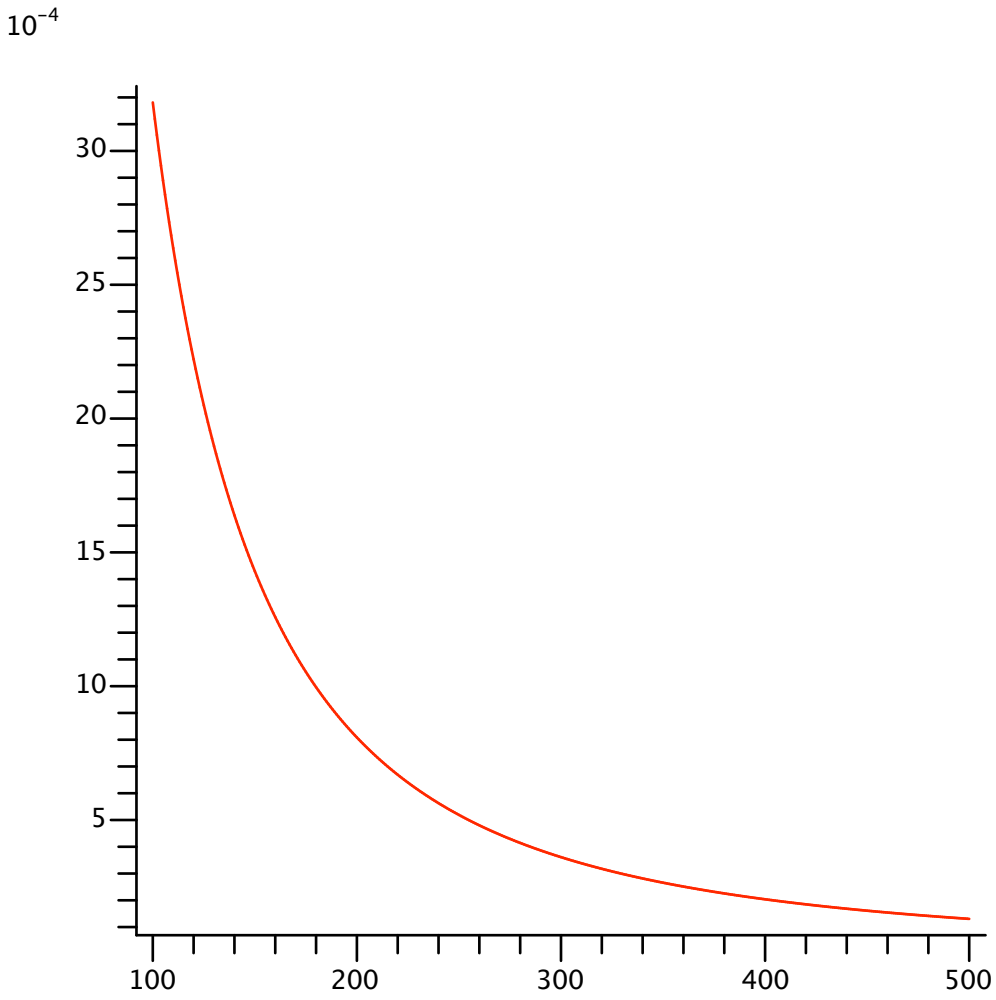
```
> Digits:=400;
> Z:=proc(s) option remember; Digits:=400; evalf(Zeta(s)) end;
```

$$Z := \mathbf{proc}(s)\ \mathbf{option}\ remember;\ Digits := 400;\ evalf(\zeta(s))\ \mathbf{end\ proc} \tag{1}$$

