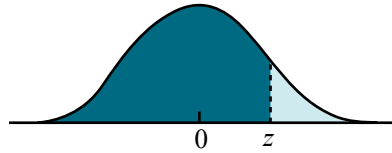


MIT OpenCourseWare
<http://ocw.mit.edu>

14.30 Introduction to Statistical Methods in Economics
Spring 2009

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.

Cumulative areas under the standard normal distribution



(Cont.)

| z | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| -3 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0010 |
| -2.9 | 0.0019 | 0.0018 | 0.0017 | 0.0017 | 0.0016 | 0.0016 | 0.0015 | 0.0015 | 0.0014 | 0.0014 |
| -2.8 | 0.0026 | 0.0025 | 0.0024 | 0.0023 | 0.0023 | 0.0022 | 0.0021 | 0.0021 | 0.0020 | 0.0019 |
| -2.7 | 0.0035 | 0.0034 | 0.0033 | 0.0032 | 0.0031 | 0.0030 | 0.0029 | 0.0028 | 0.0027 | 0.0026 |
| -2.6 | 0.0047 | 0.0045 | 0.0044 | 0.0043 | 0.0041 | 0.0040 | 0.0039 | 0.0038 | 0.0037 | 0.0036 |
| -2.5 | 0.0062 | 0.0060 | 0.0059 | 0.0057 | 0.0055 | 0.0054 | 0.0052 | 0.0051 | 0.0049 | 0.0048 |
| -2.4 | 0.0082 | 0.0080 | 0.0078 | 0.0075 | 0.0073 | 0.0071 | 0.0069 | 0.0068 | 0.0066 | 0.0064 |
| -2.3 | 0.0107 | 0.0104 | 0.0102 | 0.0099 | 0.0096 | 0.0094 | 0.0091 | 0.0089 | 0.0087 | 0.0084 |
| -2.2 | 0.0139 | 0.0136 | 0.0132 | 0.0129 | 0.0126 | 0.0122 | 0.0119 | 0.0116 | 0.0113 | 0.0110 |
| -2.1 | 0.0179 | 0.0174 | 0.0170 | 0.0166 | 0.0162 | 0.0158 | 0.0154 | 0.0150 | 0.0146 | 0.0143 |
| -2.0 | 0.0228 | 0.0222 | 0.0217 | 0.0212 | 0.0207 | 0.0202 | 0.0197 | 0.0192 | 0.0188 | 0.0183 |
| -1.9 | 0.0287 | 0.0281 | 0.0274 | 0.0268 | 0.0262 | 0.0256 | 0.0250 | 0.0244 | 0.0238 | 0.0233 |
| -1.8 | 0.0359 | 0.0352 | 0.0344 | 0.0336 | 0.0329 | 0.0322 | 0.0314 | 0.0307 | 0.0300 | 0.0294 |
| -1.7 | 0.0446 | 0.0436 | 0.0427 | 0.0418 | 0.0409 | 0.0401 | 0.0392 | 0.0384 | 0.0375 | 0.0367 |
| -1.6 | 0.0548 | 0.0537 | 0.0526 | 0.0516 | 0.0505 | 0.0495 | 0.0485 | 0.0475 | 0.0465 | 0.0455 |
| -1.5 | 0.0668 | 0.0655 | 0.0643 | 0.0630 | 0.0618 | 0.0606 | 0.0594 | 0.0582 | 0.0570 | 0.0559 |
| -1.4 | 0.0808 | 0.0793 | 0.0778 | 0.0764 | 0.0749 | 0.0735 | 0.0722 | 0.0708 | 0.0694 | 0.0681 |
| -1.3 | 0.0968 | 0.0951 | 0.0934 | 0.0918 | 0.0901 | 0.0885 | 0.0869 | 0.0853 | 0.0838 | 0.0823 |
| -1.2 | 0.1151 | 0.1131 | 0.1112 | 0.1093 | 0.1075 | 0.1056 | 0.1038 | 0.1020 | 0.1003 | 0.0985 |
| -1.1 | 0.1357 | 0.1335 | 0.1314 | 0.1292 | 0.1271 | 0.1251 | 0.1230 | 0.1210 | 0.1190 | 0.1170 |
| -1.0 | 0.1587 | 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 | 0.2389 | 0.2358 | 0.2327 | 0.2297 | 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 | 0.2483 | 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 | 0.3112 |
| -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 |

Image by MIT OpenCourseWare.

