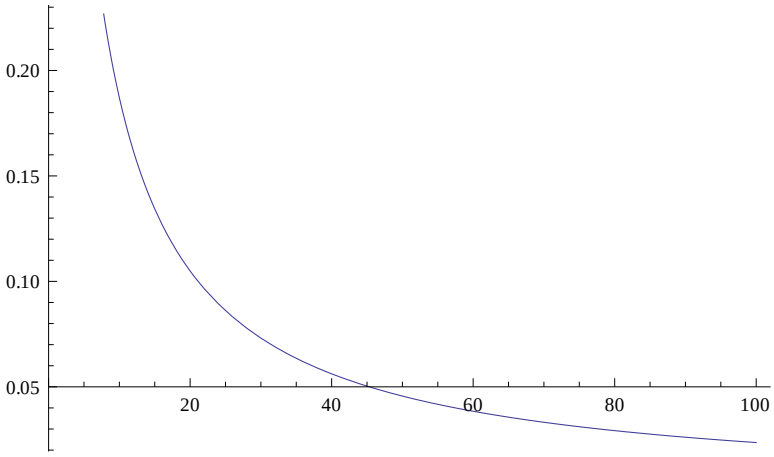
```
1 - (n^2.5 + n) / (n + 1)^2.5
```

$$1 - \frac{n + n^{2.5}}{(1 + n)^{2.5}}$$

```
Plot[%, {n, 2, 100}]
```




```
7!
```

5040

```
0 - (-0.83333333333333337`50 * (-2000000000.0000000`50))
```

$-1.66666666666666674000000000000000000000000000000000 \times 10^{9}$

```
(-5.8207660913467422`50 * 10^(-16)) (1.4551915228366858`50 * 10^(-11))
-8.4703294725430091455109504750007 6`49.69897000433602*^-27
-8.4703294725430098 e-027
-1.4551915228366858`50 * 4.3655745685100566`50
```

$-6.352747104407256786373636714416280000000000000000$

```
-6.3527471044072570 e-027
1.4551915228366858`50 * 4.3655745685100566`50
```

$6.352747104407256786373636714416280000000000000000$

```
6.3527471044072570 e-027
100000.00000000012`50 + 8.4703294725430098`50 * 10^(-27)
```

$100\,000.000000000120000000000000008470329472543009 80$

```
99999.999999999913`50 - 8.4703294725430098`50 * 10^(-27)
```

$99\,999.999999999129999999999999915296705274569902 00$

```
M = 10^5 * {{-1, -1, -1, 0, 1}, {-1, -1, 0, -1, 0},
    {-1, 0, -1, -1, 0}, {0, -1, -1, -1, 0}, {0, 0, 0, -1, 0}}
```

```
{{-100000, -100000, -100000, 0, 100000},
 {-100000, -100000, 0, -100000, 0}, {-100000, 0, -100000, -100000, 0},
 {0, -100000, -100000, -100000, 0}, {0, 0, 0, -100000, 0}}
```

```
Det[M]
```

```
-20000000000000000000000000
```

```
M = {{-1, -1, -1, -1, -1, 0, 0, 1, 1}, {-1, -1, -1, 0, -1, -1, 0, 0, 0},
  {-1, 0, 0, 0, 0, 0, 1, 1, 0}, {0, -1, 0, 0, -1, 0, 1, 1, 1},
  {0, -1, 0, 0, 0, 0, 0, 1, 1}, {0, -1, 0, 0, 0, 0, 1, 1, 0},
  {0, 0, -1, 0, -1, 0, 1, 1, 1}, {0, 0, 0, 0, -1, 0, 0, 1, 1}, {0, 0, 0, 0, -1, 0, 1, 0, 1}}
```

```
{{-1, -1, -1, -1, -1, 0, 0, 1, 1}, {-1, -1, -1, 0, -1, -1, 0, 0, 0},
 {-1, 0, 0, 0, 0, 0, 1, 1, 0}, {0, -1, 0, 0, -1, 0, 1, 1, 1},
 {0, -1, 0, 0, 0, 0, 0, 1, 1}, {0, -1, 0, 0, 0, 0, 1, 1, 0},
 {0, 0, -1, 0, -1, 0, 1, 1, 1}, {0, 0, 0, 0, -1, 0, 0, 1, 1}, {0, 0, 0, 0, -1, 0, 1, 0, 1}}
```

```
MatrixForm[M]
```

