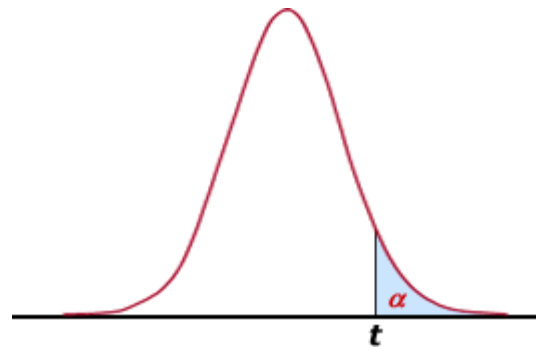


# VALUES OF THE STUDENT'S t-DISTRIBUTION



$$F(t) = P[T \leq t] = 1 - \alpha$$

10 degrees of freedom and  $\alpha=0.05$   $\longrightarrow P[T \leq 1.812] = 0.95$

Degrees of freedom

|           | 0.40  | 0.25  | 0.10  | 0.05  | 0.025  | 0.01   | 0.005  | 0.001   | 0.0005  | $\alpha$   |
|-----------|-------|-------|-------|-------|--------|--------|--------|---------|---------|------------|
| <i>df</i> | 0.60  | 0.75  | 0.90  | 0.95  | 0.975  | 0.99   | 0.995  | 0.999   | 0.9995  | $1-\alpha$ |
| 1         | 0.325 | 1.000 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 | 318.317 | 636.607 |            |
| 2         | 0.289 | 0.816 | 1.886 | 2.920 | 4.303  | 6.965  | 9.925  | 22.327  | 31.598  |            |
| 3         | 0.277 | 0.765 | 1.638 | 2.353 | 3.182  | 4.541  | 5.841  | 10.215  | 12.924  |            |
| 4         | 0.271 | 0.741 | 1.533 | 2.132 | 2.776  | 3.747  | 4.604  | 7.173   | 8.610   |            |
| 5         | 0.267 | 0.727 | 1.476 | 2.015 | 2.571  | 3.365  | 4.032  | 5.893   | 6.869   |            |
| 6         | 0.265 | 0.718 | 1.440 | 1.943 | 2.447  | 3.143  | 3.707  | 5.208   | 5.959   |            |
| 7         | 0.263 | 0.711 | 1.415 | 1.895 | 2.365  | 2.998  | 3.499  | 4.785   | 5.408   |            |
| 8         | 0.262 | 0.706 | 1.397 | 1.860 | 2.306  | 2.896  | 3.355  | 4.501   | 5.041   |            |
| 9         | 0.261 | 0.703 | 1.383 | 1.833 | 2.262  | 2.821  | 3.250  | 4.297   | 4.781   |            |
| 10        | 0.260 | 0.700 | 1.372 | 1.812 | 2.228  | 2.764  | 3.169  | 4.144   | 4.587   |            |
| 11        | 0.260 | 0.697 | 1.363 | 1.796 | 2.201  | 2.718  | 3.106  | 4.025   | 4.437   |            |
| 12        | 0.259 | 0.695 | 1.356 | 1.782 | 2.179  | 2.681  | 3.055  | 3.930   | 4.318   |            |

