

Standard Normal Table

| Z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 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 | 0.7704 | 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 | 0.9031 | 0.9147 | 0.9162 | 0.9177 |
| 1.4 | 0.9192 | 0.9207 | 0.9222 | 0.9236 | 0.9251 | 0.9265 | 0.9279 | 0.9292 | 0.9306 | 0.9319 |
| 1.5 | 0.9332 | 0.9345 | 0.9357 | 0.9370 | 0.9382 | 0.9394 | 0.9406 | 0.9418 | 0.9429 | 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 | 0.9649 | 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 | 0.9924 | 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 | 0.9958 | 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 |

TABLE of CRITICAL VALUES for STUDENT'S t DISTRIBUTIONS

Column headings denote probabilities (α) **above** tabulated values.

| d.f. | 0.40 | 0.25 | 0.10 | 0.05 | 0.04 | 0.025 | 0.02 | 0.01 | 0.005 | 0.0025 | 0.001 | 0.0005 |
|------|-------|-------|-------|-------|-------|--------|--------|--------|--------|---------|---------|---------|
| 1 | 0.325 | 1.000 | 3.078 | 6.314 | 7.916 | 12.706 | 15.894 | 31.821 | 63.656 | 127.321 | 318.289 | 636.578 |
| 2 | 0.289 | 0.816 | 1.886 | 2.920 | 3.320 | 4.303 | 4.849 | 6.965 | 9.925 | 14.089 | 22.328 | 31.600 |
| 3 | 0.277 | 0.765 | 1.638 | 2.353 | 2.605 | 3.182 | 3.482 | 4.541 | 5.841 | 7.453 | 10.214 | 12.924 |
| 4 | 0.271 | 0.741 | 1.533 | 2.132 | 2.333 | 2.776 | 2.999 | 3.747 | 4.604 | 5.598 | 7.173 | 8.610 |
| 5 | 0.267 | 0.727 | 1.476 | 2.015 | 2.191 | 2.571 | 2.757 | 3.365 | 4.032 | 4.773 | 5.894 | 6.869 |
| 6 | 0.265 | 0.718 | 1.440 | 1.943 | 2.104 | 2.447 | 2.612 | 3.143 | 3.707 | 4.317 | 5.208 | 5.959 |
| 7 | 0.263 | 0.711 | 1.415 | 1.895 | 2.046 | 2.365 | 2.517 | 2.998 | 3.499 | 4.029 | 4.785 | 5.408 |
| 8 | 0.262 | 0.706 | 1.397 | 1.860 | 2.004 | 2.306 | 2.449 | 2.896 | 3.355 | 3.833 | 4.501 | 5.041 |
| 9 | 0.261 | 0.703 | 1.383 | 1.833 | 1.973 | 2.262 | 2.398 | 2.821 | 3.250 | 3.690 | 4.297 | 4.781 |
| 10 | 0.260 | 0.700 | 1.372 | 1.812 | 1.948 | 2.228 | 2.359 | 2.764 | 3.169 | 3.581 | 4.144 | 4.587 |
