$\Gamma'(x) / \Gamma(x) = \Psi(x)$ give a very easy way to compute as many terms as may be desired in the series which occurs in the asymptotic form of the gamma function.

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AN ERRONEOUS APPLICATION OF BAYES' THEOREM TO THE SET OF REAL NUMBERS.

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BAYES' theorem on the probability of causes is frequently introduced with an urn problem.* Here only a finite number of objects come into consideration. For example: The urn U_1 contained 3 white balls and 1 black ball; the urn U_2 contained 2 white balls and 2 black balls. A man, blindfolded, drew a white ball. What is the probability that this white ball came out of U_1,—assuming that each urn was equally accessible? After a consideration of the general problem of this nature, the following theorem, known as Bayes' theorem, is announced:

Let ω_i be the probability a priori that a certain urn, or "cause," or set of conditions U_i will come into play. The "causes" are to be mutually exclusive; and $i = 1, 2, \cdots, s$. Let p_i be the probability that U_i, when brought into play, will yield a certain event. Then, after this event has happened, the probability a posteriori P_i that the event had its origin in U_i is

$$P_i = \frac{\omega_i p_i}{\omega_1 p_1 + \omega_2 p_2 + \cdots + \omega_s p_s}.$$

In the preceding example, it is assumed that $\omega_1 = \omega_2 = \frac{1}{2}$. Hence, with $p_1 = \frac{3}{4}$, $p_2 = \frac{2}{4}$, it follows that $P_1 = \frac{3}{5}$,—a result which on inspection seems plausible; since $\frac{3}{5}$ of all the white balls were in the first urn, U_1. This urn example illustrates, indeed, the following important corollary of Bayes' theorem:

If each of a finite number s of mutually exclusive causes

* E. g., Poincaré, Calcul des Probabilités (1912), p. 153.