## Critical Values for t, $\chi^2$, and F Distributions
## F Distributions Indexed by Numerator Degrees of Freedom
## CDF - Lower tail probabilities

| df | $t_{.95}$ | $t_{.975}$ | $\chi^2_{.95}$ | $F_{.95,1}$ | $F_{.95,2}$ | $F_{.95,3}$ | $F_{.95,4}$ | $F_{.95,5}$ | $F_{.95,6}$ | $F_{.95,7}$ | $F_{.95,8}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.314 | 12.706 | 3.841 | 161.448 | 199.500 | 215.707 | 224.583 | 230.162 | 233.986 | 236.768 | 238.883 |
| 2 | 2.920 | 4.303 | 5.991 | 18.513 | 19.000 | 19.164 | 19.247 | 19.296 | 19.330 | 19.353 | 19.371 |
| 3 | 2.353 | 3.182 | 7.815 | 10.128 | 9.552 | 9.277 | 9.117 | 9.013 | 8.941 | 8.887 | 8.845 |
| 4 | 2.132 | 2.776 | 9.488 | 7.709 | 6.944 | 6.591 | 6.388 | 6.256 | 6.163 | 6.094 | 6.041 |
| 5 | 2.015 | 2.571 | 11.070 | 6.608 | 5.786 | 5.409 | 5.192 | 5.050 | 4.950 | 4.876 | 4.818 |
| 6 | 1.943 | 2.447 | 12.592 | 5.987 | 5.143 | 4.757 | 4.534 | 4.387 | 4.284 | 4.207 | 4.147 |
| 7 | 1.895 | 2.365 | 14.067 | 5.591 | 4.737 | 4.347 | 4.120 | 3.972 | 3.866 | 3.787 | 3.726 |
| 8 | 1.860 | 2.306 | 15.507 | 5.318 | 4.459 | 4.066 | 3.838 | 3.687 | 3.581 | 3.500 | 3.438 |
| 9 | 1.833 | 2.262 | 16.919 | 5.117 | 4.256 | 3.863 | 3.633 | 3.482 | 3.374 | 3.293 | 3.230 |
| 10 | 1.812 | 2.228 | 18.307 | 4.965 | 4.103 | 3.708 | 3.478 | 3.326 | 3.217 | 3.135 | 3.072 |
| 11 | 1.796 | 2.201 | 19.675 | 4.844 | 3.982 | 3.587 | 3.357 | 3.204 | 3.095 | 3.012 | 2.948 |
| 12 | 1.782 | 2.179 | 21.026 | 4.747 | 3.885 | 3.490 | 3.259 | 3.106 | 2.996 | 2.913 | 2.849 |
| 13 | 1.771 | 2.160 | 22.362 | 4.667 | 3.806 | 3.411 | 3.179 | 3.025 | 2.915 | 2.832 | 2.767 |
| 14 | 1.761 | 2.145 | 23.685 | 4.600 | 3.739 | 3.344 | 3.112 | 2.958 | 2.848 | 2.764 | 2.699 |
| 15 | 1.753 | 2.131 | 24.996 | 4.543 | 3.682 | 3.287 | 3.056 | 2.901 | 2.790 | 2.707 | 2.641 |
| 16 | 1.746 | 2.120 | 26.296 | 4.494 | 3.634 | 3.239 | 3.007 | 2.852 | 2.741 | 2.657 | 2.591 |
| 17 | 1.740 | 2.110 | 27.587 | 4.451 | 3.592 | 3.197 | 2.965 | 2.810 | 2.699 | 2.614 | 2.548 |
| 18 | 1.734 | 2.101 | 28.869 | 4.414 | 3.555 | 3.160 | 2.928 | 2.773 | 2.661 | 2.577 | 2.510 |
| 19 | 1.729 | 2.093 | 30.144 | 4.381 | 3.522 | 3.127 | 2.895 | 2.740 | 2.628 | 2.544 | 2.477 |
| 20 | 1.725 | 2.086 | 31.410 | 4.351 | 3.493 | 3.098 | 2.866 | 2.711 | 2.599 | 2.514 | 2.447 |
| 21 | 1.721 | 2.080 | 32.671 | 4.325 | 3.467 | 3.072 | 2.840 | 2.685 | 2.573 | 2.488 | 2.420 |
| 22 | 1.717 | 2.074 | 33.924 | 4.301 | 3.443 | 3.049 | 2.817 | 2.661 | 2.549 | 2.464 | 2.397 |
