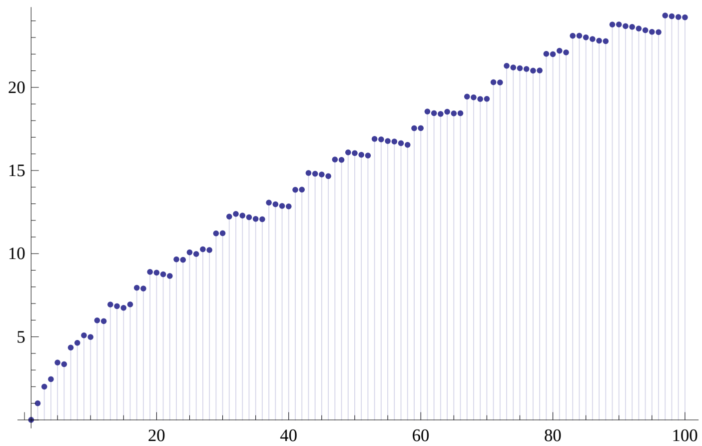
```
RiemannPrimeCounting[n_] := Sum[PrimePi[n^(1 / j)] / j, {j, 1, N[Log[n] / Log[2]]}]
d[n_, z_] := Product[1 / (p[[2]] !) Pochhammer[z, p[[2]]], {p, FI[n]}];
FI[n_] := If[n == 1, {}, FactorInteger[n]]
DD[n_, k_] := Sum[d[j, k], {j, 1, n}]
LinniksIdentityExpanded[n_, a_] :=
 Sum[(-1)^(k + 1) / k Sum[(-1)^(k - j) Binomial[k, j] DD[n, a j], {j, 0, k}],
  {k, 1, N[Log[n] / Log[2]]}]
Table[{n, N[RiemannPrimeCounting[n]], N[LinniksIdentityExpanded[n, 1 / 10]] * 10},
  {n, 1, 100}] // TableForm
```

1	0.	0.
2	1.	1.
3	2.	2.
4	2.5	2.5
5	3.5	3.5
6	3.5	3.5
7	4.5	4.5
8	4.83333	4.83333
9	5.33333	5.33333
10	5.33333	5.33333
11	6.33333	6.33333
12	6.33333	6.33333
13	7.33333	7.33333
14	7.33333	7.33333
15	7.33333	7.33333
16	7.58333	7.58333
17	8.58333	8.58333
18	8.58333	8.58333
19	9.58333	9.58333
20	9.58333	9.58333
21	9.58333	9.58333
22	9.58333	9.58333
23	10.5833	10.5833
24	10.5833	10.5833
25	11.0833	11.0833
26	11.0833	11.0833
27	11.4167	11.4167
28	11.4167	11.4167
29	12.4167	12.4167
30	12.4167	12.4167
31	13.4167	13.4167
32	13.6167	13.6167
33	13.6167	13.6167
34	13.6167	13.6167
35	13.6167	13.6167
36	13.6167	13.6167
37	14.6167	14.6167
38	14.6167	14.6167
39	14.6167	14.6167
40	14.6167	14.6167
41	15.6167	15.6167
42	15.6167	15.6167
43	16.6167	16.6167
44	16.6167	16.6167
45	16.6167	16.6167

