

Critical Values of the F -Distribution: $\alpha = 0.10$

| Denom. d.f. | Numerator Degrees of Freedom | | | | | | | | | |
|----------------|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 39.863 | 49.500 | 53.593 | 55.833 | 57.240 | 58.204 | 58.906 | 59.439 | 59.858 | 60.195 |
| 2 | 8.526 | 9.000 | 9.162 | 9.243 | 9.293 | 9.326 | 9.349 | 9.367 | 9.381 | 9.392 |
| 3 | 5.538 | 5.462 | 5.391 | 5.343 | 5.309 | 5.285 | 5.266 | 5.252 | 5.240 | 5.230 |
| 4 | 4.545 | 4.325 | 4.191 | 4.107 | 4.051 | 4.010 | 3.979 | 3.955 | 3.936 | 3.920 |
| 5 | 4.060 | 3.780 | 3.619 | 3.520 | 3.453 | 3.405 | 3.368 | 3.339 | 3.316 | 3.297 |
| 6 | 3.776 | 3.463 | 3.289 | 3.181 | 3.108 | 3.055 | 3.014 | 2.983 | 2.958 | 2.937 |
| 7 | 3.589 | 3.257 | 3.074 | 2.961 | 2.883 | 2.827 | 2.785 | 2.752 | 2.725 | 2.703 |
| 8 | 3.458 | 3.113 | 2.924 | 2.806 | 2.726 | 2.668 | 2.624 | 2.589 | 2.561 | 2.538 |
| 9 | 3.360 | 3.006 | 2.813 | 2.693 | 2.611 | 2.551 | 2.505 | 2.469 | 2.440 | 2.416 |
| 10 | 3.285 | 2.924 | 2.728 | 2.605 | 2.522 | 2.461 | 2.414 | 2.377 | 2.347 | 2.323 |
| 11 | 3.225 | 2.860 | 2.660 | 2.536 | 2.451 | 2.389 | 2.342 | 2.304 | 2.274 | 2.248 |
| 12 | 3.177 | 2.807 | 2.606 | 2.480 | 2.394 | 2.331 | 2.283 | 2.245 | 2.214 | 2.188 |
| 13 | 3.136 | 2.763 | 2.560 | 2.434 | 2.347 | 2.283 | 2.234 | 2.195 | 2.164 | 2.138 |
| 14 | 3.102 | 2.726 | 2.522 | 2.395 | 2.307 | 2.243 | 2.193 | 2.154 | 2.122 | 2.095 |
| 15 | 3.073 | 2.695 | 2.490 | 2.361 | 2.273 | 2.208 | 2.158 | 2.119 | 2.086 | 2.059 |
| 16 | 3.048 | 2.668 | 2.462 | 2.333 | 2.244 | 2.178 | 2.128 | 2.088 | 2.055 | 2.028 |
| 17 | 3.026 | 2.645 | 2.437 | 2.308 | 2.218 | 2.152 | 2.102 | 2.061 | 2.028 | 2.001 |
| 18 | 3.007 | 2.624 | 2.416 | 2.286 | 2.196 | 2.130 | 2.079 | 2.038 | 2.005 | 1.977 |
| 19 | 2.990 | 2.606 | 2.397 | 2.266 | 2.176 | 2.109 | 2.058 | 2.017 | 1.984 | 1.956 |
| 20 | 2.975 | 2.589 | 2.380 | 2.249 | 2.158 | 2.091 | 2.040 | 1.999 | 1.965 | 1.937 |
| 21 | 2.961 | 2.575 | 2.365 | 2.233 | 2.142 | 2.075 | 2.023 | 1.982 | 1.948 | 1.920 |
| 22 | 2.949 | 2.561 | 2.351 | 2.219 | 2.128 | 2.060 | 2.008 | 1.967 | 1.933 | 1.904 |
| 23 | 2.937 | 2.549 | 2.339 | 2.207 | 2.115 | 2.047 | 1.995 | 1.953 | 1.919 | 1.890 |
| 24 | 2.927 | 2.538 | 2.327 | 2.195 | 2.103 | 2.035 | 1.983 | 1.941 | 1.906 | 1.877 |
| 25 | 2.918 | 2.528 | 2.317 | 2.184 | 2.092 | 2.024 | 1.971 | 1.929 | 1.895 | 1.866 |
| 26 | 2.909 | 2.519 | 2.307 | 2.174 | 2.082 | 2.014 | 1.961 | 1.919 | 1.884 | 1.855 |
| 27 | 2.901 | 2.511 | 2.299 | 2.165 | 2.073 | 2.005 | 1.952 | 1.909 | 1.874 | 1.845 |
| 28 | 2.894 | 2.503 | 2.291 | 2.157 | 2.064 | 1.996 | 1.943 | 1.900 | 1.865 | 1.836 |
| 29 | 2.887 | 2.495 | 2.283 | 2.149 | 2.057 | 1.988 | 1.935 | 1.892 | 1.857 | 1.827 |