| 11 | 0.260 | 0.697 | 1.363 | 1.796 | 1.928 | 2.201 | 2.328 | 2.718 | 3.106 | 3.497 | 4.025 | 4.437 |
| 12 | 0.259 | 0.695 | 1.356 | 1.782 | 1.912 | 2.179 | 2.303 | 2.681 | 3.055 | 3.428 | 3.930 | 4.318 |
| 13 | 0.259 | 0.694 | 1.350 | 1.771 | 1.899 | 2.160 | 2.282 | 2.650 | 3.012 | 3.372 | 3.852 | 4.221 |
| 14 | 0.258 | 0.692 | 1.345 | 1.761 | 1.887 | 2.145 | 2.264 | 2.624 | 2.977 | 3.326 | 3.787 | 4.140 |
| 15 | 0.258 | 0.691 | 1.341 | 1.753 | 1.878 | 2.131 | 2.249 | 2.602 | 2.947 | 3.286 | 3.733 | 4.073 |
| 16 | 0.258 | 0.690 | 1.337 | 1.746 | 1.869 | 2.120 | 2.235 | 2.583 | 2.921 | 3.252 | 3.686 | 4.015 |
| 17 | 0.257 | 0.689 | 1.333 | 1.740 | 1.862 | 2.110 | 2.224 | 2.567 | 2.898 | 3.222 | 3.646 | 3.965 |
| 18 | 0.257 | 0.688 | 1.330 | 1.734 | 1.855 | 2.101 | 2.214 | 2.552 | 2.878 | 3.197 | 3.610 | 3.922 |
| 19 | 0.257 | 0.688 | 1.328 | 1.729 | 1.850 | 2.093 | 2.205 | 2.539 | 2.861 | 3.174 | 3.579 | 3.883 |
| 20 | 0.257 | 0.687 | 1.325 | 1.725 | 1.844 | 2.086 | 2.197 | 2.528 | 2.845 | 3.153 | 3.552 | 3.850 |
| 21 | 0.257 | 0.686 | 1.323 | 1.721 | 1.840 | 2.080 | 2.189 | 2.518 | 2.831 | 3.135 | 3.527 | 3.819 |
| 22 | 0.256 | 0.686 | 1.321 | 1.717 | 1.835 | 2.074 | 2.183 | 2.508 | 2.819 | 3.119 | 3.505 | 3.792 |
| 23 | 0.256 | 0.685 | 1.319 | 1.714 | 1.832 | 2.069 | 2.177 | 2.500 | 2.807 | 3.104 | 3.485 | 3.768 |
| 24 | 0.256 | 0.685 | 1.318 | 1.711 | 1.828 | 2.064 | 2.172 | 2.492 | 2.797 | 3.091 | 3.467 | 3.745 |
| 25 | 0.256 | 0.684 | 1.316 | 1.708 | 1.825 | 2.060 | 2.167 | 2.485 | 2.787 | 3.078 | 3.450 | 3.725 |
| 26 | 0.256 | 0.684 | 1.315 | 1.706 | 1.822 | 2.056 | 2.162 | 2.479 | 2.779 | 3.067 | 3.435 | 3.707 |
| 27 | 0.256 | 0.684 | 1.314 | 1.703 | 1.819 | 2.052 | 2.158 | 2.473 | 2.771 | 3.057 | 3.421 | 3.689 |
| 28 | 0.256 | 0.683 | 1.313 | 1.701 | 1.817 | 2.048 | 2.154 | 2.467 | 2.763 | 3.047 | 3.408 | 3.674 |
| 29 | 0.256 | 0.683 | 1.311 | 1.699 | 1.814 | 2.045 | 2.150 | 2.462 | 2.756 | 3.038 | 3.396 | 3.660 |
| 30 | 0.256 | 0.683 | 1.310 | 1.697 | 1.812 | 2.042 | 2.147 | 2.457 | 2.750 | 3.030 | 3.385 | 3.646 |