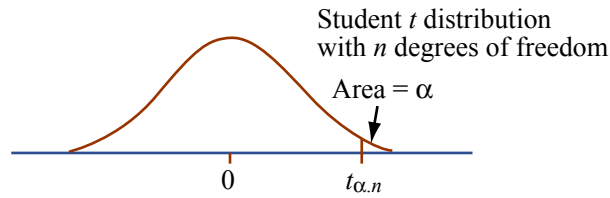
Cumulative areas under the standard normal distribution

(Cont.)

| z | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0.0 | 0.5000 | 0.5040 | 0.5080 | 0.5120 | 0.5160 | 0.5199 | 0.5239 | 0.5279 | 0.5319 | 0.5359 |
| 0.1 | 0.5398 | 0.5438 | 0.5478 | 0.5517 | 0.5557 | 0.5596 | 0.5636 | 0.5675 | 0.5714 | 0.5753 |
| 0.2 | 0.5793 | 0.5832 | 0.5871 | 0.5910 | 0.5948 | 0.5987 | 0.6026 | 0.6064 | 0.6103 | 0.6141 |
| 0.3 | 0.6179 | 0.6217 | 0.6255 | 0.6293 | 0.6331 | 0.6368 | 0.6406 | 0.6443 | 0.6480 | 0.6517 |
| 0.4 | 0.6554 | 0.6591 | 0.6628 | 0.6664 | 0.6700 | 0.6736 | 0.6772 | 0.6808 | 0.6844 | 0.6879 |
| 0.5 | 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 | 0.7517 | 0.7549 |
| 0.7 | 0.7580 | 0.7611 | 0.7642 | 0.7673 | 0.7703 | 0.7734 | 0.7764 | 0.7794 | 0.7823 | 0.7852 |
| 0.8 | 0.7881 | 0.7910 | 0.7939 | 0.7967 | 0.7995 | 0.8023 | 0.8051 | 0.8078 | 0.8106 | 0.8133 |
| 0.9 | 0.8159 | 0.8186 | 0.8212 | 0.8238 | 0.8264 | 0.8289 | 0.8315 | 0.8340 | 0.8365 | 0.8389 |
| 1.0 | 0.8413 | 0.8438 | 0.8461 | 0.8485 | 0.8508 | 0.8531 | 0.8554 | 0.8577 | 0.8599 | 0.8621 |
| 1.1 | 0.8643 | 0.8665 | 0.8686 | 0.8708 | 0.8729 | 0.8749 | 0.8770 | 0.8790 | 0.8810 | 0.8830 |
| 1.2 | 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 |
| 1.4 | 0.9192 | 0.9207 | 0.9222 | 0.9236 | 0.9251 | 0.9265 | 0.9278 | 0.9292 | 0.9306 | 0.9319 |
| 1.5 | 0.9332 | 0.9345 | 0.9357 | 0.9370 | 0.9382 | 0.9394 | 0.9406 | 0.9418 | 0.9430 | 0.9441 |
| 1.6 | 0.9452 | 0.9463 | 0.9474 | 0.9484 | 0.9495 | 0.9505 | 0.9515 | 0.9525 | 0.9535 | 0.9545 |
| 1.7 | 0.9554 | 0.9564 | 0.9573 | 0.9582 | 0.9591 | 0.9599 | 0.9608 | 0.9616 | 0.9625 | 0.9633 |
| 1.8 | 0.9641 | 0.9648 | 0.9656 | 0.9664 | 0.9671 | 0.9678 | 0.9686 | 0.9693 | 0.9700 | 0.9706 |
| 1.9 | 0.9713 | 0.9719 | 0.9726 | 0.9732 | 0.9738 | 0.9744 | 0.9750 | 0.9756 | 0.9762 | 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 | 0.9874 | 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 | 0.9987 | 0.9987 | 0.9987 | 0.9988 | 0.9988 | 0.9989 | 0.9989 | 0.9989 | 0.9990 | 0.9990 |