| 23 | 1.714 | 2.069 | 35.172 | 4.279 | 3.422 | 3.028 | 2.796 | 2.640 | 2.528 | 2.442 | 2.375 |
| 24 | 1.711 | 2.064 | 36.415 | 4.260 | 3.403 | 3.009 | 2.776 | 2.621 | 2.508 | 2.423 | 2.355 |
| 25 | 1.708 | 2.060 | 37.652 | 4.242 | 3.385 | 2.991 | 2.759 | 2.603 | 2.490 | 2.405 | 2.337 |
| 26 | 1.706 | 2.056 | 38.885 | 4.225 | 3.369 | 2.975 | 2.743 | 2.587 | 2.474 | 2.388 | 2.321 |
| 27 | 1.703 | 2.052 | 40.113 | 4.210 | 3.354 | 2.960 | 2.728 | 2.572 | 2.459 | 2.373 | 2.305 |
| 28 | 1.701 | 2.048 | 41.337 | 4.196 | 3.340 | 2.947 | 2.714 | 2.558 | 2.445 | 2.359 | 2.291 |
| 29 | 1.699 | 2.045 | 42.557 | 4.183 | 3.328 | 2.934 | 2.701 | 2.545 | 2.432 | 2.346 | 2.278 |
| 30 | 1.697 | 2.042 | 43.773 | 4.171 | 3.316 | 2.922 | 2.690 | 2.534 | 2.421 | 2.334 | 2.266 |
| 40 | 1.684 | 2.021 | 55.758 | 4.085 | 3.232 | 2.839 | 2.606 | 2.449 | 2.336 | 2.249 | 2.180 |
| 50 | 1.676 | 2.009 | 67.505 | 4.034 | 3.183 | 2.790 | 2.557 | 2.400 | 2.286 | 2.199 | 2.130 |
| 60 | 1.671 | 2.000 | 79.082 | 4.001 | 3.150 | 2.758 | 2.525 | 2.368 | 2.254 | 2.167 | 2.097 |
| 70 | 1.667 | 1.994 | 90.531 | 3.978 | 3.128 | 2.736 | 2.503 | 2.346 | 2.231 | 2.143 | 2.074 |
| 80 | 1.664 | 1.990 | 101.879 | 3.960 | 3.111 | 2.719 | 2.486 | 2.329 | 2.214 | 2.126 | 2.056 |
| 90 | 1.662 | 1.987 | 113.145 | 3.947 | 3.098 | 2.706 | 2.473 | 2.316 | 2.201 | 2.113 | 2.043 |
| 100 | 1.660 | 1.984 | 124.342 | 3.936 | 3.087 | 2.696 | 2.463 | 2.305 | 2.191 | 2.103 | 2.032 |
| 110 | 1.659 | 1.982 | 135.480 | 3.927 | 3.079 | 2.687 | 2.454 | 2.297 | 2.182 | 2.094 | 2.024 |
| 120 | 1.658 | 1.980 | 146.567 | 3.920 | 3.072 | 2.680 | 2.447 | 2.290 | 2.175 | 2.087 | 2.016 |
| 130 | 1.657 | 1.978 | 157.610 | 3.914 | 3.066 | 2.674 | 2.441 | 2.284 | 2.169 | 2.081 | 2.010 |
| 140 | 1.656 | 1.977 | 168.613 | 3.909 | 3.061 | 2.669 | 2.436 | 2.279 | 2.164 | 2.076 | 2.005 |
| 150 | 1.655 | 1.976 | 179.581 | 3.904 | 3.056 | 2.665 | 2.432 | 2.274 | 2.160 | 2.071 | 2.001 |
| 160 | 1.654 | 1.975 | 190.516 | 3.900 | 3.053 | 2.661 | 2.428 | 2.271 | 2.156 | 2.067 | 1.997 |
| 170 | 1.654 | 1.974 | 201.423 | 3.897 | 3.049 | 2.658 | 2.425 | 2.267 | 2.152 | 2.064 | 1.993 |
| 180 | 1.653 | 1.973 | 212.304 | 3.894 | 3.046 | 2.655 | 2.422 | 2.264 | 2.149 | 2.061 | 1.990 |
| 190 | 1.653 | 1.973 | 223.160 | 3.891 | 3.043 | 2.652 | 2.419 | 2.262 | 2.147 | 2.058 | 1.987 |
| 200 | 1.653 | 1.972 | 233.994 | 3.888 | 3.041 | 2.650 | 2.417 | 2.259 | 2.144 | 2.056 | 1.985 |
| $\infty$ | 1.645 | 1.960 | --- | 3.841 | 2.995 | 2.605 | 2.372 | 2.214 | 2.099 | 2.010 | 1.938 |