46	16.6167	16.6167
47	17.6167	17.6167
48	17.6167	17.6167
49	18.1167	18.1167
50	18.1167	18.1167
51	18.1167	18.1167
52	18.1167	18.1167
53	19.1167	19.1167
54	19.1167	19.1167
55	19.1167	19.1167
56	19.1167	19.1167
57	19.1167	19.1167
58	19.1167	19.1167
59	20.1167	20.1167
60	20.1167	20.1167
61	21.1167	21.1167
62	21.1167	21.1167
63	21.1167	21.1167
64	21.2833	21.2833
65	21.2833	21.2833
66	21.2833	21.2833
67	22.2833	22.2833
68	22.2833	22.2833
69	22.2833	22.2833
70	22.2833	22.2833
71	23.2833	23.2833
72	23.2833	23.2833
73	24.2833	24.2833
74	24.2833	24.2833
75	24.2833	24.2833
76	24.2833	24.2833
77	24.2833	24.2833
78	24.2833	24.2833
79	25.2833	25.2833
80	25.2833	25.2833
81	25.5333	25.5333
82	25.5333	25.5333
83	26.5333	26.5333
84	26.5333	26.5333
85	26.5333	26.5333
86	26.5333	26.5333
87	26.5333	26.5333
88	26.5333	26.5333
89	27.5333	27.5333
90	27.5333	27.5333
91	27.5333	27.5333
92	27.5333	27.5333
93	27.5333	27.5333
94	27.5333	27.5333
95	27.5333	27.5333
96	27.5333	27.5333
97	28.5333	28.5333
98	28.5333	28.5333
99	28.5333	28.5333
100	28.5333	28.5333

```
Li[n_, a_, k_] := Sum[(-1)^(k - j) Binomial[k, j] DD[n, a j], {j, 0, k}]
DiscretePlot[Li[n, -(1 / 10), 1] / (-1 / 10), {n, 1, 100}]
```




```
Series[ ((x + 1)^b - 1) / b, {x, 0, 30}]
```

$$x+\frac{1}{2}(-1+b)x^2+\frac{1}{6}(-2+b)(-1+b)x^3+\frac{1}{24}(-3+b)(-2+b)(-1+b)x^4+$$
$$\frac{1}{120}(-4+b)(-3+b)(-2+b)(-1+b)x^5+\frac{1}{720}(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^6+$$
$$\frac{(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^7}{5040}+$$
$$\frac{(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^8}{40\,320}+$$
$$\frac{(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^9}{362\,880}+\frac{1}{3\,628\,800}$$
$$(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{10}+$$
$$\frac{1}{39\,916\,800}(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)$$
$$(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{11}+\frac{1}{479\,001\,600}$$
$$(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{12}+$$
$$\frac{1}{6\,227\,020\,800}(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)$$
$$(-4+b)(-3+b)(-2+b)(-1+b)x^{13}+\frac{1}{87\,178\,291\,200}(-13+b)(-12+b)(-11+b)$$
$$(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{14}+$$
$$\frac{1}{1\,307\,674\,368\,000}(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)$$
$$(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{15}+$$
$$\frac{1}{20\,922\,789\,888\,000}(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)$$
$$(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{16}+$$
$$\frac{1}{355\,687\,428\,096\,000}(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)$$
$$(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^{17}+$$

$$\frac{1}{6\,402\,373\,705\,728\,000}(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{18}+$$
$$\frac{1}{121\,645\,100\,408\,832\,000}(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{19}+$$
$$\frac{1}{2\,432\,902\,008\,176\,640\,000}(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{20}+$$
$$\left((-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{21}\right)/51\,090\,942\,171\,709\,440\,000+$$
$$\left((-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{22}\right)/1\,124\,000\,727\,777\,607\,680\,000+$$
$$\left((-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{23}\right)/25\,852\,016\,738\,884\,976\,640\,000+$$
$$\left((-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{24}\right)/620\,448\,401\,733\,239\,439\,360\,000+$$
$$\left((-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{25}\right)/15\,511\,210\,043\,330\,985\,984\,000\,000+$$
$$\left((-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{26}\right)/403\,291\,461\,126\,605\,635\,584\,000\,000+$$
$$\left((-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{27}\right)/10\,888\,869\,450\,418\,352\,160\,768\,000\,000+$$
$$\left((-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{28}\right)/304\,888\,344\,611\,713\,860\,501\,504\,000\,000+$$
$$\left((-28+b)(-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{29}\right)/8\,841\,761\,993\,739\,701\,954\,543\,616\,000\,000+$$
$$\left((-29+b)(-28+b)(-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{30}\right)/265\,252\,859\,812\,191\,058\,636\,308\,480\,000\,000+O[x]^{31}$$

