```
colfunc = ColorData["AvocadoColors"];
poc[c_, z_] := Expand@Sum[bin[z, k], {k, 0, c}]
pocroots[n_] := If[(c = Exponent[f = poc[n, z], z]) == 0, {},
  If[c == 1, List@NRoots[f == 0, z][[2]], List @@ NRoots[f == 0, z][[All, 2]]]]
pocrootsa[n_] := pocrootsa[n] = If[(c = Exponent[f = poc[n, z], z]) == 0, {},
   If[c == 1, List@Roots[f == 0, z][[2]], List @@ Roots[f == 0, z][[All, 2]]]]
Clear[px, pz, t]
t[n_, a_, b_] :=
 t[n, a, b] = b (Floor[n / b] - Floor[(n - 1) / b]) - a (Floor[n / a] - Floor[(n - 1) / a])
px[n_, a_, b_, k_] := px[n, a, b, k] = Sum[t[j, a, b] / j px[n - j, a, b, k - 1], {j, 1, n - 1}]
px[n_, a_, b_, 1] := t[n, a, b] / n
px[n_, a_, b_, 0] := 0
pz[n_, a_, b_, z_] := Sum[ z^k / k! px[n, a, b, k], {k, 0, n}]
pz[n_, a_, b_, 0] := 1
pz[0, a_, b_, z_] := 1
pocx[m_, a_, b_, z_] := Sum[pz[n, a, b, z], {n, 0, m}]
pocxrootsa[n_, a_, b_] :=
 pocxrootsa[n, a, b] = If[(c = Exponent[f = pocx[n, a, b, z], z]) == 0, {},
   If[c == 1, List@Roots[f == 0, z][[2]], List @@ Roots[f == 0, z][[All, 2]]]]
pocc[c_, z_] := Expand@Sum[Pochhammer[z, k] / k!, {k, 0, c}]
poccrootsa[n_] := poccrootsa[n] = If[(c = Exponent[f = pocc[n, z], z]) == 0,
   {}, If[c == 1, List@Roots[f == 0, z][[2]], List @@ Roots[f == 0, z][[All, 2]]]]
```

```
poc[20, z] /. z → -3
```

```
121
```

```
N@Sum[-1 / r, {r, pocrootsa[200]}]
```

$$0.690653 - 6.93889 \times 10^{-18}\, i$$

```
Log[2.]
```

```
0.693147
```

```
N@Sum[-1 / r, {r, pocrootsa[400]}]
```

$$0.691899 + 0.\, i$$

```
N[pocrootsa[400]]
```

$$\{-0.9793 - 0.434766\, i,\ -0.9793 + 0.434766\, i,\ -0.835982 - 1.34513\, i,\ -0.835982 + 1.34513\, i,$$
$$-0.606245 - 2.32191\, i,\ -0.606245 + 2.32191\, i,\ -0.319084 - 3.35336\, i,\ -0.319084 + 3.35336\, i,$$
$$0.0139939 - 4.42949\, i,\ 0.0139939 + 4.42949\, i,\ 0.386915 - 5.5436\, i,\ 0.386915 + 5.5436\, i,$$
$$0.795861 - 6.69094\, i,\ 0.795861 + 6.69094\, i,\ 1.23818 - 7.86792\, i,\ 1.23818 + 7.86792\, i,$$
$$1.71192 - 9.0717\, i,\ 1.71192 + 9.0717\, i,\ 2.21557 - 10.3\, i,\ 2.21557 + 10.3\, i,$$
$$2.74793 - 11.551\, i,\ 2.74793 + 11.551\, i,\ 3.30801 - 12.8229\, i,\ 3.30801 + 12.8229\, i,$$
$$3.89499 - 14.1144\, i,\ 3.89499 + 14.1144\, i,\ 4.50817 - 15.4244\, i,\ 4.50817 + 15.4244\, i,$$
$$5.14697 - 16.7516\, i,\ 5.14697 + 16.7516\, i,\ 5.81088 - 18.0952\, i,\ 5.81088 + 18.0952\, i,$$
$$6.49943 - 19.4543\, i,\ 6.49943 + 19.4543\, i,\ 7.21223 - 20.828\, i,\ 7.21223 + 20.828\, i,$$
$$7.94895 - 22.2157\, i,\ 7.94895 + 22.2157\, i,\ 8.70926 - 23.6167\, i,\ 8.70926 + 23.6167\, i,$$
$$9.49289 - 25.0304\, i,\ 9.49289 + 25.0304\, i,\ 10.2996 - 26.4562\, i,\ 10.2996 + 26.4562\, i,$$
$$11.1291 - 27.8935\, i,\ 11.1291 + 27.8935\, i,\ 11.9813 - 29.3419\, i,\ 11.9813 + 29.3419\, i,$$
$$12.856 - 30.8009\, i,\ 12.856 + 30.8009\, i,\ 13.7529 - 32.2701\, i,\ 13.7529 + 32.2701\, i,$$
$$14.6721 - 33.7489\, i,\ 14.6721 + 33.7489\, i,\ 15.6132 - 35.2371\, i,\ 15.6132 + 35.2371\, i,$$
$$16.5762 - 36.7343\, i,\ 16.5762 + 36.7343\, i,\ 17.561 - 38.24\, i,\ 17.561 + 38.24\, i,$$