Source: B. W. Lindgren, *Statistical Theory* (New York: Macmillan, 1962), pp. 392-393.

Upper Percentiles of Student t Distributions



| α | | | | | | | |
|----------|--------|--------|--------|--------|--------|--------|--------|
| df | 0.20 | 0.15 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
| 1 | 1.376 | 1.963 | 3.078 | 6.3138 | 12.706 | 31.821 | 63.657 |
| 2 | 1.061 | 1.386 | 1.886 | 2.9200 | 4.3027 | 6.965 | 9.9248 |
| 3 | 0.978 | 1.250 | 1.638 | 2.3534 | 3.1825 | 4.541 | 5.8409 |
| 4 | 0.941 | 1.190 | 1.533 | 2.1318 | 2.7764 | 3.747 | 4.6041 |
| 5 | 0.920 | 1.156 | 1.476 | 2.0150 | 2.5706 | 3.365 | 4.0321 |
| 6 | 0.906 | 1.134 | 1.440 | 1.9432 | 2.4469 | 3.143 | 3.7074 |
| 7 | 0.896 | 1.119 | 1.415 | 1.8946 | 2.3646 | 2.998 | 3.4995 |
| 8 | 0.889 | 1.108 | 1.397 | 1.8595 | 2.3060 | 2.896 | 3.3554 |
| 9 | 0.883 | 1.100 | 1.383 | 1.8331 | 2.2622 | 2.821 | 3.2498 |
| 10 | 0.879 | 1.093 | 1.372 | 1.8125 | 2.2281 | 2.764 | 3.1693 |
| 11 | 0.876 | 1.088 | 1.363 | 1.7959 | 2.2010 | 2.718 | 3.1058 |
| 12 | 0.873 | 1.083 | 1.356 | 1.7823 | 2.1788 | 2.681 | 3.0545 |
| 13 | 0.870 | 1.079 | 1.350 | 1.7709 | 2.1604 | 2.650 | 3.0123 |
| 14 | 0.868 | 1.076 | 1.345 | 1.7613 | 2.1448 | 2.624 | 2.9768 |
| 15 | 0.866 | 1.074 | 1.341 | 1.7530 | 2.1315 | 2.602 | 2.9467 |
| 16 | 0.865 | 1.071 | 1.337 | 1.7459 | 2.1199 | 2.583 | 2.9208 |
| 17 | 0.863 | 1.069 | 1.333 | 1.7396 | 2.1098 | 2.567 | 2.8982 |
| 18 | 0.862 | 1.067 | 1.330 | 1.7341 | 2.1009 | 2.552 | 2.8784 |
| 19 | 0.861 | 1.066 | 1.328 | 1.7291 | 2.0930 | 2.539 | 2.8609 |
| 20 | 0.860 | 1.064 | 1.325 | 1.7247 | 2.0860 | 2.528 | 2.8453 |
| 21 | 0.859 | 1.063 | 1.323 | 1.7207 | 2.0796 | 2.518 | 2.8314 |
| 22 | 0.858 | 1.061 | 1.321 | 1.7171 | 2.0739 | 2.508 | 2.8188 |
| 23 | 0.858 | 1.060 | 1.319 | 1.7139 | 2.0687 | 2.500 | 2.8073 |
| 24 | 0.857 | 1.059 | 1.318 | 1.7109 | 2.0639 | 2.492 | 2.7969 |
| 25 | 0.856 | 1.058 | 1.316 | 1.7081 | 2.0595 | 2.485 | 2.7874 |
| 26 | 0.856 | 1.058 | 1.315 | 1.7056 | 2.0555 | 2.479 | 2.7787 |
| 27 | 0.855 | 1.057 | 1.314 | 1.7033 | 2.0518 | 2.473 | 2.7707 |
| 28 | 0.855 | 1.056 | 1.313 | 1.7011 | 2.0484 | 2.467 | 2.7633 |
| 29 | 0.854 | 1.055 | 1.311 | 1.6991 | 2.0452 | 2.462 | 2.7564 |
| 30 | 0.854 | 1.055 | 1.310 | 1.6973 | 2.0423 | 2.457 | 2.7500 |
| 31 | 0.8535 | 1.0541 | 1.3095 | 1.6955 | 2.0395 | 2.453 | 2.7441 |
| 32 | 0.8531 | 1.0536 | 1.3086 | 1.6939 | 2.0370 | 2.449 | 2.7385 |
| 33 | 0.8527 | 1.0531 | 1.3078 | 1.6924 | 2.0345 | 2.445 | 2.7333 |
| 34 | 0.8524 | 1.0526 | 1.3070 | 1.6909 | 2.0323 | 2.441 | 2.7284 |