| 30 | 2.881 | 2.489 | 2.276 | 2.142 | 2.049 | 1.980 | 1.927 | 1.884 | 1.849 | 1.819 |
| 31 | 2.875 | 2.482 | 2.270 | 2.136 | 2.042 | 1.973 | 1.920 | 1.877 | 1.842 | 1.812 |
| 32 | 2.869 | 2.477 | 2.263 | 2.129 | 2.036 | 1.967 | 1.913 | 1.870 | 1.835 | 1.805 |
| 33 | 2.864 | 2.471 | 2.258 | 2.123 | 2.030 | 1.961 | 1.907 | 1.864 | 1.828 | 1.799 |
| 34 | 2.859 | 2.466 | 2.252 | 2.118 | 2.024 | 1.955 | 1.901 | 1.858 | 1.822 | 1.793 |
| 35 | 2.855 | 2.461 | 2.247 | 2.113 | 2.019 | 1.950 | 1.896 | 1.852 | 1.817 | 1.787 |
| 36 | 2.850 | 2.456 | 2.243 | 2.108 | 2.014 | 1.945 | 1.891 | 1.847 | 1.811 | 1.781 |
| 37 | 2.846 | 2.452 | 2.238 | 2.103 | 2.009 | 1.940 | 1.886 | 1.842 | 1.806 | 1.776 |
| 38 | 2.842 | 2.448 | 2.234 | 2.099 | 2.005 | 1.935 | 1.881 | 1.838 | 1.802 | 1.772 |
| 39 | 2.839 | 2.444 | 2.230 | 2.095 | 2.001 | 1.931 | 1.877 | 1.833 | 1.797 | 1.767 |
| 40 | 2.835 | 2.440 | 2.226 | 2.091 | 1.997 | 1.927 | 1.873 | 1.829 | 1.793 | 1.763 |
| 41 | 2.832 | 2.437 | 2.222 | 2.087 | 1.993 | 1.923 | 1.869 | 1.825 | 1.789 | 1.759 |
| 42 | 2.829 | 2.434 | 2.219 | 2.084 | 1.989 | 1.919 | 1.865 | 1.821 | 1.785 | 1.755 |
| 43 | 2.826 | 2.430 | 2.216 | 2.080 | 1.986 | 1.916 | 1.861 | 1.817 | 1.781 | 1.751 |
| 44 | 2.823 | 2.427 | 2.213 | 2.077 | 1.983 | 1.913 | 1.858 | 1.814 | 1.778 | 1.747 |
| 45 | 2.820 | 2.425 | 2.210 | 2.074 | 1.980 | 1.909 | 1.855 | 1.811 | 1.774 | 1.744 |
| 46 | 2.818 | 2.422 | 2.207 | 2.071 | 1.977 | 1.906 | 1.852 | 1.808 | 1.771 | 1.741 |
| 47 | 2.815 | 2.419 | 2.204 | 2.068 | 1.974 | 1.903 | 1.849 | 1.805 | 1.768 | 1.738 |
| 48 | 2.813 | 2.417 | 2.202 | 2.066 | 1.971 | 1.901 | 1.846 | 1.802 | 1.765 | 1.735 |
| 49 | 2.811 | 2.414 | 2.199 | 2.063 | 1.968 | 1.898 | 1.843 | 1.799 | 1.763 | 1.732 |
| 50 | 2.809 | 2.412 | 2.197 | 2.061 | 1.966 | 1.895 | 1.840 | 1.796 | 1.760 | 1.729 |
| 60 | 2.791 | 2.393 | 2.177 | 2.041 | 1.946 | 1.875 | 1.819 | 1.775 | 1.738 | 1.707 |
| 70 | 2.779 | 2.380 | 2.164 | 2.027 | 1.931 | 1.860 | 1.804 | 1.760 | 1.723 | 1.691 |
| 80 | 2.769 | 2.370 | 2.154 | 2.016 | 1.921 | 1.849 | 1.793 | 1.748 | 1.711 | 1.680 |
| 90 | 2.762 | 2.363 | 2.146 | 2.008 | 1.912 | 1.841 | 1.785 | 1.739 | 1.702 | 1.670 |
| 100 | 2.756 | 2.356 | 2.139 | 2.002 | 1.906 | 1.834 | 1.778 | 1.732 | 1.695 | 1.663 |
| 120 | 2.748 | 2.347 | 2.130 | 1.992 | 1.896 | 1.824 | 1.767 | 1.722 | 1.684 | 1.652 |
| 140 | 2.742 | 2.341 | 2.123 | 1.985 | 1.889 | 1.817 | 1.760 | 1.714 | 1.677 | 1.645 |
| 180 | 2.734 | 2.332 | 2.114 | 1.976 | 1.880 | 1.807 | 1.750 | 1.705 | 1.667 | 1.634 |
| 200 | 2.731 | 2.329 | 2.111 | 1.973 | 1.876 | 1.804 | 1.747 | 1.701 | 1.663 | 1.631 |
| ∞ | 2.706 | 2.303 | 2.084 | 1.945 | 1.847 | 1.774 | 1.717 | 1.670 | 1.632 | 1.599 |