18.5676 − 39.754 i, 18.5676 + 39.754 i, 19.5957 − 41.2758 i, 19.5957 + 41.2758 i,
20.6453 − 42.8053 i, 20.6453 + 42.8053 i, 21.7164 − 44.342 i, 21.7164 + 44.342 i,
22.8089 − 45.8857 i, 22.8089 + 45.8857 i, 23.9228 − 47.436 i, 23.9228 + 47.436 i,
25.0579 − 48.9928 i, 25.0579 + 48.9928 i, 26.2143 − 50.5557 i, 26.2143 + 50.5557 i,
27.3919 − 52.1245 i, 27.3919 + 52.1245 i, 28.5907 − 53.6989 i, 28.5907 + 53.6989 i,
29.8106 − 55.2786 i, 29.8106 + 55.2786 i, 31.0517 − 56.8635 i, 31.0517 + 56.8635 i,
32.3139 − 58.4532 i, 32.3139 + 58.4532 i, 33.5973 − 60.0476 i, 33.5973 + 60.0476 i,
34.9018 − 61.6465 i, 34.9018 + 61.6465 i, 36.2274 − 63.2495 i, 36.2274 + 63.2495 i,
37.5741 − 64.8565 i, 37.5741 + 64.8565 i, 38.9419 − 66.4673 i, 38.9419 + 66.4673 i,
40.3309 − 68.0816 i, 40.3309 + 68.0816 i, 41.7411 − 69.6993 i, 41.7411 + 69.6993 i,
43.1725 − 71.3201 i, 43.1725 + 71.3201 i, 44.6251 − 72.9438 i, 44.6251 + 72.9438 i,
46.0989 − 74.5703 i, 46.0989 + 74.5703 i, 47.594 − 76.1993 i, 47.594 + 76.1993 i,
49.1104 − 77.8307 i, 49.1104 + 77.8307 i, 50.6482 − 79.4642 i, 50.6482 + 79.4642 i,
52.2074 − 81.0996 i, 52.2074 + 81.0996 i, 53.788 − 82.7369 i, 53.788 + 82.7369 i,
55.3901 − 84.3757 i, 55.3901 + 84.3757 i, 57.0138 − 86.0159 i, 57.0138 + 86.0159 i,
58.6591 − 87.6572 i, 58.6591 + 87.6572 i, 60.326 − 89.2996 i, 60.326 + 89.2996 i,
62.0147 − 90.9428 i, 62.0147 + 90.9428 i, 63.7252 − 92.5867 i, 63.7252 + 92.5867 i,
65.4576 − 94.231 i, 65.4576 + 94.231 i, 67.2119 − 95.8755 i, 67.2119 + 95.8755 i,
68.9882 − 97.5202 i, 68.9882 + 97.5202 i, 70.7866 − 99.1647 i, 70.7866 + 99.1647 i,
72.6072 − 100.809 i, 72.6072 + 100.809 i, 74.4501 − 102.453 i, 74.4501 + 102.453 i,
76.3153 − 104.096 i, 76.3153 + 104.096 i, 78.203 − 105.738 i, 78.203 + 105.738 i,
80.1133 − 107.379 i, 80.1133 + 107.379 i, 82.0462 − 109.019 i, 82.0462 + 109.019 i,
84.0019 − 110.658 i, 84.0019 + 110.658 i, 85.9805 − 112.295 i, 85.9805 + 112.295 i,
87.9821 − 113.93 i, 87.9821 + 113.93 i, 90.0067 − 115.563 i, 90.0067 + 115.563 i,
92.0546 − 117.194 i, 92.0546 + 117.194 i, 94.1259 − 118.823 i, 94.1259 + 118.823 i,
96.2206 − 120.449 i, 96.2206 + 120.449 i, 98.3389 − 122.072 i, 98.3389 + 122.072 i,
100.481 − 123.693 i, 100.481 + 123.693 i, 102.647 − 125.31 i, 102.647 + 125.31 i,
104.837 − 126.924 i, 104.837 + 126.924 i, 107.051 − 128.534 i, 107.051 + 128.534 i,
109.29 − 130.14 i, 109.29 + 130.14 i, 111.553 − 131.742 i, 111.553 + 131.742 i,
113.84 − 133.341 i, 113.84 + 133.341 i, 116.153 − 134.934 i, 116.153 + 134.934 i,
118.49 − 136.523 i, 118.49 + 136.523 i, 120.853 − 138.107 i, 120.853 + 138.107 i,
123.241 − 139.686 i, 123.241 + 139.686 i, 125.655 − 141.26 i, 125.655 + 141.26 i,
128.094 − 142.828 i, 128.094 + 142.828 i, 130.559 − 144.39 i, 130.559 + 144.39 i,
133.05 − 145.946 i, 133.05 + 145.946 i, 135.568 − 147.496 i, 135.568 + 147.496 i,
138.113 − 149.039 i, 138.113 + 149.039 i, 140.684 − 150.575 i, 140.684 + 150.575 i,
143.282 − 152.105 i, 143.282 + 152.105 i, 145.907 − 153.627 i, 145.907 + 153.627 i,
148.56 − 155.141 i, 148.56 + 155.141 i, 151.241 − 156.647 i, 151.241 + 156.647 i,
153.949 − 158.145 i, 153.949 + 158.145 i, 156.686 − 159.635 i, 156.686 + 159.635 i,
159.452 − 161.116 i, 159.452 + 161.116 i, 162.246 − 162.587 i, 162.246 + 162.587 i,
165.07 − 164.05 i, 165.07 + 164.05 i, 167.923 − 165.502 i, 167.923 + 165.502 i,
170.806 − 166.945 i, 170.806 + 166.945 i, 173.718 − 168.377 i, 173.718 + 168.377 i,
176.661 − 169.798 i, 176.661 + 169.798 i, 179.635 − 171.208 i, 179.635 + 171.208 i,
182.64 − 172.607 i, 182.64 + 172.607 i, 185.677 − 173.994 i, 185.677 + 173.994 i,
188.745 − 175.368 i, 188.745 + 175.368 i, 191.845 − 176.73 i, 191.845 + 176.73 i,
194.978 − 178.08 i, 194.978 + 178.08 i, 198.144 − 179.415 i, 198.144 + 179.415 i,
201.343 − 180.737 i, 201.343 + 180.737 i, 204.577 − 182.044 i, 204.577 + 182.044 i,
207.844 − 183.337 i, 207.844 + 183.337 i, 211.146 − 184.614 i, 211.146 + 184.614 i,
214.484 − 185.876 i, 214.484 + 185.876 i, 217.857 − 187.122 i, 217.857 + 187.122 i,
221.267 − 188.351 i, 221.267 + 188.351 i, 224.713 − 189.562 i, 224.713 + 189.562 i,
228.197 − 190.756 i, 228.197 + 190.756 i, 231.719 − 191.931 i, 231.719 + 191.931 i,
235.279 − 193.087 i, 235.279 + 193.087 i, 238.879 − 194.224 i, 238.879 + 194.224 i,
242.518 − 195.341 i, 242.518 + 195.341 i, 246.198 − 196.436 i, 246.198 + 196.436 i,
249.919 − 197.51 i, 249.919 + 197.51 i, 253.681 − 198.562 i, 253.681 + 198.562 i,
257.487 − 199.591 i, 257.487 + 199.591 i, 261.336 − 200.596 i, 261.336 + 200.596 i,
265.229 − 201.577 i, 265.229 + 201.577 i, 269.167 − 202.532 i, 269.167 + 202.532 i,
273.152 − 203.461 i, 273.152 + 203.461 i, 277.183 − 204.362 i, 277.183 + 204.362 i,

```
 281.262 - 205.236 i, 281.262 + 205.236 i, 285.39 - 206.08 i, 285.39 + 206.08 i,
 289.567 - 206.895 i, 289.567 + 206.895 i, 293.796 - 207.678 i, 293.796 + 207.678 i,
 298.077 - 208.429 i, 298.077 + 208.429 i, 302.412 - 209.147 i, 302.412 + 209.147 i,
 306.801 - 209.83 i, 306.801 + 209.83 i, 311.246 - 210.477 i, 311.246 + 210.477 i,
 315.749 - 211.086 i, 315.749 + 211.086 i, 320.311 - 211.657 i, 320.311 + 211.657 i,
 324.933 - 212.188 i, 324.933 + 212.188 i, 329.617 - 212.677 i, 329.617 + 212.677 i,
 334.365 - 213.122 i, 334.365 + 213.122 i, 339.179 - 213.523 i, 339.179 + 213.523 i,
 344.06 - 213.876 i, 344.06 + 213.876 i, 349.011 - 214.18 i, 349.011 + 214.18 i,
 354.034 - 214.433 i, 354.034 + 214.433 i, 359.131 - 214.633 i, 359.131 + 214.633 i,
 364.304 - 214.778 i, 364.304 + 214.778 i, 369.557 - 214.864 i, 369.557 + 214.864 i,
 374.892 - 214.889 i, 374.892 + 214.889 i, 380.312 - 214.851 i, 380.312 + 214.851 i,
 385.82 - 214.747 i, 385.82 + 214.747 i, 391.42 - 214.573 i, 391.42 + 214.573 i,
 397.115 - 214.325 i, 397.115 + 214.325 i, 402.909 - 214.001 i, 402.909 + 214.001 i,
 408.807 - 213.596 i, 408.807 + 213.596 i, 414.812 - 213.106 i, 414.812 + 213.106 i,
 420.931 - 212.525 i, 420.931 + 212.525 i, 427.169 - 211.85 i, 427.169 + 211.85 i,
 433.531 - 211.075 i, 433.531 + 211.075 i, 440.024 - 210.193 i, 440.024 + 210.193 i,
 446.655 - 209.198 i, 446.655 + 209.198 i, 453.432 - 208.084 i, 453.432 + 208.084 i,
 460.363 - 206.841 i, 460.363 + 206.841 i, 467.458 - 205.462 i, 467.458 + 205.462 i,
 474.728 - 203.937 i, 474.728 + 203.937 i, 482.184 - 202.255 i, 482.184 + 202.255 i,
 489.84 - 200.404 i, 489.84 + 200.404 i, 497.71 - 198.37 i, 497.71 + 198.37 i,
 505.813 - 196.138 i, 505.813 + 196.138 i, 514.166 - 193.692 i, 514.166 + 193.692 i,
 522.794 - 191.009 i, 522.794 + 191.009 i, 531.722 - 188.068 i, 531.722 + 188.068 i,
 540.98 - 184.842 i, 540.98 + 184.842 i, 550.606 - 181.298 i, 550.606 + 181.298 i,
 560.643 - 177.397 i, 560.643 + 177.397 i, 571.145 - 173.095 i, 571.145 + 173.095 i,
 582.179 - 168.334 i, 582.179 + 168.334 i, 593.827 - 163.042 i, 593.827 + 163.042 i,
 606.2 - 157.129 i, 606.2 + 157.129 i, 619.443 - 150.472 i, 619.443 + 150.472 i,
 633.758 - 142.908 i, 633.758 + 142.908 i, 649.442 - 134.199 i, 649.442 + 134.199 i,
 666.956 - 123.985 i, 666.956 + 123.985 i, 687.102 - 111.665 i, 687.102 + 111.665 i,
 711.506 - 96.086 i, 711.506 + 96.086 i, 744.694 - 74.3335 i, 744.694 + 74.3335 i}
```

```
N@Product[1 - 1 / r, {r, pocrootsa[400]}]
```