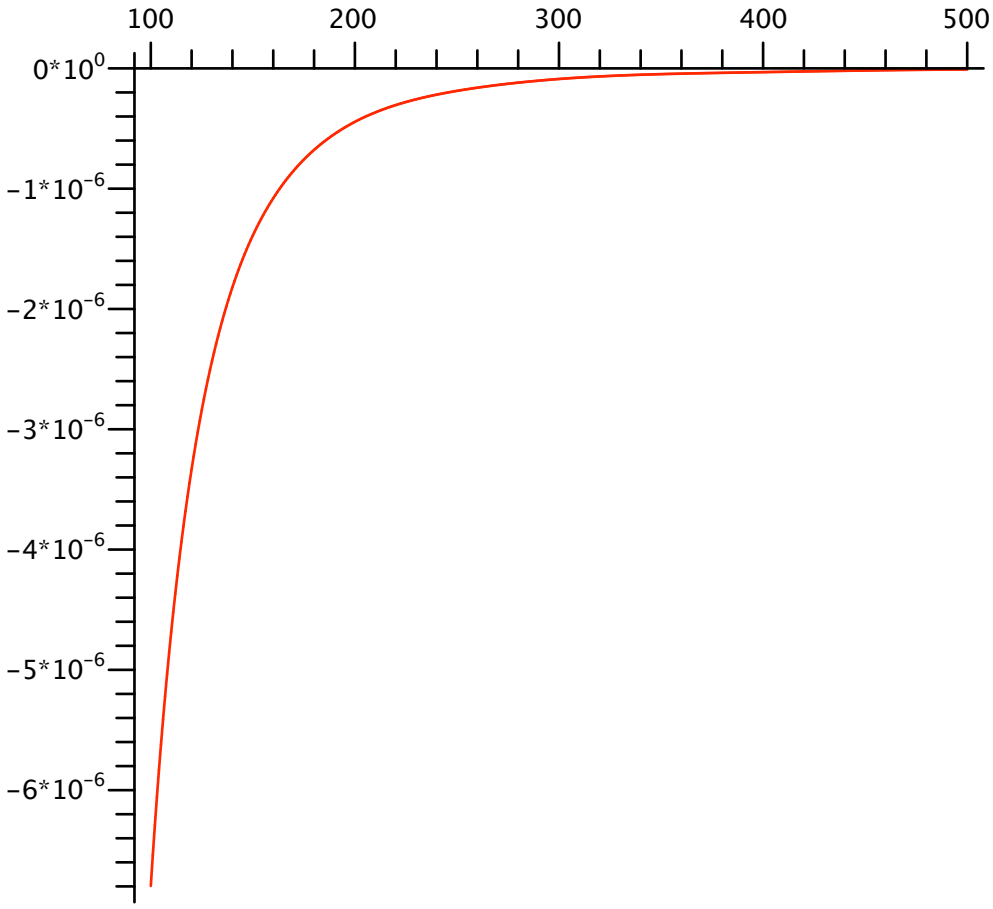
```
> d:=proc(n) local k; option remember; Digits:=400; add((-1)^k*
  binomial(n,k)/Z(k),k=2..n); end;
```

$$d := \mathbf{proc}(n)\ \mathbf{option}\ remember;\ \mathbf{local}\ k;\ Digits := 400;\ add(((-1)^{\wedge}k * \mathrm{binomial}(n,k))/Z(k), k = 2..n)\ \mathbf{end\ proc} \tag{2}$$

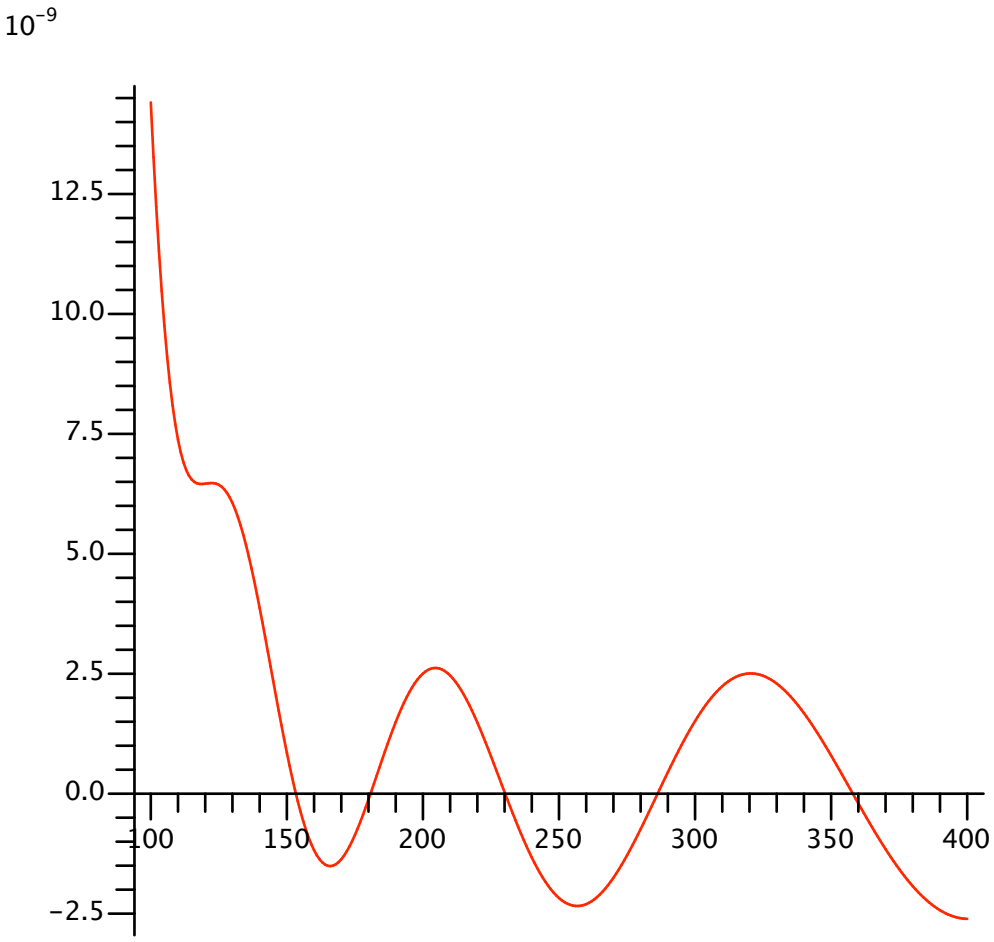
```
> plot([seq([n,2-d(n)],n=100..500)]);
```