$$\begin{pmatrix} -100000 & -100000 & -100000 & -100000 & -100000 & 0 & 0 & 100000 & 100000 \\ -100000 & -100000 & -100000 & 0 & -100000 & -100000 & 0 & 0 & 0 \\ -100000 & 0 & 0 & 0 & 0 & 0 & 100000 & 100000 & 0 \\ 0 & -100000 & 0 & 0 & -100000 & 0 & 100000 & 100000 & 100000 \\ 0 & -100000 & 0 & 0 & 0 & 0 & 0 & 100000 & 100000 \\ 0 & -100000 & 0 & 0 & 0 & 0 & 100000 & 100000 & 0 \\ 0 & 0 & -100000 & 0 & -100000 & 0 & 100000 & 100000 & 100000 \\ 0 & 0 & 0 & 0 & -100000 & 0 & 0 & 100000 & 100000 \\ 0 & 0 & 0 & 0 & -100000 & 0 & 100000 & 0 & 100000 \end{pmatrix}$$

```
Det[M] // N
```

```
1.
```

```
Log[1.1] / Log[10]
```

```
0.0413927
```

```
Log[10.0]
```

```
2.30259
```

```
Exp[0.69314]
```

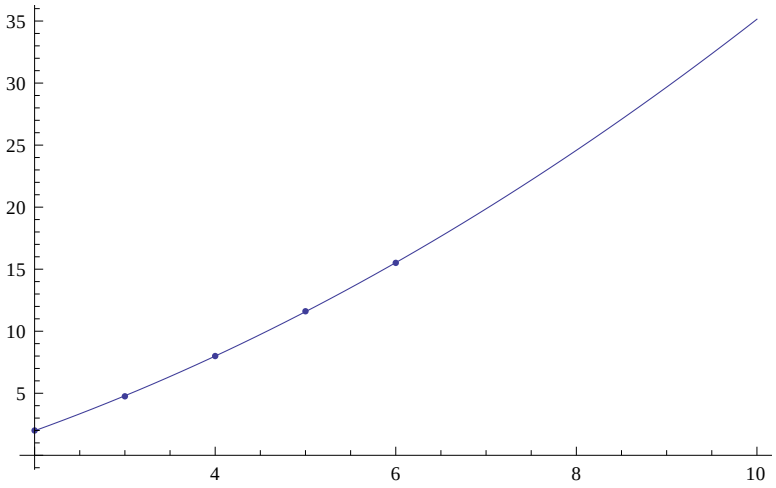
```
1.99999
```

```
Log[2] / Log[1.1]
```

```
7.27254
```

```
f[x_] := -2.5198385641318484579999999999999999998`18.190605497678977 +
   1.870274851204952909114285714285714285714`18.190605497678977 x +
   0.189644430860971142285714285714285714285714`18.190605497678977 x^2;
```

```
Show[ListPlot[{{2, 2}, {3, 4.754887502163468227}, {4, 8},
   {5, 11.609640474436812241}, {6, 15.50977500432693823}}], Plot[f[x], {x, 2, 10}]]
```




```
lm = LinearModelFit[{{2, 2}, {3, 4.754887502163468227}, {4, 8},
   {5, 11.609640474436812241}, {6, 15.50977500432693823}}, {x, x^2}, x]
```

```
f[7]
```

```
Normal[Series[f[x], {x, 5, 3}]] /. x → x + 1
```

```
g[x_] := 11.572646463417194644714285714285714285 83`18.033607801451257 +
  3.766719159814664331971428571428571428 61`18.190605497678977 (-4 + x) +
  0.189644430860971142285714285714285714 29`18.190605497678977 (-4 + x)^2
```

```
g[0]
```

```
-0.4599192820659244
```

```
M = {{-1, -1, -1, -1, -1, 0, 0, 1, 1},
   {-1, -1, -1, 0, -1, -1, 0, 0, 0},
   {-1, 0, 0, 0, 0, 0, 1, 1, 0},
   {2, -1, 1, 1, -1, 0, 1, 0, 1},
   {-1, -2, 0, 1, 2, -1, -1, 2, 1},
   {2, -2, -1, -2, -1, 1, 2, 0, -2},
   {3, 2, -3, 3, 1, -1, 0, 1, 2},
   {1, 1, 0, 2, -2, -2, -2, 4, 0},
   {2, -1, 2, -3, 2, -5, 1, 0, 1}};
```

```
Det[M]
```

```
57 600
```

```
MatrixForm[M]
```