$$2. + 7.49717 \times 10^{-17}\, i$$

```
N@2^ZetaZero[1]
```

$$-1.31714 - 0.514916\, i$$

```
colfunc = ColorData["AvocadoColors"];
pts1 = Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocrootsa[400], {n, 1, 1}];
Graphics[pts1, Frame → True]
```


```
Sum[Binomial[-ZetaZero[1], k], {k, 0, Infinity}]
```

Sum::div : Sum does not converge. ≫

$$\sum_{k=0}^{\infty} \text{Binomial}[-\text{ZetaZero}[1], k]$$

Sum::div : Sum does not converge. ≫

$$\sum_{k=0}^{\infty} \text{Binomial}[-0.5 + 14.\,i, k]$$

```
1 / 2^ZetaZero[1]
```

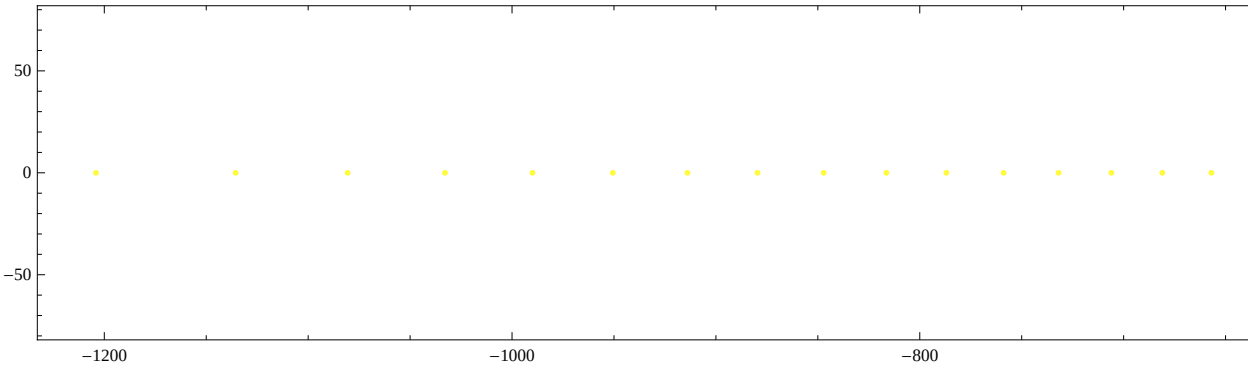
$$2^{-\text{ZetaZero}[1]}$$

```
Clear[px, pz, t]
t[n_, a_, b_] :=
 t[n, a, b] = b (Floor[n / b] - Floor[(n - 1) / b]) - a (Floor[n / a] - Floor[(n - 1) / a])
px[n_, a_, b_, k_] := px[n, a, b, k] = Sum[t[j, a, b] / j px[n - j, a, b, k - 1], {j, 1, n - 1}]
px[n_, a_, b_, 1] := t[n, a, b] / n
px[n_, a_, b_, 0] := 0
pz[n_, a_, b_, z_] := Sum[ z^k / k! px[n, a, b, k], {k, 0, n}]
pz[n_, a_, b_, 0] := 1
pz[0, a_, b_, z_] := 1
```