Image by MIT OpenCourseWare.

Upper Percentiles of Student t Distributions (cont.)

| α | | | | | | | |
|----------|--------|--------|--------|--------|--------|-------|--------|
| df | 0.20 | 0.15 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
| 35 | 0.8521 | 1.0521 | 1.3062 | 1.6896 | 2.0301 | 2.438 | 2.7239 |
| 36 | 0.8518 | 1.0516 | 1.3055 | 1.6883 | 2.0281 | 2.434 | 2.7195 |
| 37 | 0.8515 | 1.0512 | 1.3049 | 1.6871 | 2.0262 | 2.431 | 2.7155 |
| 38 | 0.8512 | 1.0508 | 1.3042 | 1.6860 | 2.0244 | 2.428 | 2.7116 |
| 39 | 0.8510 | 1.0504 | 1.3037 | 1.6849 | 2.0227 | 2.426 | 2.7079 |
| 40 | 0.8507 | 1.0501 | 1.3031 | 1.6839 | 2.0211 | 2.423 | 2.7045 |
| 41 | 0.8505 | 1.0498 | 1.3026 | 1.6829 | 2.0196 | 2.421 | 2.7012 |
| 42 | 0.8503 | 1.0494 | 1.3020 | 1.6820 | 2.0181 | 2.418 | 2.6981 |
| 43 | 0.8501 | 1.0491 | 1.3016 | 1.6811 | 2.0167 | 2.416 | 2.6952 |
| 44 | 0.8599 | 1.0488 | 1.3011 | 1.6802 | 2.0154 | 2.414 | 2.6923 |
| 45 | 0.8497 | 1.0485 | 1.3007 | 1.6794 | 2.0141 | 2.412 | 2.6896 |
| 46 | 0.8495 | 1.0483 | 1.3002 | 1.6787 | 2.1788 | 2.410 | 2.6870 |
| 47 | 0.8494 | 1.0480 | 1.2998 | 1.6779 | 2.0129 | 2.408 | 2.6846 |
| 48 | 0.8492 | 1.0478 | 1.2994 | 1.6772 | 2.0118 | 2.406 | 2.6822 |
| 49 | 0.8490 | 1.0476 | 1.2991 | 1.6766 | 2.0106 | 2.405 | 2.6800 |
| 50 | 0.8489 | 1.0473 | 1.2987 | 1.6759 | 2.0096 | 2.403 | 2.6778 |
| 51 | 0.8448 | 1.0471 | 1.2984 | 1.6753 | 2.0086 | 2.402 | 2.6758 |
| 52 | 0.8486 | 1.0469 | 1.2981 | 1.6747 | 2.0077 | 2.400 | 2.6738 |
| 53 | 0.8485 | 1.0467 | 1.2978 | 1.6742 | 2.0067 | 2.399 | 2.6719 |
| 54 | 0.8484 | 1.0465 | 1.2975 | 1.6736 | 2.0058 | 2.397 | 2.6700 |
| 55 | 0.8483 | 1.0463 | 1.2972 | 1.6731 | 2.0049 | 2.396 | 2.6683 |