| 31 | 0.256 | 0.682 | 1.309 | 1.696 | 1.810 | 2.040 | 2.144 | 2.453 | 2.744 | 3.022 | 3.375 | 3.633 |
| 32 | 0.255 | 0.682 | 1.309 | 1.694 | 1.808 | 2.037 | 2.141 | 2.449 | 2.738 | 3.015 | 3.365 | 3.622 |
| 33 | 0.255 | 0.682 | 1.308 | 1.692 | 1.806 | 2.035 | 2.138 | 2.445 | 2.733 | 3.008 | 3.356 | 3.611 |
| 34 | 0.255 | 0.682 | 1.307 | 1.691 | 1.805 | 2.032 | 2.136 | 2.441 | 2.728 | 3.002 | 3.348 | 3.601 |
| 35 | 0.255 | 0.682 | 1.306 | 1.690 | 1.803 | 2.030 | 2.133 | 2.438 | 2.724 | 2.996 | 3.340 | 3.591 |
| 36 | 0.255 | 0.681 | 1.306 | 1.688 | 1.802 | 2.028 | 2.131 | 2.434 | 2.719 | 2.990 | 3.333 | 3.582 |
| 37 | 0.255 | 0.681 | 1.305 | 1.687 | 1.800 | 2.026 | 2.129 | 2.431 | 2.715 | 2.985 | 3.326 | 3.574 |
| 38 | 0.255 | 0.681 | 1.304 | 1.686 | 1.799 | 2.024 | 2.127 | 2.429 | 2.712 | 2.980 | 3.319 | 3.566 |
| 39 | 0.255 | 0.681 | 1.304 | 1.685 | 1.798 | 2.023 | 2.125 | 2.426 | 2.708 | 2.976 | 3.313 | 3.558 |
| 40 | 0.255 | 0.681 | 1.303 | 1.684 | 1.796 | 2.021 | 2.123 | 2.423 | 2.704 | 2.971 | 3.307 | 3.551 |
| 60 | 0.254 | 0.679 | 1.296 | 1.671 | 1.781 | 2.000 | 2.099 | 2.390 | 2.660 | 2.915 | 3.232 | 3.460 |
| 80 | 0.254 | 0.678 | 1.292 | 1.664 | 1.773 | 1.990 | 2.088 | 2.374 | 2.639 | 2.887 | 3.195 | 3.416 |
| 100 | 0.254 | 0.677 | 1.290 | 1.660 | 1.769 | 1.984 | 2.081 | 2.364 | 2.626 | 2.871 | 3.174 | 3.390 |
| 120 | 0.254 | 0.677 | 1.289 | 1.658 | 1.766 | 1.980 | 2.076 | 2.358 | 2.617 | 2.860 | 3.160 | 3.373 |
| 140 | 0.254 | 0.676 | 1.288 | 1.656 | 1.763 | 1.977 | 2.073 | 2.353 | 2.611 | 2.852 | 3.149 | 3.361 |
| 160 | 0.254 | 0.676 | 1.287 | 1.654 | 1.762 | 1.975 | 2.071 | 2.350 | 2.607 | 2.847 | 3.142 | 3.352 |
| 180 | 0.254 | 0.676 | 1.286 | 1.653 | 1.761 | 1.973 | 2.069 | 2.347 | 2.603 | 2.842 | 3.136 | 3.345 |
| 200 | 0.254 | 0.676 | 1.286 | 1.653 | 1.760 | 1.972 | 2.067 | 2.345 | 2.601 | 2.838 | 3.131 | 3.340 |
| 250 | 0.254 | 0.675 | 1.285 | 1.651 | 1.758 | 1.969 | 2.065 | 2.341 | 2.596 | 2.832 | 3.123 | 3.330 |
| inf | 0.253 | 0.674 | 1.282 | 1.645 | 1.751 | 1.960 | 2.054 | 2.326 | 2.576 | 2.807 | 3.090 | 3.290 |

