 8	5.525 9	5.044 6	4.673 8	4.378 3	4.136 5	3.762 9	3.372 5	2.958 3	2.693 2	2.506 7	2.257 8	2.096 7	1.982 3	1.860 3	1.727 4	1.530 0	1.364 2	1.214 4	10,000
	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	

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