| 56 | 0.8481 | 1.0461 | 1.2969 | 1.6725 | 2.0041 | 2.395 | 2.6666 |
| 57 | 0.8480 | 1.0460 | 1.2967 | 1.6721 | 2.0033 | 2.393 | 2.6650 |
| 58 | 0.8479 | 1.0458 | 1.2964 | 1.6716 | 2.0025 | 2.392 | 2.6633 |
| 59 | 0.8478 | 1.0457 | 1.2962 | 1.6712 | 2.0017 | 2.391 | 2.6618 |
| 60 | 0.8477 | 1.0455 | 1.2959 | 1.6707 | 2.0003 | 2.390 | 2.6603 |
| 61 | 0.8476 | 1.0454 | 1.2957 | 1.6703 | 2.9997 | 2.389 | 2.6590 |
| 62 | 0.8475 | 1.0452 | 1.2954 | 1.6698 | 2.9990 | 2.388 | 2.6576 |
| 63 | 0.8474 | 1.0451 | 1.2952 | 1.6694 | 2.9984 | 2.387 | 2.6563 |
| 64 | 0.8473 | 1.0449 | 1.2950 | 1.6690 | 2.9977 | 2.386 | 2.6549 |
| 65 | 0.8472 | 1.0448 | 1.2948 | 1.6687 | 2.9972 | 2.385 | 2.6537 |
| 66 | 0.8471 | 1.0447 | 1.2945 | 1.6683 | 2.9966 | 2.384 | 2.6525 |
| 67 | 0.8471 | 1.0446 | 1.2944 | 1.6680 | 2.9961 | 2.383 | 2.6513 |
| 68 | 0.8470 | 1.0444 | 1.2942 | 1.6676 | 2.9955 | 2.382 | 2.6501 |
| 69 | 0.8469 | 1.0443 | 1.2940 | 1.6673 | 2.9950 | 2.381 | 2.6491 |
| 70 | 0.8468 | 1.0442 | 1.2938 | 1.6669 | 2.9945 | 2.381 | 2.6480 |
| 71 | 0.8468 | 1.0441 | 1.2936 | 1.6666 | 2.9940 | 2.380 | 2.6470 |
| 72 | 0.8467 | 1.0440 | 1.2934 | 1.6663 | 2.9935 | 2.379 | 2.6459 |
| 73 | 0.8466 | 1.0439 | 1.2933 | 1.6660 | 2.9931 | 2.378 | 2.6450 |
| 74 | 0.8465 | 1.0438 | 1.2931 | 1.6657 | 2.9926 | 2.378 | 2.6440 |
| 75 | 0.8465 | 1.0437 | 1.2930 | 1.6655 | 2.9922 | 2.377 | 2.6431 |
| 76 | 0.8464 | 1.0436 | 1.2928 | 1.6652 | 2.9917 | 2.376 | 2.6421 |
| 77 | 0.8464 | 1.0435 | 1.2927 | 1.6649 | 2.9913 | 2.376 | 2.6413 |
| 78 | 0.8463 | 1.0434 | 1.2925 | 1.6646 | 2.9909 | 2.375 | 2.6406 |
| 79 | 0.8463 | 1.0433 | 1.2924 | 1.6644 | 2.9905 | 2.374 | 2.6396 |

Image by MIT OpenCourseWare.