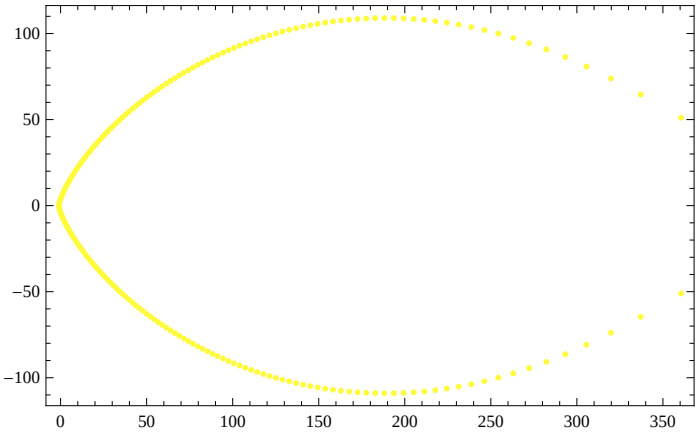
```
N@pocxrootsa[200, 3, 1]
```

```
{-1204.08, -1135.59, -1080.62, -1032.89, -989.963, -950.57, -913.949, -879.593, -847.143,
 -816.333, -786.96, -758.862, -731.91, -705.997, -681.034, -656.945, -633.666, -611.141,
 -589.321, -568.163, -547.631, -527.689, -508.307, -489.459, -471.12, -453.267,
 -435.881, -418.941, -402.433, -386.338, -370.644, -355.337, -340.404, -325.833,
 -311.614, -297.737, -284.192, -270.971, -258.065, -245.466, -233.167, -221.162,
 -209.443, -198.004, -186.84, -175.946, -165.315, -154.943, -144.826, -134.958,
 -125.336, -115.956, -106.813, -97.9042, -89.2261, -80.7753, -72.5486, -64.5429,
 -56.7553, -49.1832, -41.8239, -34.6748, -27.7336, -20.998, -14.4656, -8.13457,
 -0.780608 - 1.08241 i, -0.780608 + 1.08241 i, -0.37672 - 2.13676 i, -0.37672 + 2.13676 i,
 0.116421 - 3.22249 i, 0.116421 + 3.22249 i, 0.685648 - 4.33882 i, 0.685648 + 4.33882 i,
 1.32446 - 5.48178 i, 1.32446 + 5.48178 i, 2.02732 - 6.64776 i, 2.02732 + 6.64776 i,
 2.78964 - 7.83337 i, 2.78964 + 7.83337 i, 3.6079 - 9.03544 i, 3.6079 + 9.03544 i,
 4.47946 - 10.2512 i, 4.47946 + 10.2512 i, 5.40234 - 11.4784 i, 5.40234 + 11.4784 i,
 6.37498 - 12.7148 i, 6.37498 + 12.7148 i, 7.39615 - 13.9588 i, 7.39615 + 13.9588 i,
 8.46486 - 15.2087 i, 8.46486 + 15.2087 i, 9.58035 - 16.4631 i, 9.58035 + 16.4631 i,
 10.742 - 17.7206 i, 10.742 + 17.7206 i, 11.9493 - 18.9799 i, 11.9493 + 18.9799 i,
 13.2021 - 20.2398 i, 13.2021 + 20.2398 i, 14.4999 - 21.4993 i, 14.4999 + 21.4993 i,
 15.8428 - 22.7572 i, 15.8428 + 22.7572 i, 17.2308 - 24.0123 i, 17.2308 + 24.0123 i,
 18.6638 - 25.2636 i, 18.6638 + 25.2636 i, 20.142 - 26.5102 i, 20.142 + 26.5102 i,
 21.6658 - 27.7508 i, 21.6658 + 27.7508 i, 23.2353 - 28.9844 i, 23.2353 + 28.9844 i,
 24.851 - 30.2099 i, 24.851 + 30.2099 i, 26.5135 - 31.4263 i, 26.5135 + 31.4263 i,
 28.2232 - 32.6323 i, 28.2232 + 32.6323 i, 29.9808 - 33.8269 i, 29.9808 + 33.8269 i,
 31.787 - 35.0087 i, 31.787 + 35.0087 i, 33.6428 - 36.1765 i, 33.6428 + 36.1765 i,
 35.5489 - 37.329 i, 35.5489 + 37.329 i, 37.5065 - 38.4647 i, 37.5065 + 38.4647 i,
 39.5168 - 39.5822 i, 39.5168 + 39.5822 i, 41.5809 - 40.6798 i, 41.5809 + 40.6798 i,
 43.7004 - 41.756 i, 43.7004 + 41.756 i, 45.8767 - 42.8089 i, 45.8767 + 42.8089 i,
 48.1116 - 43.8366 i, 48.1116 + 43.8366 i, 50.4071 - 44.837 i, 50.4071 + 44.837 i,
 52.7651 - 45.8078 i, 52.7651 + 45.8078 i, 55.1881 - 46.7466 i, 55.1881 + 46.7466 i,
 57.6786 - 47.6507 i, 57.6786 + 47.6507 i, 60.2396 - 48.5173 i, 60.2396 + 48.5173 i,
 62.8741 - 49.343 i, 62.8741 + 49.343 i, 65.5858 - 50.1244 i, 65.5858 + 50.1244 i,
 68.3787 - 50.8575 i, 68.3787 + 50.8575 i, 71.2574 - 51.5379 i, 71.2574 + 51.5379 i,
 74.227 - 52.1608 i, 74.227 + 52.1608 i, 77.2933 - 52.7205 i, 77.2933 + 52.7205 i,
 80.463 - 53.2108 i, 80.463 + 53.2108 i, 83.7438 - 53.6246 i, 83.7438 + 53.6246 i,
 87.1447 - 53.9536 i, 87.1447 + 53.9536 i, 90.676 - 54.1883 i, 90.676 + 54.1883 i,
 94.3501 - 54.3176 i, 94.3501 + 54.3176 i, 98.1817 - 54.3283 i, 98.1817 + 54.3283 i,
 102.188 - 54.2048 i, 102.188 + 54.2048 i, 106.392 - 53.9281 i, 106.392 + 53.9281 i,
 110.82 - 53.4748 i, 110.82 + 53.4748 i, 115.506 - 52.8156 i, 115.506 + 52.8156 i,
 120.496 - 51.9131 i, 120.496 + 51.9131 i, 125.848 - 50.7177 i, 125.848 + 50.7177 i,
 131.647 - 49.162 i, 131.647 + 49.162 i, 138.014 - 47.1493 i, 138.014 + 47.1493 i,
 145.141 - 44.5327 i, 145.141 + 44.5327 i, 153.358 - 41.0673 i, 153.358 + 41.0673 i,
 163.339 - 36.2828 i, 163.339 + 36.2828 i, 176.961 - 28.9948 i, 176.961 + 28.9948 i, -2., -1.}
```

```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 3, 1], {n, 1, 1}],
 Frame → True]
```




```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 2, 1], {n, 1, 1}],
 Frame → True]
```




```
N@Sum[ -1 / r, {r, pocxrootsa[200, 3, 1]}]
```

```
1.1036 + 0. i
```

```
Chop@N@Product[1 - 1 / r, {r, pocxrootsa[200, 3, 1]}]
```

```
3.
```

```
N@Sum[ -1 / r, {r, pocxrootsa[200, 4, 1]}]
```

```
1.37883 + 0. i
```

