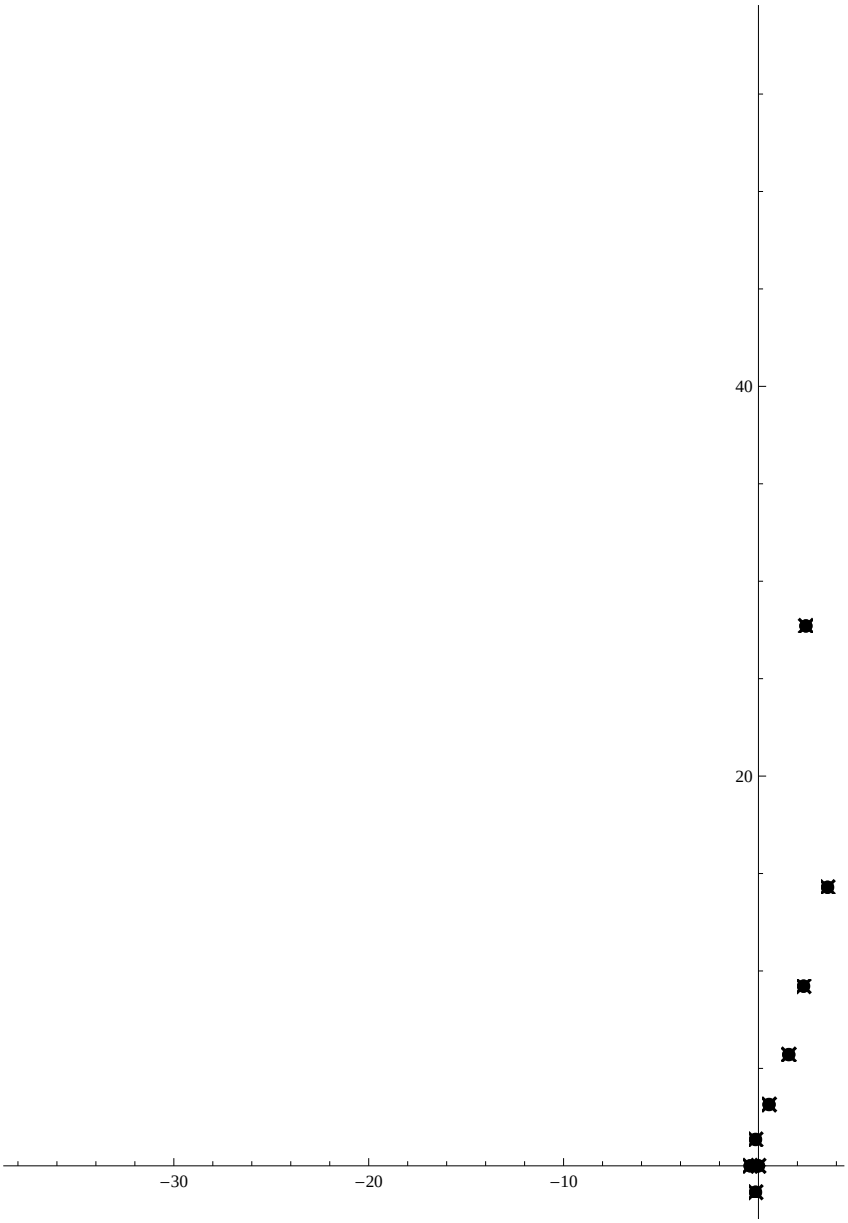
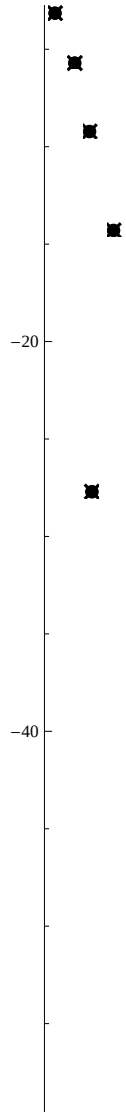
```
K[n_] := If[n == 1, 0, FullSimplify[MangoldtLambda[n] / Log[n]]]
P[n_, k_] := P[n, k] = Sum[ K[j] P[Floor[n / j], k - 1], {j, 2, n}]; P[n_, 0] := 1
Phyp[n_, k_, a_] := Phyp[n, k, a] =
  Sum[If[K[m] == 0, 0, Binomial[k, j] K[m]^(k - j) Phyp[Floor[n / (m^(k - j))], j, m + 1]],
   {m, a, n^(1 / k)}, {j, 0, k - 1}]
Phyp[n_, 1, a_] := Phyp[n, 1, a] = Sum[ K[j], {j, a, n}]; Phyp[n_, 0, a_] := 1
bins[ z_, a_] := Product[ (z - k), {k, 0, a - 1}] / a!
P1[n_, z_] := Expand[Sum[bins[z, a] P[n, a], {a, 0, Log[2, n]}]]
P1h[n_, z_] := Expand[Sum[bins[z, a] Phyp[n, a, 2], {a, 0, Log[2, n]}]]
P1h2[n_, z_] := Expand[FullSimplify[(P1h[n, z + 1] - 1) / (z + 1)]]
```

```
RootLocusPlot[1 / Expand[P1h[530 000, x]], {k, 0, 1}, FeedbackType → None]
```






```
(1 - 1 / List @@ NRoots[ P1h[530 000, x] == 0, x][[All, 2]])
```

```
{1.0078, 1.00032 - 0.00166572 i, 1.00032 + 0.00166572 i, 1.00244 - 0.0131344 i,
 1.00244 + 0.0131344 i, 3.33346, 1.08156 - 0.729614 i, 1.08156 + 0.729614 i,
 8826.48, 0.946785 - 0.308571 i, 0.946785 + 0.308571 i, 0.955564 - 0.163063 i,
 0.955564 + 0.163063 i, 0.974388 - 0.102019 i, 0.974388 + 0.102019 i, 0.996852 - 0.0358172 i,
 0.996852 + 0.0358172 i, 0.983653 - 0.0658927 i, 0.983653 + 0.0658927 i}
```

```
P1[100, z]
```

$$1 + \frac{341\,z}{72} + \frac{6683\,z^2}{360} + \frac{45\,z^3}{16} + \frac{41\,z^4}{18} + \frac{2\,z^5}{15} + \frac{7\,z^6}{720}$$

```
vv := {-999.8815576256916`, -182.67217231000708`,
  -1.4793791531870175` - 27.308662724086556` i,
  -1.4793791531870175` + 27.308662724086556` i, -0.6706279346947679` - 0.5389419630736445` i,
  -0.6706279346947679` + 0.5389419630736445` i, -0.0031680220240090963`,
  0.10809074763072718` - 2.5030341283517754` i, 0.10809074763072718` + 2.5030341283517754` i,
  0.7555329045665851` - 5.580324806796909` i, 0.7555329045665851` + 5.580324806796909` i,
  1.0648324145458472` - 9.82455476742625` i, 1.0648324145458472` + 9.82455476742625` i}
```

```
Product[ 1 - 1 / j, {j, vv}]
```

```
1459.1 + 0. i
```

```
N[P1h[530 000, 1]]
```

```
43 903.9
```

```
RootLocusPlot[1 / Expand[P1h[100, x]], {k, 0, 1}, FeedbackType → None]
```