

**Table 6.5** AUXILIARY FUNCTIONS FOR GAMMA AND DIGAMMA FUNCTIONS

| $x^{-1}$ | $f_1(x)$  | $f_2(x)$  | $f_3(x)$  | $\langle x \rangle$ |
|----------|---|---|---|---------------------|
| 0.015    | 1.00125 077   | 0.92018 852   | 0.00751 875   | 67                  |
| 0.014    | 1.00116 735   | 0.92010 519   | 0.00701 633   | 71                  |
| 0.013    | 1.00108 391   | 0.92002 186   | 0.00651 408   | 77                  |
| 0.012    | 1.00100 050   | 0.91993 853   | 0.00601 200   | 83                  |
| 0.011    | 1.00091 708   | 0.91985 520   | 0.00551 008   | 91                  |
| 0.010    | 1.00083 368   | 0.91977 186   | 0.00500 833   | 100                 |
| 0.009    | 1.00075 028   | 0.91968 853   | 0.00450 675   | 111                 |
| 0.008    | 1.00066 689   | 0.91960 520   | 0.00400 533   | 125                 |
| 0.007    | 1.00058 350   | 0.91952 187   | 0.00350 408   | 143                 |
| 0.006    | 1.00050 012   | 0.91943 853   | 0.00300 300   | 167                 |
| 0.005    | 1.00041 675   | 0.91935 520   | 0.00250 208   | 200                 |
| 0.004    | 1.00033 339   | 0.91927 187   | 0.00200 133   | 250                 |
| 0.003    | 1.00025 003   | 0.91918 853   | 0.00150 075   | 333                 |
| 0.002    | 1.00016 668   | 0.91910 520   | 0.00100 033   | 500                 |
| 0.001    | 1.00008 334   | 0.91902 187   | 0.00050 008   | 1000                |
| 0.000    | 1.00000 000   | 0.91893 853   | 0.00000 000   | $\infty$            |
|          | $\left[ \begin{matrix} (-8)1 \\ 2 \end{matrix} \right]$ | $\left[ \begin{matrix} (-8)1 \\ 2 \end{matrix} \right]$ | $\left[ \begin{matrix} (-8)2 \\ 3 \end{matrix} \right]$ |                     |

$$x! = (2\pi)^{\frac{1}{2}} x^{x+\frac{1}{2}} e^{-x} f_1(x)$$

$$\Gamma(x) = (2\pi)^{\frac{1}{2}} x^{x-\frac{1}{2}} e^{-x} f_1(x)$$

$$\ln \Gamma(x) = \ln(x-1)! = (x-\frac{1}{2}) \ln x - x + f_2(x)$$

$$\psi(x) = \ln x - f_3(x)$$

$$(2\pi)^{\frac{1}{2}} = 2.50662 82746 31001$$

$\langle x \rangle =$  nearest integer to  $x$ .

**Table 6.6** FACTORIALS FOR LARGE ARGUMENTS

| $n$ | $n!$                            | $n$  | $n!$                            |
|-----|---------------------------------|------|---------------------------------|
| 100 | (157) 9.3326 21544 39441 52682  | 600  | (1408) 1.2655 72316 22543 07425 |
| 200 | (374) 7.8865 78673 64790 50355  | 700  | (1689) 2.4220 40124 75027 21799 |
| 300 | (614) 3.0605 75122 16440 63604  | 800  | (1976) 7.7105 30113 35386 00414 |
| 400 | (868) 6.4034 52284 66238 95262  | 900  | (2269) 6.7526 80220 96458 41584 |
| 500 | (1134) 1.2201 36825 99111 00687 | 1000 | (2567) 4.0238 72600 77093 77354 |
|     | $\Gamma(n+1)$                   |      | $\Gamma(n+1)$                   |

Compiled from Ballistic Research Laboratory, A table of the factorial numbers and their reciprocals from 1! to 1000! to 20 significant digits, Technical Note No. 381, Aberdeen Proving Ground, Md.(1951) (with permission).