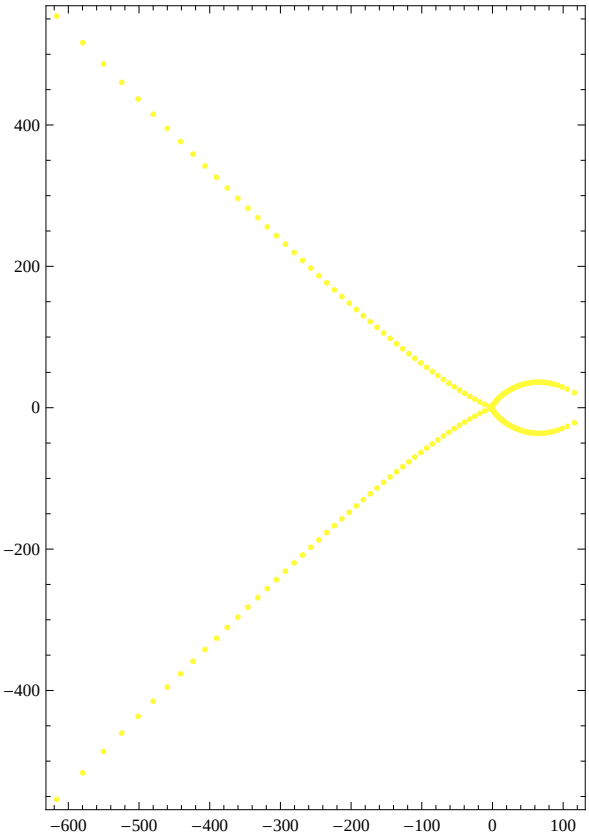
```
Chop@N@Product[1 - 1 / r, {r, pocxrootsa[200, 4, 1]}]
```

```
4.
```