VALUES OF THE STUDENT'S t-DISTRIBUTION

$$F(t) = P[T \leq t] = 1 - \alpha$$

| <i>df</i> | 0.40<br>0.60 | 0.25<br>0.75 | 0.10<br>0.90 | 0.05<br>0.95 | 0.025<br>0.975 | 0.01<br>0.99 | 0.005<br>0.995 | 0.001<br>0.999 | 0.0005<br>0.9995 | $\alpha$<br>$1-\alpha$ |
|-----------|--------------|--------------|--------------|--------------|----------------|--------------|----------------|----------------|------------------|------------------------|
| 1         | 0.325        | 1.000        | 3.078        | 6.314        | 12.706         | 31.821       | 63.657         | 318.317        | 636.607          |                        |
| 2         | 0.289        | 0.816        | 1.886        | 2.920        | 4.303          | 6.965        | 9.925          | 22.327         | 31.598           |                        |
| 3         | 0.277        | 0.765        | 1.638        | 2.353        | 3.182          | 4.541        | 5.841          | 10.215         | 12.924           |                        |
| 4         | 0.271        | 0.741        | 1.533        | 2.132        | 2.776          | 3.747        | 4.604          | 7.173          | 8.610            |                        |
| 5         | 0.267        | 0.727        | 1.476        | 2.015        | 2.571          | 3.365        | 4.032          | 5.893          | 6.869            |                        |
| 6         | 0.265        | 0.718        | 1.440        | 1.943        | 2.447          | 3.143        | 3.707          | 5.208          | 5.959            |                        |
| 7         | 0.263        | 0.711        | 1.415        | 1.895        | 2.365          | 2.998        | 3.499          | 4.785          | 5.408            |                        |
| 8         | 0.262        | 0.706        | 1.397        | 1.860        | 2.306          | 2.896        | 3.355          | 4.501          | 5.041            |                        |
| 9         | 0.261        | 0.703        | 1.383        | 1.833        | 2.262          | 2.821        | 3.250          | 4.297          | 4.781            |                        |
| 10        | 0.260        | 0.700        | 1.372        | 1.812        | 2.228          | 2.764        | 3.169          | 4.144          | 4.587            |                        |
| 11        | 0.260        | 0.697        | 1.363        | 1.796        | 2.201          | 2.718        | 3.106          | 4.025          | 4.437            |                        |
| 12        | 0.259        | 0.695        | 1.356        | 1.782        | 2.179          | 2.681        | 3.055          | 3.930          | 4.318            |                        |
| 13        | 0.259        | 0.694        | 1.350        | 1.771        | 2.160          | 2.650        | 3.012          | 3.852          | 4.221            |                        |
| 14        | 0.258        | 0.692        | 1.345        | 1.761        | 2.145          | 2.624        | 2.977          | 3.787          | 4.140            |                        |
| 15        | 0.258        | 0.691        | 1.341        | 1.753        | 2.131          | 2.602        | 2.947          | 3.733          | 4.073            |                        |
| 16        | 0.258        | 0.690        | 1.337        | 1.746        | 2.120          | 2.583        | 2.921          | 3.686          | 4.015            |                        |
| 17        | 0.257        | 0.689        | 1.333        | 1.740        | 2.110          | 2.567        | 2.898          | 3.646          | 3.965            |                        |
| 18        | 0.257        | 0.688        | 1.330        | 1.734        | 2.101          | 2.552        | 2.878          | 3.611          | 3.922            |                        |
| 19        | 0.257        | 0.688        | 1.328        | 1.729        | 2.093          | 2.539        | 2.861          | 3.579          | 3.883            |                        |
| 20        | 0.257        | 0.687        | 1.325        | 1.725        | 2.086          | 2.528        | 2.845          | 3.552          | 3.850            |                        |
| 21        | 0.257        | 0.686        | 1.323        | 1.721        | 2.080          | 2.518        | 2.831          | 3.527          | 3.819            |                        |
| 22        | 0.256        | 0.686        | 1.321        | 1.717        | 2.074          | 2.508        | 2.819          | 3.505          | 3.792            |                        |
| 23        | 0.256        | 0.685        | 1.319        | 1.714        | 2.069          | 2.500        | 2.807          | 3.485          | 3.768            |                        |
| 24        | 0.256        | 0.685        | 1.318        | 1.711        | 2.064          | 2.492        | 2.797          | 3.467          | 3.745            |                        |