$$\begin{pmatrix} -1 & -1 & -1 & -1 & -1 & 0 & 0 & 1 & 1 \\ -1 & -1 & -1 & 0 & -1 & -1 & 0 & 0 & 0 \\ -1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 2 & -1 & 1 & 1 & -1 & 0 & 1 & 0 & 1 \\ -1 & -2 & 0 & 1 & 2 & -1 & -1 & 2 & 1 \\ 2 & -2 & -1 & -2 & -1 & 1 & 2 & 0 & -2 \\ 3 & 2 & -3 & 3 & 1 & -1 & 0 & 1 & 2 \\ 1 & 1 & 0 & 2 & -2 & -2 & -2 & 4 & 0 \\ 2 & -1 & 2 & -3 & 2 & -5 & 1 & 0 & 1 \end{pmatrix}$$

```
A = M
```

```
{{-1, -1, -1, -1, -1, 0, 0, 1, 1}, {-1, -1, -1, 0, -1, -1, 0, 0, 0},
 {-1, 0, 0, 0, 0, 0, 1, 1, 0}, {2, -1, 1, 1, -1, 0, 1, 0, 1}, {-1, -2, 0, 1, 2, -1, -1, 2, 1},
 {2, -2, -1, -2, -1, 1, 2, 0, -2}, {3, 2, -3, 3, 1, -1, 0, 1, 2},
 {1, 1, 0, 2, -2, -2, -2, 4, 0}, {2, -1, 2, -3, 2, -5, 1, 0, 1}}
```

```
A = M; denom = 1; sign = 1; k = 0;
```

```
k++; For[i = k, (i < n) && A[[i + 1, k + 1]] == 0, i++]; i
```

```
1
```

```
If[i == n, det = 0; Break;]
```

```
For[j = k, j < n, j++, det = A[[k + 1, j + 1]];
 A[[k + 1, j + 1]] = A[[i + 1, j + 1]]; A[[i + 1, j + 1]] = det]; sign = -sign;
```

```
pivot = A[[k + 1, k + 1]]
```

```
-1
```

```
For[i = k + 1, i < n, i++,
 temp = A[[i + 1, k + 1]];
 For[j = k + 1, j < n, j++,
  A[[i + 1, j + 1]] = (A[[i + 1, j + 1]] * pivot - temp * A[[k + 1, j + 1]]) / denom;]]
denom = pivot;
```

```
Diagonal[A]
MatrixForm[A]
```

```
{-1, -1, 0, -1, -4, -3, 0, -4, -1}
```

$$\begin{pmatrix} -1 & -1 & -1 & -1 & -1 & 0 & 0 & 1 & 1 \\ -1 & -1 & -1 & 0 & -1 & -1 & 0 & 0 & 0 \\ -1 & 0 & 0 & 0 & 0 & 0 & -1 & -1 & 0 \\ 2 & -1 & -2 & -1 & 0 & -1 & -1 & 0 & -1 \\ -1 & -2 & -2 & -1 & -4 & -1 & 1 & -2 & -1 \\ 2 & -2 & -1 & 2 & -1 & -3 & -2 & 0 & 2 \\ 3 & 2 & 5 & -3 & 1 & 3 & 0 & -1 & -2 \\ 1 & 1 & 1 & -2 & 3 & 3 & 2 & -4 & 0 \\ 2 & -1 & -3 & 3 & -3 & 4 & -1 & 0 & -1 \end{pmatrix}$$

denom * sign

57 600

k

8

sign

−1

Det[A]

57 600

k

7