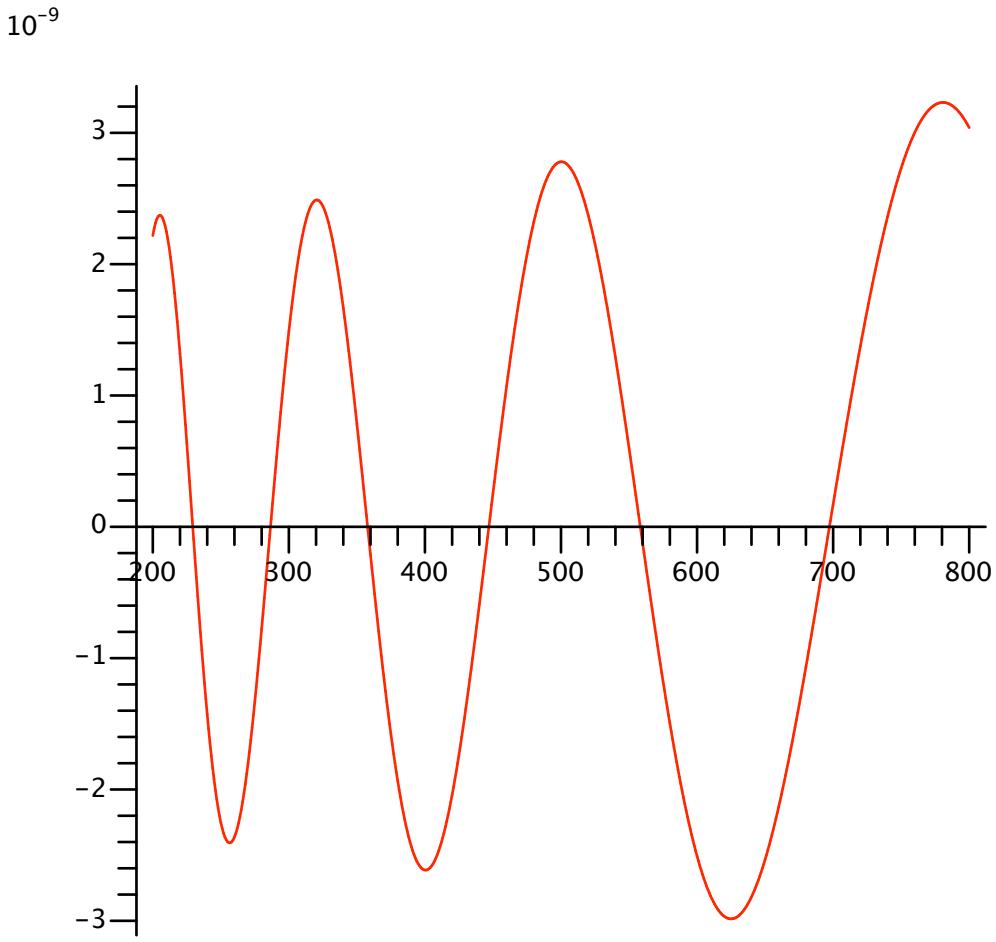

```
> plot([seq([n,2-d(n)+1/(Zeta(1, -2)*(n+1)*(n+2))],n=100..500)]);
```




```
> 
> plot([seq([n,2-d(n)+1/(Zeta(1, -2)*(n+1)*(n+2))+6/(Zeta(1, -4)*
  (n+1)*(n+2)*(n+3)*(n+4))],n=100..400)]);
```




```
> plot([seq([n,2-d(n)+1/(Zeta(1, -2)*(n+1)*(n+2))+6/(Zeta(1, -4)*
(n+1)*(n+2)*(n+3)*(n+4))+120/(Zeta(1, -6)*(n+1)*(n+2)*(n+3)*(n+4)*
(n+5)*(n+6))],n=200..800)]);
```




```
> resid:=proc(s0) local kern, s;  1/Zeta(s)*GAMMA(N+1)/(GAMMA(N-s+1)
  /GAMMA(-s)); series(%,s=s0,4); coeff(%,s-s0,-1); simplify(%); end;
```