| 25        | 0.256        | 0.684        | 1.316        | 1.708        | 2.060          | 2.485        | 2.787          | 3.450          | 3.725            |                        |
| 26        | 0.256        | 0.684        | 1.315        | 1.706        | 2.056          | 2.479        | 2.779          | 3.435          | 3.707            |                        |
| 27        | 0.256        | 0.684        | 1.314        | 1.703        | 2.052          | 2.473        | 2.771          | 3.421          | 3.690            |                        |
| 28        | 0.256        | 0.683        | 1.313        | 1.701        | 2.048          | 2.467        | 2.763          | 3.408          | 3.674            |                        |
| 29        | 0.256        | 0.683        | 1.311        | 1.699        | 2.045          | 2.462        | 2.756          | 3.396          | 3.659            |                        |
| 30        | 0.256        | 0.683        | 1.310        | 1.697        | 2.042          | 2.457        | 2.750          | 3.385          | 3.646            |                        |
| 31        | 0.256        | 0.682        | 1.309        | 1.696        | 2.040          | 2.453        | 2.744          | 3.375          | 3.633            |                        |
| 32        | 0.255        | 0.682        | 1.309        | 1.694        | 2.037          | 2.449        | 2.738          | 3.365          | 3.622            |                        |
| 33        | 0.255        | 0.682        | 1.308        | 1.692        | 2.035          | 2.445        | 2.733          | 3.356          | 3.611            |                        |
| 34        | 0.255        | 0.682        | 1.307        | 1.691        | 2.032          | 2.441        | 2.728          | 3.348          | 3.601            |                        |
| 35        | 0.255        | 0.682        | 1.306        | 1.690        | 2.030          | 2.438        | 2.724          | 3.340          | 3.591            |                        |
| 36        | 0.255        | 0.681        | 1.306        | 1.688        | 2.028          | 2.028        | 2.719          | 3.333          | 3.582            |                        |
| 37        | 0.255        | 0.681        | 1.305        | 1.687        | 2.026          | 2.026        | 2.715          | 3.326          | 3.574            |                        |
| 38        | 0.255        | 0.681        | 1.304        | 1.686        | 2.024          | 2.024        | 2.712          | 3.319          | 3.566            |                        |
| 39        | 0.255        | 0.681        | 1.304        | 1.685        | 2.023          | 2.023        | 2.708          | 3.313          | 3.558            |                        |
| 40        | 0.255        | 0.681        | 1.303        | 1.684        | 2.021          | 2.021        | 2.704          | 3.307          | 3.551            |                        |
| 41        | 0.255        | 0.681        | 1.303        | 1.683        | 2.020          | 2.020        | 2.701          | 3.301          | 3.544            |                        |
| 42        | 0.255        | 0.680        | 1.302        | 1.682        | 2.018          | 2.018        | 2.698          | 3.296          | 3.538            |                        |
| 43        | 0.255        | 0.680        | 1.302        | 1.681        | 2.017          | 2.017        | 2.695          | 3.291          | 3.532            |                        |
| 44        | 0.255        | 0.680        | 1.301        | 1.680        | 2.015          | 2.015        | 2.692          | 3.286          | 3.526            |                        |
| 45        | 0.255        | 0.680        | 1.301        | 1.679        | 2.014          | 2.014        | 2.690          | 3.281          | 3.520            |                        |
| 46        | 0.255        | 0.680        | 1.300        | 1.679        | 2.013          | 2.013        | 2.687          | 3.277          | 3.515            |                        |
| 47        | 0.255        | 0.680        | 1.300        | 1.678        | 2.012          | 2.012        | 2.685          | 3.273          | 3.510            |                        |
| 48        | 0.255        | 0.680        | 1.299        | 1.677        | 2.011          | 2.011        | 2.682          | 3.269          | 3.505            |                        |
| 49        | 0.255        | 0.680        | 1.299        | 1.677        | 2.010          | 2.010        | 2.680          | 3.265          | 3.500            |                        |
| 50        | 0.255        | 0.679        | 1.299        | 1.676        | 2.009          | 2.009        | 2.678          | 3.261          | 3.496            |                        |