Percentage Points of the Chi-Square Distribution

| Degrees of Freedom | Probability of a larger value of χ^2 | | | | | | | | |
|--------------------|---|--------|--------|--------|--------|-------|-------|-------|-------|
| | 0.99 | 0.95 | 0.90 | 0.75 | 0.50 | 0.25 | 0.10 | 0.05 | 0.01 |
| 1 | 0.000 | 0.004 | 0.016 | 0.102 | 0.455 | 1.32 | 2.71 | 3.84 | 6.63 |
| 2 | 0.020 | 0.103 | 0.211 | 0.575 | 1.386 | 2.77 | 4.61 | 5.99 | 9.21 |
| 3 | 0.115 | 0.352 | 0.584 | 1.212 | 2.366 | 4.11 | 6.25 | 7.81 | 11.34 |
| 4 | 0.297 | 0.711 | 1.064 | 1.923 | 3.357 | 5.39 | 7.78 | 9.49 | 13.28 |
| 5 | 0.554 | 1.145 | 1.610 | 2.675 | 4.351 | 6.63 | 9.24 | 11.07 | 15.09 |
| 6 | 0.872 | 1.635 | 2.204 | 3.455 | 5.348 | 7.84 | 10.64 | 12.59 | 16.81 |
| 7 | 1.239 | 2.167 | 2.833 | 4.255 | 6.346 | 9.04 | 12.02 | 14.07 | 18.48 |
| 8 | 1.647 | 2.733 | 3.490 | 5.071 | 7.344 | 10.22 | 13.36 | 15.51 | 20.09 |
| 9 | 2.088 | 3.325 | 4.168 | 5.899 | 8.343 | 11.39 | 14.68 | 16.92 | 21.67 |
| 10 | 2.558 | 3.940 | 4.865 | 6.737 | 9.342 | 12.55 | 15.99 | 18.31 | 23.21 |
| 11 | 3.053 | 4.575 | 5.578 | 7.584 | 10.341 | 13.70 | 17.28 | 19.68 | 24.72 |
| 12 | 3.571 | 5.226 | 6.304 | 8.438 | 11.340 | 14.85 | 18.55 | 21.03 | 26.22 |
| 13 | 4.107 | 5.892 | 7.042 | 9.299 | 12.340 | 15.98 | 19.81 | 22.36 | 27.69 |
| 14 | 4.660 | 6.571 | 7.790 | 10.165 | 13.339 | 17.12 | 21.06 | 23.68 | 29.14 |
| 15 | 5.229 | 7.261 | 8.547 | 11.037 | 14.339 | 18.25 | 22.31 | 25.00 | 30.58 |
| 16 | 5.812 | 7.962 | 9.312 | 11.912 | 15.338 | 19.37 | 23.54 | 26.30 | 32.00 |
| 17 | 6.408 | 8.672 | 10.085 | 12.792 | 16.338 | 20.49 | 24.77 | 27.59 | 33.41 |
| 18 | 7.015 | 9.390 | 10.865 | 13.675 | 17.338 | 21.60 | 25.99 | 28.87 | 34.80 |
| 19 | 7.633 | 10.117 | 11.651 | 14.562 | 18.338 | 22.72 | 27.20 | 30.14 | 36.19 |
| 20 | 8.260 | 10.851 | 12.443 | 15.452 | 19.337 | 23.83 | 28.41 | 31.41 | 37.57 |
| 22 | 9.542 | 12.338 | 14.041 | 17.240 | 21.337 | 26.04 | 30.81 | 33.92 | 40.29 |
| 24 | 10.856 | 13.848 | 15.659 | 19.037 | 23.337 | 28.24 | 33.20 | 36.42 | 42.98 |
| 26 | 12.198 | 15.379 | 17.292 | 20.843 | 25.336 | 30.43 | 35.56 | 38.89 | 45.64 |
| 28 | 13.565 | 16.928 | 18.939 | 22.657 | 27.336 | 32.62 | 37.92 | 41.34 | 48.28 |
| 30 | 14.953 | 18.493 | 20.599 | 24.478 | 29.336 | 34.80 | 40.26 | 43.77 | 50.89 |
| 40 | 22.164 | 26.509 | 29.051 | 33.660 | 39.335 | 45.62 | 51.80 | 55.76 | 63.69 |
| 50 | 27.707 | 34.764 | 37.689 | 42.942 | 49.335 | 56.33 | 63.17 | 67.50 | 76.15 |
| 60 | 37.485 | 43.188 | 46.459 | 52.294 | 59.335 | 66.98 | 74.40 | 79.08 | 88.38 |