FF[x_, b_] := $x+\frac{1}{2}(-1+b)x^2+\frac{1}{6}(-2+b)(-1+b)x^3+\frac{1}{24}(-3+b)(-2+b)(-1+b)x^4+\frac{1}{120}(-4+b)(-3+b)(-2+b)(-1+b)x^5+\frac{1}{720}(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^6+\frac{(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)x^7}{5040}+$

$$\frac{(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{8}}{40\,320}+\frac{1}{362\,880}$$
$$(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{9}+\frac{1}{3\,628\,800}$$
$$(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{10}+\frac{1}{39\,916\,800}$$
$$(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{11}+$$
$$\frac{1}{479\,001\,600}\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)$$
$$(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{12}+\frac{1}{6\,227\,020\,800}\,(-12+b)\,(-11+b)\,(-10+b)$$
$$(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{13}+$$
$$\frac{1}{87\,178\,291\,200}\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)$$
$$(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{14}+\frac{1}{1\,307\,674\,368\,000}\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)$$
$$(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{15}+$$
$$\frac{1}{20\,922\,789\,888\,000}\,(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)$$
$$(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{16}+$$
$$\frac{1}{355\,687\,428\,096\,000}\,(-16+b)\,(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)$$
$$(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{17}+$$
$$\frac{1}{6\,402\,373\,705\,728\,000}\,(-17+b)\,(-16+b)\,(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)$$
$$(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{18}+$$
$$\frac{1}{121\,645\,100\,408\,832\,000}\,(-18+b)\,(-17+b)\,(-16+b)\,(-15+b)\,(-14+b)\,(-13+b)$$
$$(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)$$
$$(-3+b)\,(-2+b)\,(-1+b)\,x^{19}+\frac{1}{2\,432\,902\,008\,176\,640\,000}\,(-19+b)\,(-18+b)$$
$$(-17+b)\,(-16+b)\,(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)$$
$$(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{20}+$$
$$\Big((-20+b)\,(-19+b)\,(-18+b)\,(-17+b)\,(-16+b)\,(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)$$
$$(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{21}\Big)\Big/$$
$$51\,090\,942\,171\,709\,440\,000+\Big((-21+b)\,(-20+b)\,(-19+b)\,(-18+b)\,(-17+b)\,(-16+b)$$
$$(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)$$
$$(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{22}\Big)\Big/1\,124\,000\,727\,777\,607\,680\,000+$$
$$\Big((-22+b)\,(-21+b)\,(-20+b)\,(-19+b)\,(-18+b)\,(-17+b)\,(-16+b)\,(-15+b)\,(-14+b)$$
$$(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)$$
$$(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{23}\Big)\Big/25\,852\,016\,738\,884\,976\,640\,000+$$
$$\Big((-23+b)\,(-22+b)\,(-21+b)\,(-20+b)\,(-19+b)\,(-18+b)\,(-17+b)\,(-16+b)\,(-15+b)$$
$$(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)\,(-6+b)$$
$$(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{24}\Big)\Big/620\,448\,401\,733\,239\,439\,360\,000+$$
$$\Big((-24+b)\,(-23+b)\,(-22+b)\,(-21+b)\,(-20+b)\,(-19+b)\,(-18+b)\,(-17+b)\,(-16+b)$$
$$(-15+b)\,(-14+b)\,(-13+b)\,(-12+b)\,(-11+b)\,(-10+b)\,(-9+b)\,(-8+b)\,(-7+b)$$
$$(-6+b)\,(-5+b)\,(-4+b)\,(-3+b)\,(-2+b)\,(-1+b)\,x^{25}\Big)\Big/15\,511\,210\,043\,330\,985\,984\,000\,000+$$
$$\Big((-25+b)\,(-24+b)\,(-23+b)\,(-22+b)\,(-21+b)\,(-20+b)\,(-19+b)\,(-18+b)\,(-17+b)$$

