ALGORITHM 31
GAMMA FUNCTION

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```
real procedure Gamma (x); real x;
comment For x in the range 2 ≤ x ≤ 3 an approximating polynomial is used. In this range the maximum absolute error ε(x)
  is | ε(x) | < 0.25 × 10⁻⁷. For x > 3 we write Γ(x) = (x−1)(x−2)
  ...(x−n)Γ(x−n) where 2 ≤ (x−n) ≤ 3, and for x < 2 we write
  Γ(x) = Γ(x+n) / (x(x+1)...(x+n−1)) where 2 ≤ (x−n) ≤ 3. For x = 0
  or a negative integer Γ(x) is set equal to a large value 10⁵⁰.
begin
  real h, y;
  h := 1.0; y := x;
A1: if y = 0 then h := 10⁵⁰
    else if y = 2.0 then go to A2
    else if y < 2.0 then begin
    h := h/y; y := y + 1.0; go to A1 end
    else if y ≥ 3.0 then begin
    y := y − 1.0; h := h × y; go to A1 end
    else begin y := y − 2.0;
    h := (((((((.0016063118 × y + .0051589951) × y
      + .0044511400) × y + .0721101567) × y
      + .0821117404) × y + .4117741955) × y
      + .4227874605) × y + .9999999758) × h end;
A2: Gamma := h end Gamma.
```

CERTIFICATION OF ALGORITHM 31
GAMMA FUNCTION [R. M. COLLINGE, *Comm. ACM*, Feb. 61]

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GAMMA was successfully run on FACIT EDB using FACIT-ALGOL 1, which is a realization of ALGOL 60 for FACIT EDB. No changes in the program were necessary. The relative error was as stated in the comment of GAMMA about 10^{-8}.

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