$$resid := \mathbf{proc}(s0) \quad (3)$$

```
    local kern, s;
    (GAMMA(N+1)*GAMMA(-s))/(Zeta(s)*GAMMA(N-s+1));
    series(%, s=s0, 4);
    coeff(%, s-s0, -1);
    simplify(%)
end proc
```

```
>
> resid(0);
```

$$2 \quad (4)$$

```
> resid(-2);lprint(%);
```

$$\frac{1}{\zeta(1,-2)\,(N+1)\,(N+2)}$$

```
1/(Zeta(1, -2)*(N+1)*(N+2))
> resid(-4);
```

```
> lprint(%);
6/(Zeta(1, -4)*(N+1)*(N+2)*(N+3)*(N+4))
> resid(-6):subs(N=n,%);lprint(%);
```

$$\frac{120}{\zeta(1,-6)\,(n+1)\,(n+2)\,(n+3)\,(n+4)\,(n+5)\,(n+6)}$$

```
120/(Zeta(1, -6)*(n+1)*(n+2)*(n+3)*(n+4)*(n+5)*(n+6))
> ?ZetaZeroes
> zz0:=proc() local olddigits, res; option remember;
  olddigits:=Digits;  Digits:=20; res:=fsolve(abs(Zeta(1/2+I*t)),t=
  14..15); Digits:=olddigits; res; end;
```

```
zz0 := proc( )                                                    (5)
    option remember;
    local olddigits, res;
    olddigits := Digits;
    Digits := 20;
    res := fsolve(abs(Zeta(1/2 + I*t)), t = 14..15);
    Digits := olddigits;
    res
end proc
> zz0();
                        14.134725141734693790                     (6)
> f:=proc(n) local olddigits,res; olddigits:=Digits; Digits:=20;
  1/Zeta(1,1/2.+I*zz0())*GAMMA(n+1.)/(GAMMA(n-1/2-I*zz0())/GAMMA(
  -1/2-I*zz0()));res:=evalc(%); evalf(%);
  Digits:=olddigits; res; end;
f := proc(n)                                                      (7)
    local olddigits, res;
    olddigits := Digits;
    Digits := 20;
    (GAMMA(n + 1.)*GAMMA(-1/2 + I*zz0()))/(Zeta(1, 1/2.
    + I*zz0())*GAMMA(n - 1/2 - I*zz0()));
    res := evalc(`%`);
    evalf(`%`);
    Digits := olddigits;
    res
end proc
> for j from 240 to 400 by 10 do j,f(j) od;
```

$$240,\ 1.5745358080918481227\ 10^{-7} - 2.3979470065966618001\ 10^{-7}\ I$$

$$250,\ 2.7494826161098368634\ 10^{-7} - 1.1984694588702337038\ 10^{-7}\ I$$

$$260,\ 3.0996017590564946385\ 10^{-7} + 4.5238164972450041018\ 10^{-8}\ I$$

$$270,\ 2.5412973189486136337\ 10^{-7} + 2.0545599770500087671\ 10^{-7}\ I$$

$$280,\ 1.2488527041691127597\ 10^{-7} + 3.1685249487201663704\ 10^{-7}\ I$$

$$
\begin{aligned}
&290,\ -4.3115009435023943122\ 10^{-8} + 3.5195360718765399742\ 10^{-7}\ I\\
&300,\ -2.0896141215727940497\ 10^{-7} + 3.0390739403188504575\ 10^{-7}\ I\\
&310,\ -3.3564598746270378080\ 10^{-7} + 1.8501862553324535879\ 10^{-7}\ I\\
&320,\ -3.9734439974661284412\ 10^{-7} + 2.1439164409524316388\ 10^{-8}\ I\\
&330,\ -3.8302012467727615837\ 10^{-7} - 1.5392136126908048498\ 10^{-7}\ I\\
&340,\ -2.9653103063544132964\ 10^{-7} - 3.0844258010211749176\ 10^{-7}\ I\\
&350,\ -1.5403912612074243861\ 10^{-7} - 4.1550377522592198160\ 10^{-7}\ I\\
&360,\ 2.0208825914718944186\ 10^{-8} - 4.5816493778462533707\ 10^{-7}\ I\\
&370,\ 1.9867128810793138548\ 10^{-7} - 4.3066092403570476859\ 10^{-7}\ I\\
&380,\ 3.5500006314087227193\ 10^{-7} - 3.3794771219409683295\ 10^{-7}\ I\\
&390,\ 4.6762453788554482888\ 10^{-7} - 1.9377827718434541889\ 10^{-7}\ I\\
&400,\ 5.2211295114674863711\ 10^{-7} - 1.7880934857494418087\ 10^{-8}\ I
\end{aligned}
\tag{8}
$$

>