VALUES OF THE STUDENT'S t-DISTRIBUTION (Continued)

$$F(t) = P[T \leq t] = 1 - \alpha$$

| <i>df</i> | 0.40<br>0.60 | 0.25<br>0.75 | 0.10<br>0.90 | 0.05<br>0.95 | 0.025<br>0.975 | 0.01<br>0.99 | 0.005<br>0.995 | 0.001<br>0.999 | 0.0005<br>0.9995 | $\alpha$<br>$1-\alpha$ |
|-----------|--------------|--------------|--------------|--------------|----------------|--------------|----------------|----------------|------------------|------------------------|
| 51        | 0.255        | 0.679        | 1.298        | 1.675        | 2.008          | 2.008        | 2.676          | 3.258          | 3.492            |                        |
| 52        | 0.255        | 0.679        | 1.298        | 1.675        | 2.007          | 2.007        | 2.674          | 3.255          | 3.488            |                        |
| 53        | 0.255        | 0.679        | 1.298        | 1.674        | 2.006          | 2.006        | 2.672          | 3.251          | 3.484            |                        |
| 54        | 0.255        | 0.679        | 1.297        | 1.674        | 2.005          | 2.005        | 2.670          | 3.248          | 3.480            |                        |
| 55        | 0.255        | 0.679        | 1.297        | 1.673        | 2.004          | 2.004        | 2.668          | 3.245          | 3.476            |                        |
| 56        | 0.255        | 0.679        | 1.297        | 1.673        | 2.003          | 2.003        | 2.667          | 3.242          | 3.473            |                        |
| 57        | 0.255        | 0.679        | 1.297        | 1.672        | 2.002          | 2.002        | 2.665          | 3.239          | 3.470            |                        |
| 58        | 0.255        | 0.679        | 1.296        | 1.672        | 2.002          | 2.002        | 2.663          | 3.237          | 3.466            |                        |
| 59        | 0.254        | 0.679        | 1.296        | 1.671        | 2.001          | 2.001        | 2.662          | 3.234          | 3.463            |                        |
| 60        | 0.254        | 0.679        | 1.296        | 1.671        | 2.000          | 2.000        | 2.660          | 3.232          | 3.460            |                        |
| 61        | 0.254        | 0.679        | 1.296        | 1.670        | 2.000          | 2.000        | 2.659          | 3.229          | 3.457            |                        |
| 62        | 0.254        | 0.678        | 1.295        | 1.670        | 1.999          | 1.999        | 2.658          | 3.227          | 3.455            |                        |
| 63        | 0.254        | 0.678        | 1.295        | 1.669        | 1.998          | 1.998        | 2.656          | 3.225          | 3.452            |                        |
| 64        | 0.254        | 0.678        | 1.295        | 1.669        | 1.998          | 1.998        | 2.655          | 3.223          | 3.449            |                        |
| 65        | 0.254        | 0.678        | 1.295        | 1.669        | 1.997          | 1.997        | 2.654          | 3.221          | 3.447            |                        |
| 66        | 0.254        | 0.678        | 1.295        | 1.668        | 1.997          | 2.384        | 2.652          | 3.218          | 3.444            |                        |
| 67        | 0.254        | 0.678        | 1.294        | 1.668        | 1.996          | 2.383        | 2.651          | 3.217          | 3.442            |                        |
| 68        | 0.254        | 0.678        | 1.294        | 1.668        | 1.995          | 2.382        | 2.650          | 3.215          | 3.440            |                        |
| 69        | 0.254        | 0.678        | 1.294        | 1.667        | 1.995          | 2.382        | 2.649          | 3.213          | 3.437            |                        |
| 70        | 0.254        | 0.678        | 1.294        | 1.667        | 1.994          | 2.381        | 2.648          | 3.211          | 3.435            |                        |
| 71        | 0.254        | 0.678        | 1.294        | 1.667        | 1.994          | 2.380        | 2.647          | 3.209          | 3.433            |                        |
| 72        | 0.254        | 0.678        | 1.293        | 1.666        | 1.993          | 2.379        | 2.646          | 3.207          | 3.431            |                        |
| 73        | 0.254        | 0.678        | 1.293        | 1.666        | 1.993          | 2.379        | 2.645          | 3.206          | 3.429            |                        |
| 74        | 0.254        | 0.678        | 1.293        | 1.666        | 1.993          | 2.378        | 2.644          | 3.204          | 3.427            |                        |