$$(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{26}\big)\big/403\,291\,461\,126\,605\,635\,584\,000\,000\,+$$
$$\big((-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{27}\big)\big/10\,888\,869\,450\,418\,352\,160\,768\,000\,000\,+$$
$$\big((-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{28}\big)\big/304\,888\,344\,611\,713\,860\,501\,504\,000\,000\,+$$
$$\big((-28+b)(-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{29}\big)\big/8\,841\,761\,993\,739\,701\,954\,543\,616\,000\,000\,+$$
$$\big((-29+b)(-28+b)(-27+b)(-26+b)(-25+b)(-24+b)(-23+b)(-22+b)(-21+b)(-20+b)(-19+b)(-18+b)(-17+b)(-16+b)(-15+b)(-14+b)(-13+b)(-12+b)(-11+b)(-10+b)(-9+b)(-8+b)(-7+b)(-6+b)(-5+b)(-4+b)(-3+b)(-2+b)(-1+b)\,x^{30}\big)\big/265\,252\,859\,812\,191\,058\,636\,308\,480\,000\,000$$

$$n-n^2+n^3-n^4+n^5-n^6+n^7-n^8+n^9-n^{10}+n^{11}-n^{12}+n^{13}-n^{14}+n^{15}-n^{16}+n^{17}-n^{18}+n^{19}-n^{20}+n^{21}-n^{22}+n^{23}-n^{24}+n^{25}-n^{26}+n^{27}-n^{28}+n^{29}-n^{30}$$

```
FF[x, -1]
Series[(-1 / (x + 1)) + 1, {x, 0, 30}]
```

$$x-x^2+x^3-x^4+x^5-x^6+x^7-x^8+x^9-x^{10}+x^{11}-x^{12}+x^{13}-x^{14}+x^{15}-x^{16}+x^{17}-x^{18}+x^{19}-x^{20}+x^{21}-x^{22}+x^{23}-x^{24}+x^{25}-x^{26}+x^{27}-x^{28}+x^{29}-x^{30}$$

$$x-x^2+x^3-x^4+x^5-x^6+x^7-x^8+x^9-x^{10}+x^{11}-x^{12}+x^{13}-x^{14}+x^{15}-x^{16}+x^{17}-x^{18}+x^{19}-x^{20}+x^{21}-x^{22}+x^{23}-x^{24}+x^{25}-x^{26}+x^{27}-x^{28}+x^{29}-x^{30}+O[x]^{31}$$

```
FF[x, 0]
Series[Log[x + 1], {x, 0, 30}]
```

$$x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+\frac{x^5}{5}-\frac{x^6}{6}+\frac{x^7}{7}-\frac{x^8}{8}+\frac{x^9}{9}-\frac{x^{10}}{10}+\frac{x^{11}}{11}-\frac{x^{12}}{12}+\frac{x^{13}}{13}-\frac{x^{14}}{14}+\frac{x^{15}}{15}-\frac{x^{16}}{16}+\frac{x^{17}}{17}-\frac{x^{18}}{18}+\frac{x^{19}}{19}-\frac{x^{20}}{20}+\frac{x^{21}}{21}-\frac{x^{22}}{22}+\frac{x^{23}}{23}-\frac{x^{24}}{24}+\frac{x^{25}}{25}-\frac{x^{26}}{26}+\frac{x^{27}}{27}-\frac{x^{28}}{28}+\frac{x^{29}}{29}-\frac{x^{30}}{30}$$

$$x-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+\frac{x^5}{5}-\frac{x^6}{6}+\frac{x^7}{7}-\frac{x^8}{8}+\frac{x^9}{9}-\frac{x^{10}}{10}+\frac{x^{11}}{11}-\frac{x^{12}}{12}+\frac{x^{13}}{13}-\frac{x^{14}}{14}+\frac{x^{15}}{15}-\frac{x^{16}}{16}+\frac{x^{17}}{17}-\frac{x^{18}}{18}+\frac{x^{19}}{19}-\frac{x^{20}}{20}+\frac{x^{21}}{21}-\frac{x^{22}}{22}+\frac{x^{23}}{23}-\frac{x^{24}}{24}+\frac{x^{25}}{25}-\frac{x^{26}}{26}+\frac{x^{27}}{27}-\frac{x^{28}}{28}+\frac{x^{29}}{29}-\frac{x^{30}}{30}+O[x]^{31}$$

```
Log[1 + .9]
```