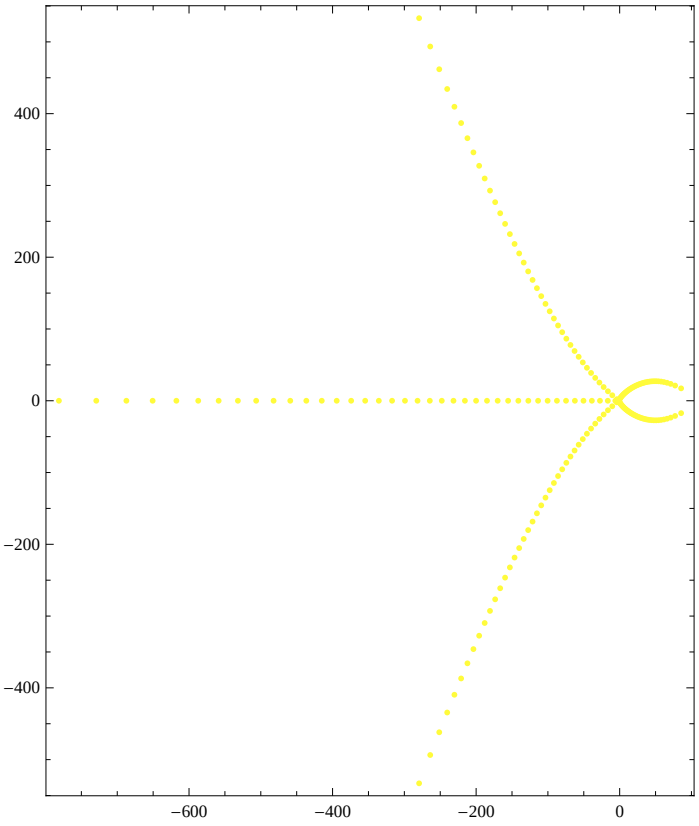
```
Log[4.]
```

```
1.38629
```

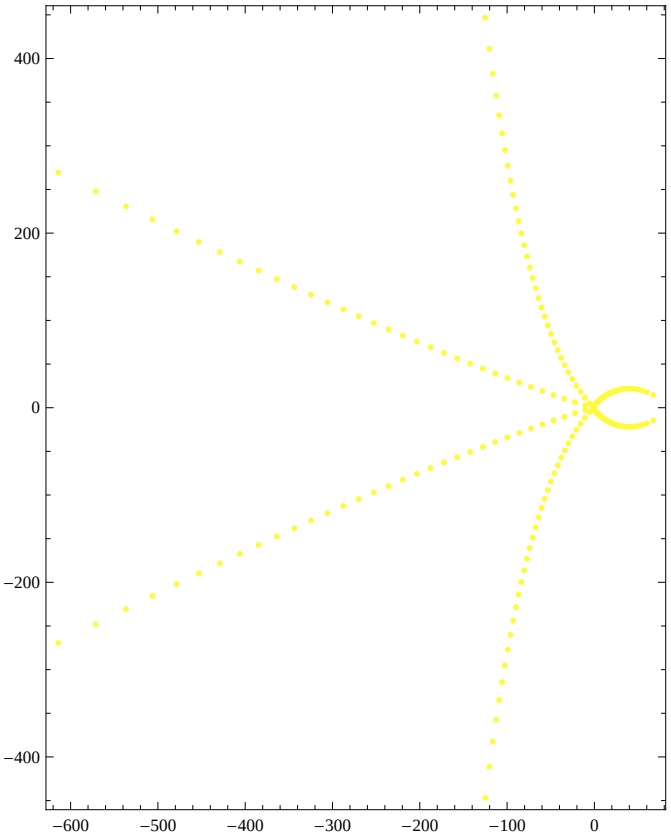
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 4, 1], {n, 1, 1}],
 Frame → True]
```



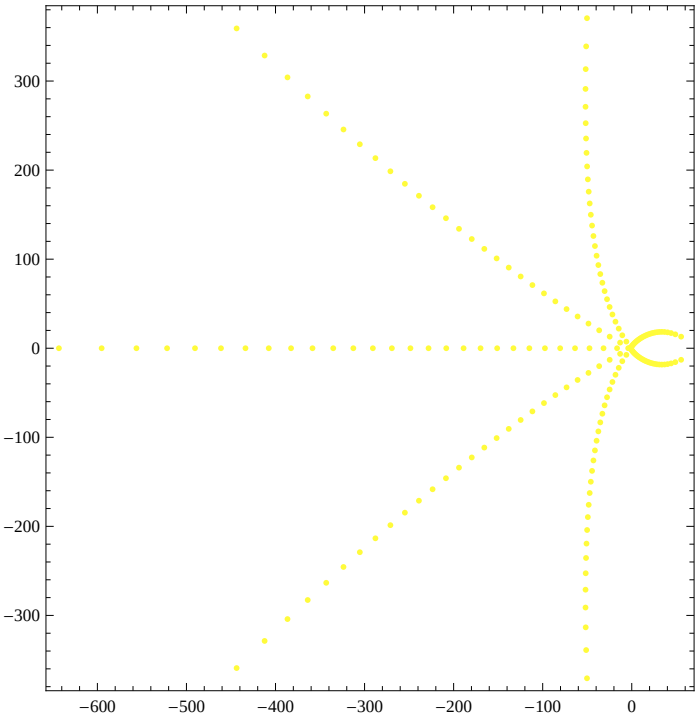
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 5, 1], {n, 1, 1}],
 Frame → True]
```



```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 6, 1], {n, 1, 1}],
 Frame → True]
```

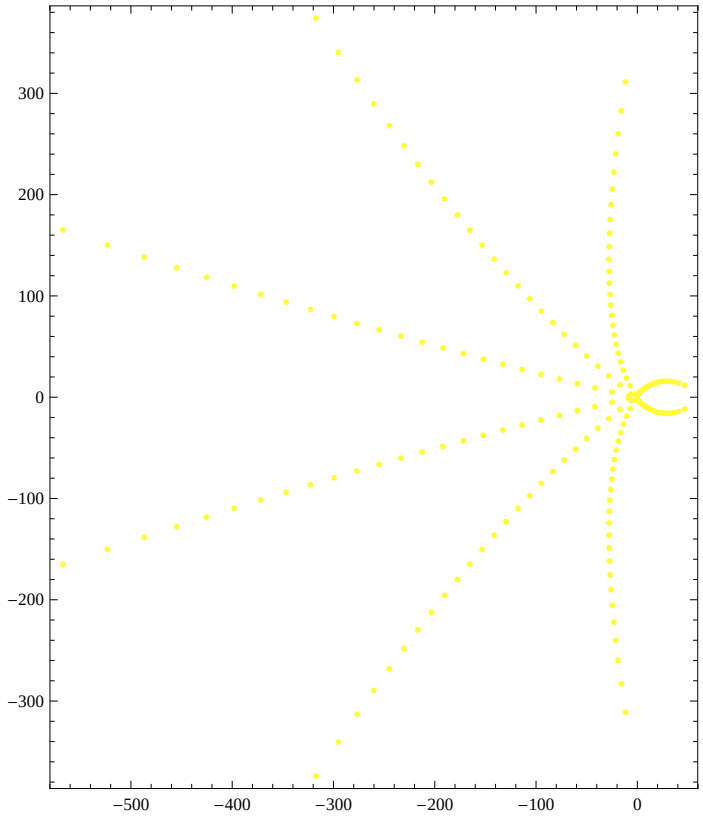


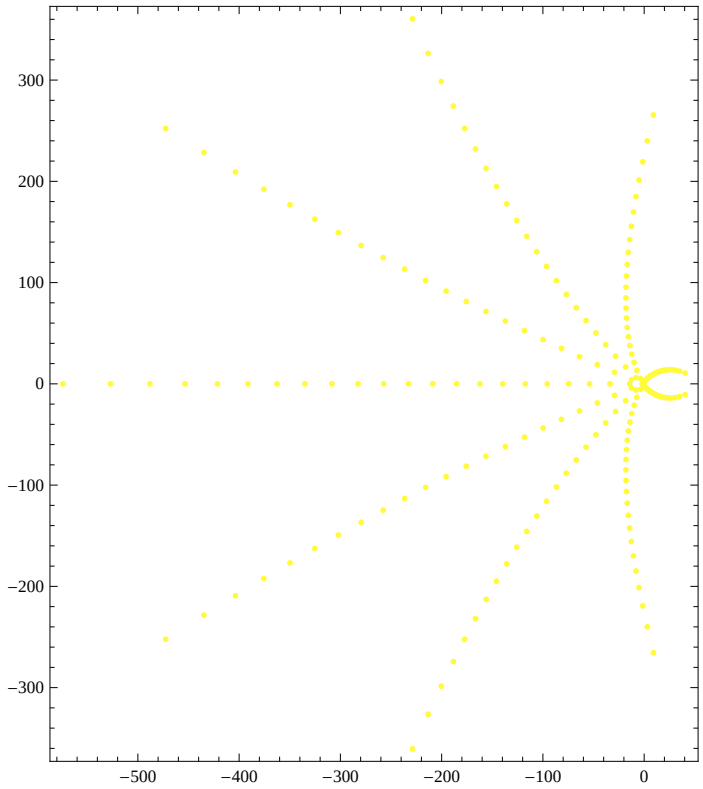
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 7, 1], {n, 1, 1}],
 Frame → True]
```



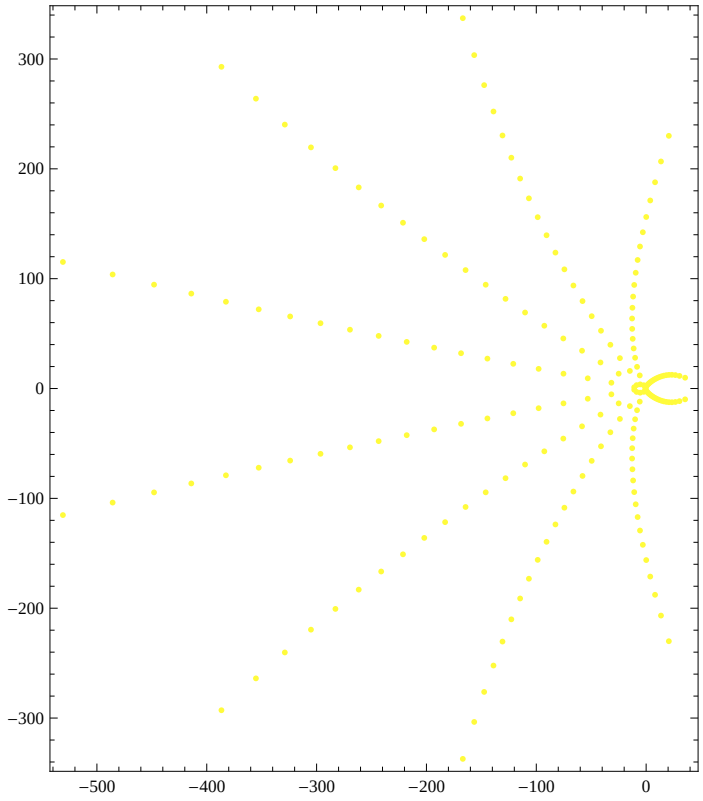