| 75        | 0.254        | 0.678        | 1.293        | 1.665        | 1.992          | 2.377        | 2.643          | 3.203          | 3.425            |                        |
| 76        | 0.254        | 0.678        | 1.293        | 1.665        | 1.992          | 2.376        | 2.642          | 3.201          | 3.423            |                        |
| 77        | 0.254        | 0.678        | 1.293        | 1.665        | 1.991          | 2.376        | 2.641          | 3.200          | 3.422            |                        |
| 78        | 0.254        | 0.678        | 1.292        | 1.665        | 1.991          | 2.375        | 2.640          | 3.198          | 3.420            |                        |
| 79        | 0.254        | 0.678        | 1.292        | 1.664        | 1.990          | 2.375        | 2.640          | 3.197          | 3.418            |                        |
| 80        | 0.254        | 0.678        | 1.292        | 1.664        | 1.990          | 2.374        | 2.639          | 3.195          | 3.416            |                        |
| 81        | 0.254        | 0.678        | 1.292        | 1.664        | 1.990          | 2.373        | 2.638          | 3.194          | 3.415            |                        |
| 82        | 0.254        | 0.677        | 1.292        | 1.664        | 1.989          | 2.373        | 2.637          | 3.193          | 3.413            |                        |
| 83        | 0.254        | 0.677        | 1.292        | 1.663        | 1.989          | 2.372        | 2.636          | 3.191          | 3.412            |                        |
| 84        | 0.254        | 0.677        | 1.292        | 1.663        | 1.989          | 2.372        | 2.636          | 3.190          | 3.410            |                        |
| 85        | 0.254        | 0.677        | 1.292        | 1.663        | 1.988          | 2.371        | 2.635          | 3.189          | 3.409            |                        |
| 86        | 0.254        | 0.677        | 1.291        | 1.663        | 1.988          | 2.371        | 2.634          | 3.188          | 3.407            |                        |
| 87        | 0.254        | 0.677        | 1.291        | 1.663        | 1.988          | 2.370        | 2.634          | 3.187          | 3.406            |                        |
| 88        | 0.254        | 0.677        | 1.291        | 1.662        | 1.987          | 2.369        | 2.633          | 3.186          | 3.405            |                        |
| 89        | 0.254        | 0.677        | 1.291        | 1.662        | 1.987          | 2.369        | 2.632          | 3.184          | 3.403            |                        |
| 90        | 0.254        | 0.677        | 1.291        | 1.662        | 1.987          | 2.369        | 2.632          | 3.183          | 3.402            |                        |
| 91        | 0.254        | 0.677        | 1.291        | 1.662        | 1.986          | 2.368        | 2.631          | 3.182          | 3.401            |                        |
| 92        | 0.254        | 0.677        | 1.291        | 1.662        | 1.986          | 2.368        | 2.630          | 3.181          | 3.400            |                        |
| 93        | 0.254        | 0.677        | 1.291        | 1.661        | 1.986          | 2.367        | 2.630          | 3.180          | 3.398            |                        |
| 94        | 0.254        | 0.677        | 1.291        | 1.661        | 1.986          | 2.367        | 2.629          | 3.179          | 3.397            |                        |
| 95        | 0.254        | 0.677        | 1.291        | 1.661        | 1.985          | 2.366        | 2.629          | 3.178          | 3.396            |                        |
| 96        | 0.254        | 0.677        | 1.290        | 1.661        | 1.985          | 2.366        | 2.628          | 3.177          | 3.395            |                        |
| 97        | 0.254        | 0.677        | 1.290        | 1.661        | 1.985          | 2.365        | 2.627          | 3.176          | 3.394            |                        |
| 98        | 0.254        | 0.677        | 1.290        | 1.661        | 1.984          | 2.365        | 2.627          | 3.176          | 3.393            |                        |
| 99        | 0.254        | 0.677        | 1.290        | 1.660        | 1.984          | 2.365        | 2.626          | 3.175          | 3.392            |                        |
| 100       | 0.254        | 0.677        | 1.290        | 1.660        | 1.984          | 2.364        | 2.626          | 3.174          | 3.391            |                        |
| $\infty$  | 0.253        | 0.674        | 1.282        | 1.645        | 1.960          | 2.326        | 2.576          | 3.090          | 3.291            |                        |