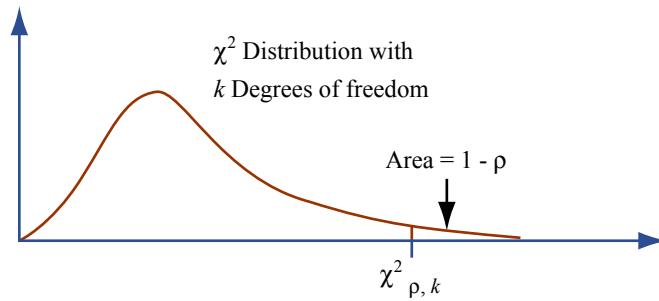
Upper Percentiles of Student t Distributions (cont.)

| α | | | | | | | |
|----------|--------|--------|--------|--------|--------|-------|--------|
| df | 0.20 | 0.15 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
| 80 | 0.8462 | 1.0432 | 1.2922 | 6.6641 | 1.9901 | 2.374 | 2.6388 |
| 81 | 0.8461 | 1.0431 | 1.2921 | 2.6639 | 1.9897 | 2.373 | 2.6380 |
| 82 | 0.8460 | 1.0430 | 1.2920 | 2.6637 | 1.9893 | 2.372 | 2.6372 |
| 83 | 0.8460 | 1.0430 | 1.2919 | 2.6635 | 1.9890 | 2.372 | 2.6365 |
| 84 | 0.8459 | 1.0429 | 1.2917 | 2.6632 | 1.9886 | 2.371 | 2.6357 |
| 85 | 0.8459 | 1.0428 | 1.2916 | 1.6630 | 1.9883 | 2.371 | 2.6350 |
| 86 | 0.8458 | 1.0427 | 1.2915 | 1.6628 | 1.9880 | 2.370 | 2.6343 |
| 87 | 0.8458 | 1.0427 | 1.2914 | 1.6626 | 1.9877 | 2.370 | 2.6336 |
| 88 | 0.8457 | 1.0426 | 1.2913 | 1.6624 | 1.9873 | 2.396 | 2.6329 |
| 89 | 0.8457 | 1.0426 | 1.2912 | 1.6622 | 1.9870 | 2.396 | 2.6323 |
| 90 | 0.8457 | 1.0425 | 1.2910 | 1.6620 | 1.9867 | 2.368 | 2.6316 |
| 91 | 0.8457 | 1.0424 | 1.2909 | 1.6618 | 1.9864 | 2.368 | 2.6310 |
| 92 | 0.8456 | 1.0423 | 1.2908 | 1.6616 | 1.9861 | 2.367 | 2.6303 |
| 93 | 0.8456 | 1.0423 | 1.2907 | 1.6614 | 1.9859 | 2.367 | 2.6298 |
| 94 | 0.8455 | 1.0422 | 1.2906 | 1.6612 | 1.9856 | 2.366 | 2.6292 |
| 95 | 0.8455 | 1.0422 | 1.2905 | 1.6611 | 1.9853 | 2.366 | 2.6286 |
| 96 | 0.8454 | 1.0421 | 1.2904 | 1.6609 | 1.9850 | 2.366 | 2.6280 |
| 97 | 0.8454 | 1.0421 | 1.2904 | 1.6608 | 1.9848 | 2.365 | 2.6275 |
| 98 | 0.8453 | 1.0420 | 1.2903 | 1.6606 | 1.9845 | 2.365 | 2.6270 |
| 99 | 0.8453 | 1.0419 | 1.2902 | 1.6604 | 1.9843 | 2.364 | 2.6265 |
| 100 | 0.8452 | 1.0418 | 1.2901 | 1.6602 | 1.9840 | 2.364 | 2.6260 |
| ∞ | 0.84 | 1.04 | 1.28 | 1.64 | 1.96 | 2.33 | 2.58 |

Source: Scientific tables. 6th ed. (Basel, Switzerland: J.R. Geigy, 1962), p.36.

