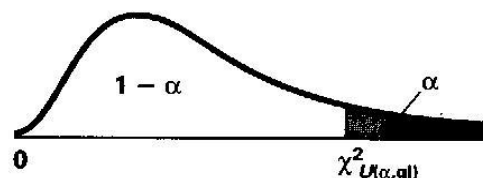


**Tabla E.4** Valores críticos de  $\chi^2$

Para un número dado de grados de libertad, el elemento representa el valor crítico de  $\chi^2$  que corresponde a un área de la cola superior especificada ( $\alpha$ )



| Grados de libertad | Áreas de la cola superior |        |        |        |        |        |        |        |        |        |        |        |
|--------------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                    | .995                      | .99    | .975   | .95    | .90    | .75    | .25    | .10    | .05    | .025   | .01    | .005   |
| 1                  |                           |        | 0.001  | 0.004  | 0.016  | 0.102  | 1.323  | 2.706  | 3.841  | 5.024  | 6.635  | 7.879  |
| 2                  | 0.010                     | 0.020  | 0.051  | 0.103  | 0.211  | 0.575  | 2.773  | 4.605  | 5.991  | 7.378  | 9.210  | 10.597 |
| 3                  | 0.072                     | 0.115  | 0.216  | 0.352  | 0.584  | 1.213  | 4.108  | 6.251  | 7.815  | 9.348  | 11.345 | 12.838 |
| 4                  | 0.207                     | 0.297  | 0.484  | 0.711  | 1.064  | 1.923  | 5.385  | 7.779  | 9.488  | 11.143 | 13.277 | 14.860 |
| 5                  | 0.412                     | 0.554  | 0.831  | 1.145  | 1.610  | 2.675  | 6.626  | 9.236  | 11.071 | 12.833 | 15.086 | 16.750 |
| 6                  | 0.676                     | 0.872  | 1.237  | 1.635  | 2.204  | 3.455  | 7.841  | 10.645 | 12.592 | 14.449 | 16.812 | 18.548 |
| 7                  | 0.989                     | 1.239  | 1.690  | 2.167  | 2.833  | 4.255  | 9.037  | 12.017 | 14.067 | 16.013 | 18.475 | 20.278 |
| 8                  | 1.344                     | 1.646  | 2.180  | 2.733  | 3.490  | 5.071  | 10.219 | 13.362 | 15.507 | 17.535 | 20.090 | 21.955 |
| 9                  | 1.735                     | 2.088  | 2.700  | 3.325  | 4.168  | 5.899  | 11.389 | 14.684 | 16.919 | 19.023 | 21.666 | 23.589 |
| 10                 | 2.156                     | 2.558  | 3.247  | 3.940  | 4.865  | 6.737  | 12.549 | 15.987 | 18.307 | 20.483 | 23.209 | 25.188 |
| 11                 | 2.603                     | 3.053  | 3.816  | 4.575  | 5.578  | 7.584  | 13.701 | 17.275 | 19.675 | 21.920 | 24.725 | 26.757 |
| 12                 | 3.074                     | 3.571  | 4.404  | 5.226  | 6.304  | 8.438  | 14.845 | 18.549 | 21.026 | 23.337 | 26.217 | 28.299 |
| 13                 | 3.565                     | 4.107  | 5.009  | 5.892  | 7.042  | 9.299  | 15.984 | 19.812 | 22.362 | 24.736 | 27.688 | 29.819 |
| 14                 | 4.075                     | 4.660  | 5.629  | 6.571  | 7.790  | 10.165 | 17.117 | 21.064 | 23.685 | 26.119 | 29.141 | 31.319 |
| 15                 | 4.601                     | 5.229  | 6.262  | 7.261  | 8.547  | 11.037 | 18.245 | 22.307 | 24.996 | 27.488 | 30.578 | 32.801 |
| 16                 | 5.142                     | 5.812  | 6.908  | 7.962  | 9.312  | 11.912 | 19.369 | 23.542 | 26.296 | 28.845 | 32.000 | 34.267 |
| 17                 | 5.697                     | 6.408  | 7.564  | 8.672  | 10.085 | 12.792 | 20.489 | 24.769 | 27.587 | 30.191 | 33.409 | 35.718 |
| 18                 | 6.265                     | 7.015  | 8.231  | 9.390  | 10.865 | 13.675 | 21.605 | 25.989 | 28.869 | 31.526 | 34.805 | 37.156 |
| 19                 | 6.844                     | 7.633  | 8.907  | 10.117 | 11.651 | 14.562 | 22.718 | 27.204 | 30.144 | 32.852 | 36.191 | 38.582 |
| 20                 | 7.434                     | 8.260  | 9.591  | 10.851 | 12.443 | 15.452 | 23.828 | 28.412 | 31.410 | 34.170 | 37.566 | 39.997 |
| 21                 | 8.034                     | 8.897  | 10.283 | 11.591 | 13.240 | 16.344 | 24.935 | 29.615 | 32.671 | 35.479 | 38.932 | 41.401 |
| 22                 | 8.643                     | 9.542  | 10.982 | 12.338 | 14.042 | 17.240 | 26.039 | 30.813 | 33.924 | 36.781 | 40.289 | 42.796 |
| 23                 | 9.260                     | 10.196 | 11.689 | 13.091 | 14.848 | 18.137 | 27.141 | 32.007 | 35.172 | 38.076 | 41.638 | 44.181 |
| 24                 | 9.886                     | 10.856 | 12.401 | 13.848 | 15.659 | 19.037 | 28.241 | 33.196 | 36.415 | 39.364 | 42.980 | 45.559 |
| 25                 | 10.520                    | 11.524 | 13.120 | 14.611 | 16.473 | 19.939 | 29.339 | 34.382 | 37.652 | 40.646 | 44.314 | 46.928 |
| 26                 | 11.160                    | 12.198 | 13.844 | 15.379 | 17.292 | 20.843 | 30.435 | 35.563 | 38.885 | 41.923 | 45.642 | 48.290 |
| 27                 | 11.808                    | 12.879 | 14.573 | 16.151 | 18.114 | 21.749 | 31.528 | 36.741 | 40.113 | 43.194 | 46.963 | 49.645 |
| 28                 | 12.461                    | 13.565 | 15.308 | 16.928 | 18.939 | 22.657 | 32.620 | 37.916 | 41.337 | 44.461 | 48.278 | 50.993 |
| 29                 | 13.121                    | 14.257 | 16.047 | 17.708 | 19.768 | 23.567 | 33.711 | 39.087 | 42.557 | 45.722 | 49.588 | 52.336 |
| 30                 | 13.787                    | 14.954 | 16.791 | 18.493 | 20.599 | 24.478 | 34.800 | 40.256 | 43.773 | 46.979 | 50.892 | 53.672 |

Para valores más grandes de grados de libertad (gl) se puede usar la expresión  $Z = \sqrt{2\chi^2} - \sqrt{2(gl) - 1}$  y el área de la cola superior que resulta se puede obtener en la tabla de la distribución normal estándar (Tabla E.2a).