```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 8, 1], {n, 1, 1}],
 Frame → True]
```

```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 9, 1], {n, 1, 1}],
 Frame → True]
```

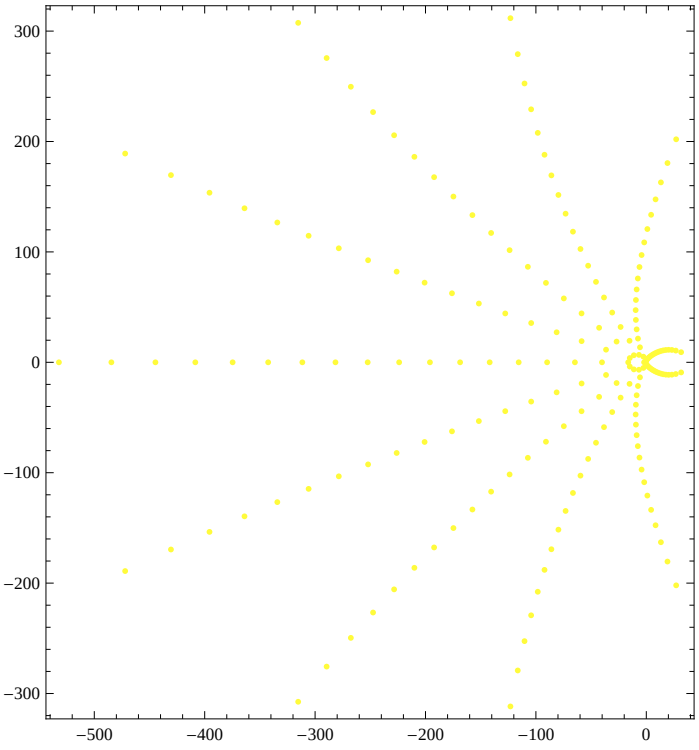

300
200
100
0
−100
−200
−300
−500
−400
−300
−200
−100
0


300
200
100
0
−100
−200
−300
−500
−400
−300
−200
−100
0

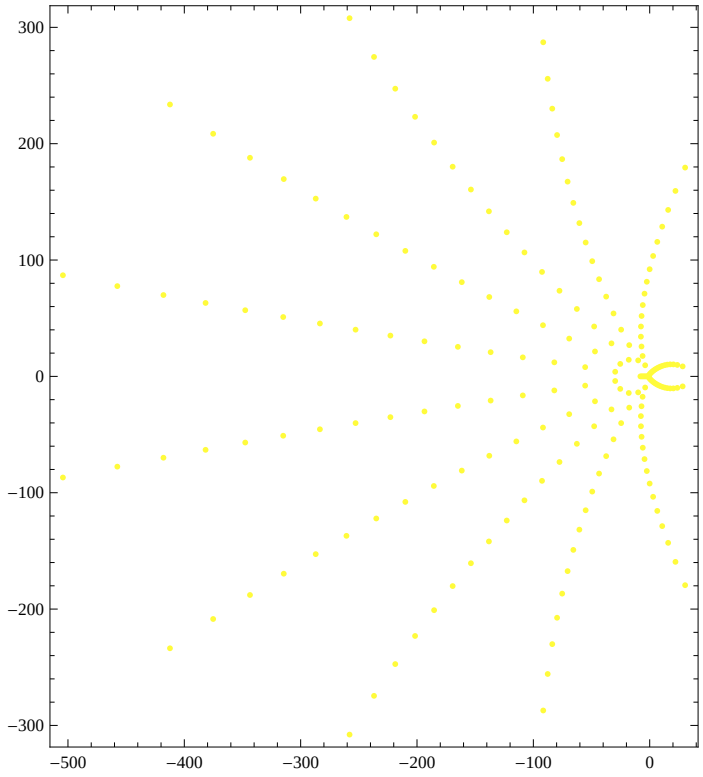
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 10, 1], {n, 1, 1}],
 Frame → True]
```