0.641854

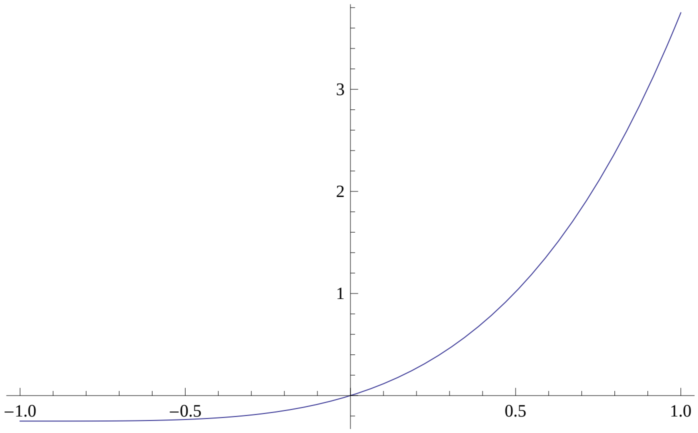
```
FF[.9, -1]
```

0.453604

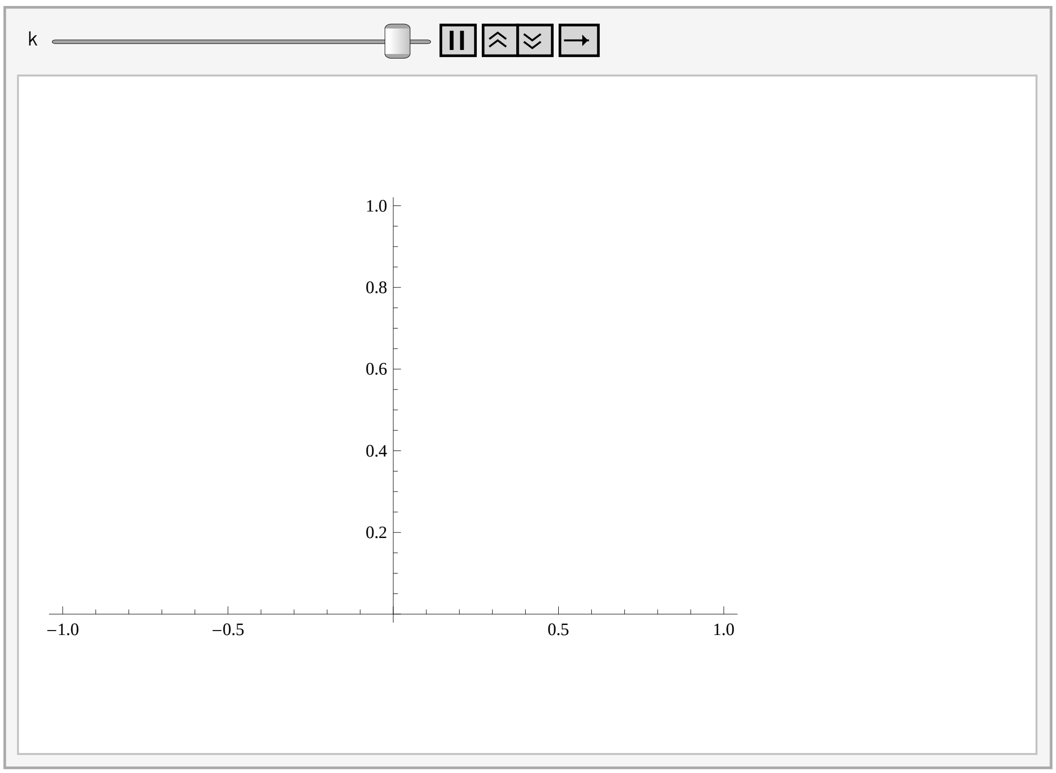
```
1 / (.9 + 1)
```

0.526316

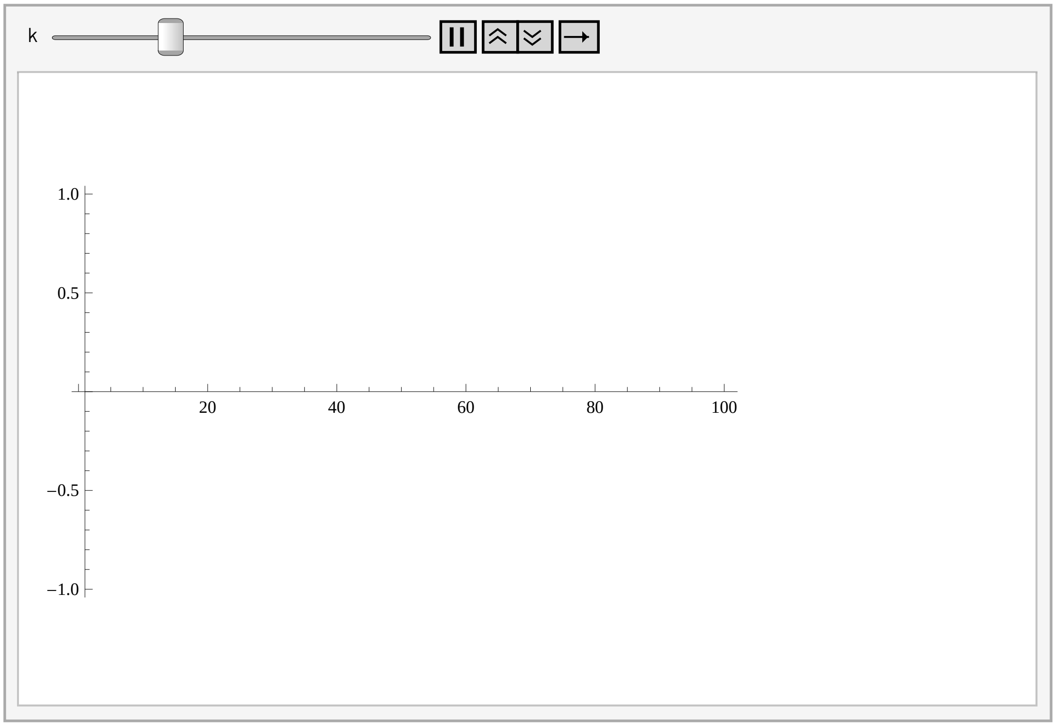
```
Plot[ FF[n, 4], {n, -1, 1}]
```




```
Animate[Plot[ FF[n, Cos[k] .5 + .5], {n, -1, 1}], {k, 0, 2 Pi, .0001}]
```



```
K[n_] := FullSimplify[MangoldtLambda[n] / Log[n]]
P[n_, k_] := P[n, k] = Sum[K[j] P[Floor[n / j], k - 1], {j, 2, n}]; P[n_, 0] := 1
DD[n_, k_] := Sum[k^j / j ! P[n, j], {j, 0, Log[2, n]}]
Animate[DiscretePlot[(DD[n, z = Cos[k] .5 + .5] - 1) / z, {n, 1, 100}], {k, 0, 2 Pi, .0001}]
```




```
PlotRange → {{1, 100}, {-10, 10}}
```

```
d[n_, z_] := d[n, z] = Product[1 / (p[[2]] !) Pochhammer[z, p[[2]]], {p, FI[n]}];
FI[n_] := If[n == 1, {}, FactorInteger[n]]
DD[n_, k_] := DD[n, k] = Sum[d[j, k], {j, 1, n}]
Li[n_, a_, k_] :=
 Li[n, a, k] = (-1) ^ (k + 1) / k Sum[(-1) ^ (k - j) Binomial[k, j] DD[n, a j], {j, 0, k}]
DiscretePlot[{ Li[n, ss = 1, 1] / ss, Li[n, ss, 2] / ss, Li[n, ss, 3] / ss, Li[n, ss, 4] / ss,
   Li[n, ss, 5] / ss, Li[n, ss, 6] / ss, Li[n, ss, 7] / ss, Li[n, ss, 8] / ss},
 {n, 2, 1000}, PlotRange → {{1, 100}, {-10, 30}}]
```