Image by MIT OpenCourseWare.

Upper and Lower Percentiles of χ^2 Distributions



| | | p | | | | | | | |
|----|----------|----------|---------|--------|--------|--------|--------|--------|--|
| df | 0.010 | 0.025 | 0.050 | 0.10 | 0.090 | 0.95 | 0.975 | 0.99 | |
| 1 | 0.000157 | 0.000982 | 0.00393 | 0.0158 | 2.706 | 3.841 | 5.024 | 6.635 | |
| 2 | 0.0201 | 0.0506 | 0.103 | 0.211 | 4.605 | 5.991 | 7.378 | 9.210 | |
| 3 | 0.115 | 0.216 | 0.352 | 0.584 | 6.251 | 7.815 | 9.348 | 11.345 | |
| 4 | 0.297 | 0.484 | 0.711 | 1.064 | 7.779 | 9.488 | 11.143 | 13.277 | |
| 5 | 0.554 | 0.831 | 1.145 | 1.610 | 9.236 | 11.070 | 12.832 | 15.086 | |
| 6 | 0.872 | 1.237 | 1.635 | 2.204 | 10.645 | 12.592 | 14.449 | 16.812 | |
| 7 | 1.239 | 1.690 | 2.167 | 2.833 | 12.017 | 14.067 | 16.013 | 18.475 | |
| 8 | 1.646 | 2.180 | 2.733 | 3.490 | 13.362 | 15.507 | 17.535 | 20.090 | |
| 9 | 2.088 | 2.700 | 3.325 | 4.168 | 14.684 | 16.919 | 19.023 | 21.666 | |
| 10 | 2.558 | 3.247 | 3.940 | 4.865 | 15.987 | 18.307 | 20.483 | 23.209 | |
| 11 | 3.053 | 3.816 | 4.575 | 5.578 | 17.275 | 19.675 | 21.920 | 24.725 | |
| 12 | 3.571 | 4.404 | 5.226 | 6.304 | 18.549 | 21.026 | 23.336 | 26.217 | |
| 13 | 4.107 | 5.009 | 5.892 | 7.042 | 19.812 | 22.362 | 24.736 | 27.688 | |
| 14 | 4.660 | 5.629 | 6.571 | 7.790 | 21.064 | 23.685 | 26.119 | 29.141 | |
| 15 | 5.229 | 6.262 | 7.261 | 8.547 | 22.307 | 24.996 | 27.488 | 30.578 | |
| 16 | 5.812 | 6.908 | 7.962 | 9.312 | 23.542 | 26.296 | 28.845 | 32.000 | |
| 17 | 6.408 | 7.564 | 8.672 | 10.085 | 24.769 | 27.587 | 30.191 | 33.409 | |
| 18 | 7.015 | 8.231 | 9.390 | 10.865 | 25.989 | 28.869 | 31.526 | 34.805 | |
| 19 | 7.633 | 8.907 | 10.117 | 11.651 | 27.204 | 30.144 | 32.852 | 36.191 | |
| 20 | 8.260 | 9.591 | 10.851 | 12.443 | 28.412 | 31.410 | 34.170 | 37.566 | |
| 21 | 8.897 | 10.283 | 11.591 | 13.240 | 29.615 | 32.671 | 35.479 | 38.932 | |
| 22 | 9.542 | 10.982 | 12.338 | 14.041 | 30.813 | 33.924 | 36.781 | 40.289 | |
| 23 | 10.196 | 11.688 | 13.091 | 14.848 | 32.007 | 35.172 | 38.076 | 41.638 | |
| 24 | 10.856 | 12.401 | 13.848 | 15.659 | 33.196 | 36.415 | 39.364 | 42.980 | |
| 25 | 11.524 | 13.120 | 14.611 | 16.473 | 34.382 | 37.652 | 40.646 | 44.314 | |
| 26 | 12.198 | 13.844 | 15.379 | 17.292 | 35.563 | 38.885 | 41.923 | 45.642 | |
| 27 | 12.879 | 14.573 | 16.151 | 18.114 | 36.741 | 40.113 | 43.194 | 46.963 | |
| 28 | 13.565 | 15.308 | 16.928 | 18.939 | 37.916 | 41.337 | 44.461 | 48.278 | |
| 29 | 14.256 | 16.047 | 17.708 | 19.768 | 39.087 | 42.557 | 45.722 | 49.588 | |
| 30 | 14.953 | 16.791 | 18.493 | 20.599 | 40.256 | 43.773 | 46.979 | 50.892 | |
| 31 | 15.655 | 17.539 | 19.281 | 21.434 | 41.422 | 44.985 | 48.232 | 52.191 | |
| 32 | 16.362 | 18.291 | 20.072 | 22.271 | 42.585 | 46.194 | 49.480 | 53.486 | |
| 33 | 17.073 | 19.047 | 20.867 | 23.110 | 43.745 | 47.400 | 50.725 | 54.776 | |
| 34 | 17.789 | 19.806 | 21.664 | 23.952 | 44.903 | 48.602 | 51.966 | 56.061 | |

Upper and Lower Percentiles of χ^2 Distributions (cont.)

| ρ | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| df | 0.010 | 0.025 | 0.050 | 0.10 | 0.90 | 0.95 | 0.975 | 0.99 |
| 35 | 18.509 | 20.569 | 22.465 | 24.797 | 46.059 | 49.802 | 53.203 | 57.342 |
| 36 | 19.233 | 21.336 | 23.269 | 25.643 | 47.212 | 50.998 | 54.437 | 58.619 |
| 37 | 19.960 | 22.106 | 24.075 | 26.492 | 48.363 | 52.192 | 55.668 | 59.892 |
| 38 | 20.691 | 22.878 | 24.884 | 27.343 | 49.513 | 53.384 | 56.895 | 61.162 |
| 39 | 21.426 | 23.654 | 25.695 | 28.196 | 50.660 | 54.572 | 58.120 | 62.428 |
| 40 | 22.164 | 24.433 | 26.509 | 29.051 | 51.805 | 55.758 | 59.342 | 63.691 |
| 41 | 22.906 | 25.215 | 27.326 | 29.907 | 52.949 | 56.942 | 60.561 | 64.950 |
| 42 | 23.650 | 25.999 | 28.144 | 30.765 | 54.090 | 58.124 | 61.777 | 66.206 |
| 43 | 24.398 | 26.785 | 28.965 | 31.625 | 55.230 | 59.304 | 62.990 | 67.459 |
| 44 | 25.148 | 27.575 | 29.787 | 32.487 | 56.369 | 60.481 | 64.201 | 68.709 |
| 45 | 25.901 | 28.366 | 30.612 | 33.350 | 57.505 | 61.656 | 65.410 | 69.957 |
| 46 | 26.657 | 29.160 | 31.439 | 34.215 | 58.641 | 62.830 | 66.617 | 71.201 |
| 47 | 27.416 | 29.956 | 32.268 | 35.081 | 59.774 | 64.001 | 67.821 | 72.443 |
| 48 | 28.177 | 30.755 | 33.098 | 35.949 | 60.907 | 65.171 | 69.023 | 73.683 |
| 49 | 28.941 | 31.555 | 33.930 | 36.818 | 62.038 | 66.339 | 70.222 | 74.919 |
| 50 | 29.707 | 32.357 | 34.764 | 37.689 | 63.167 | 67.505 | 71.420 | 76.154 |

Source: Scientific tables. 6th ed. (Basel, Switzerland: J.R. Geigy, 1962), p.36.

Image by MIT OpenCourseWare.