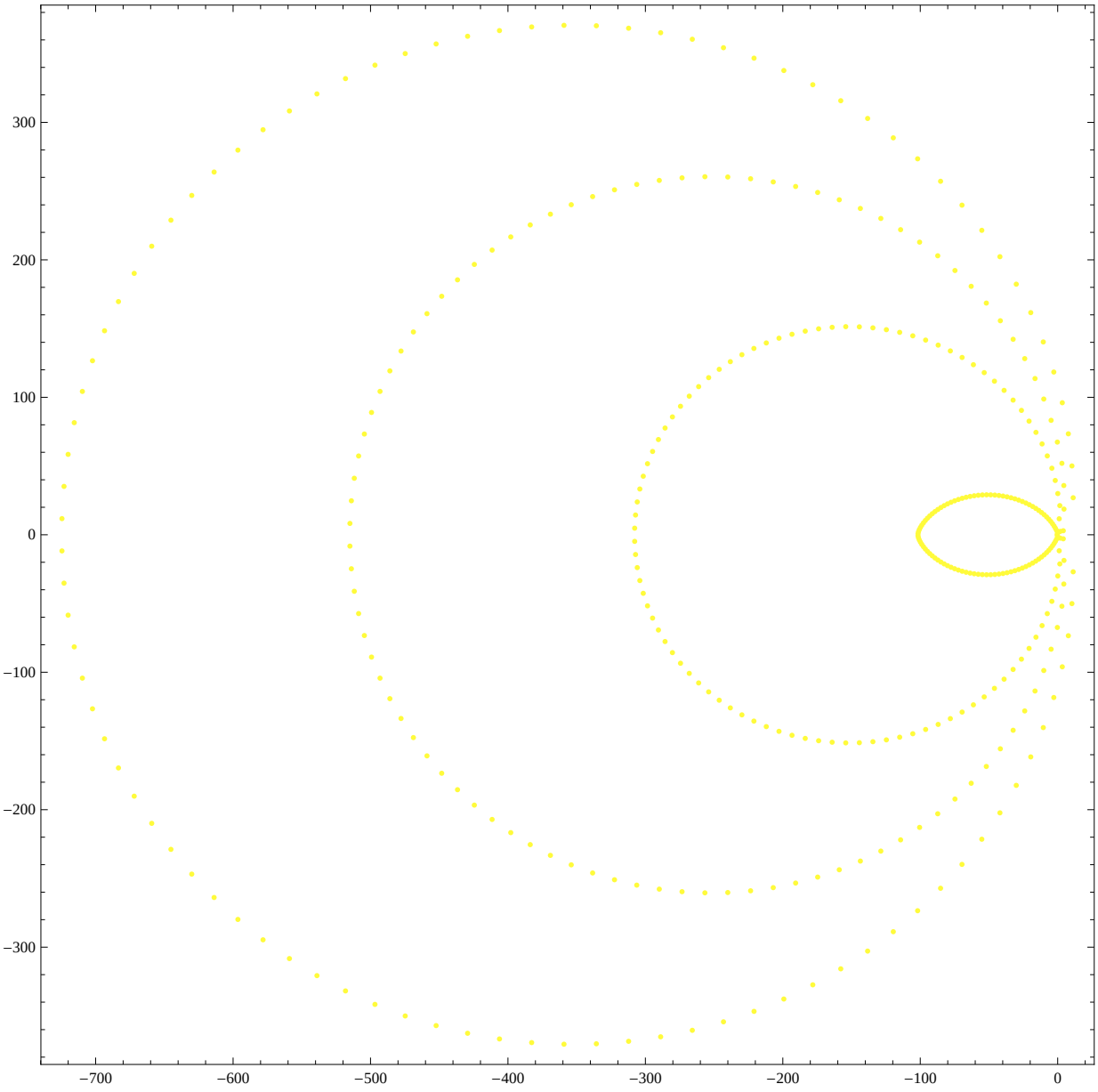
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 11, 1], {n, 1, 1}],
 Frame → True]
```



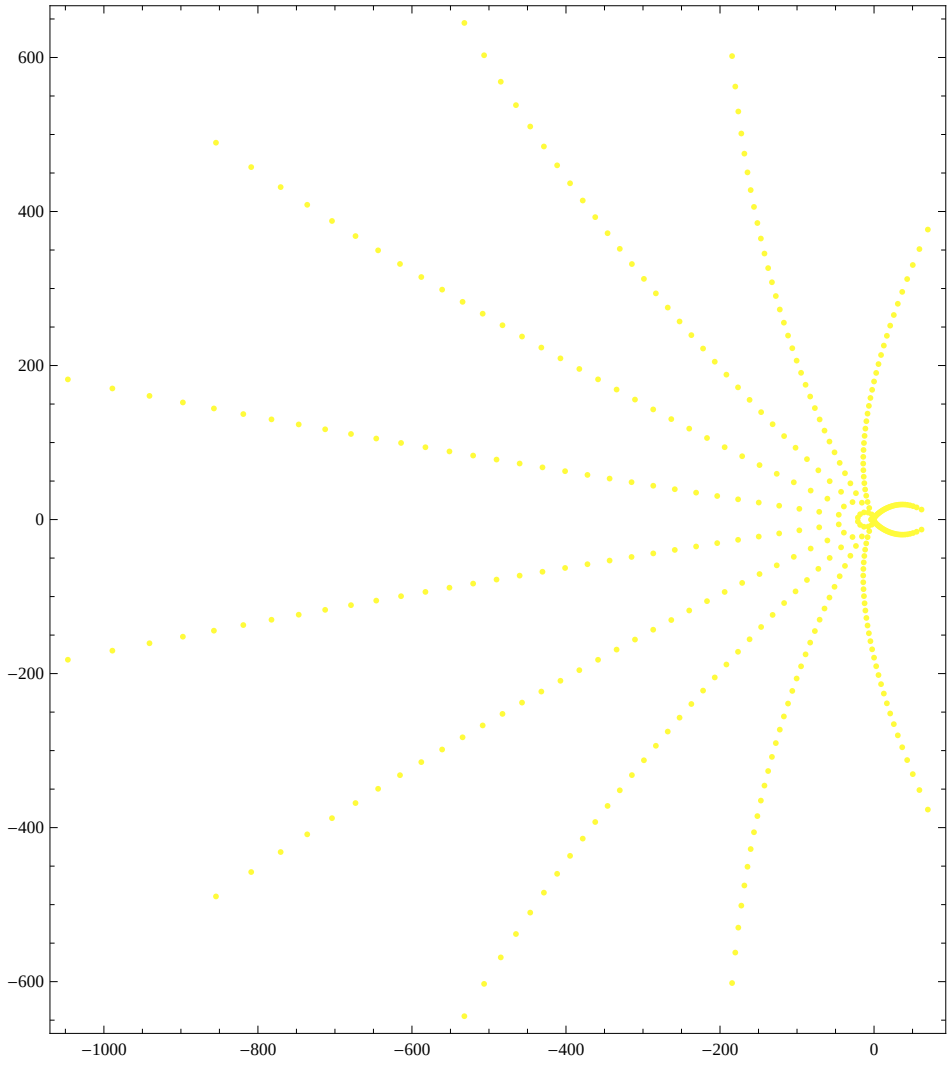
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 12, 1], {n, 1, 1}],
 Frame → True]
```



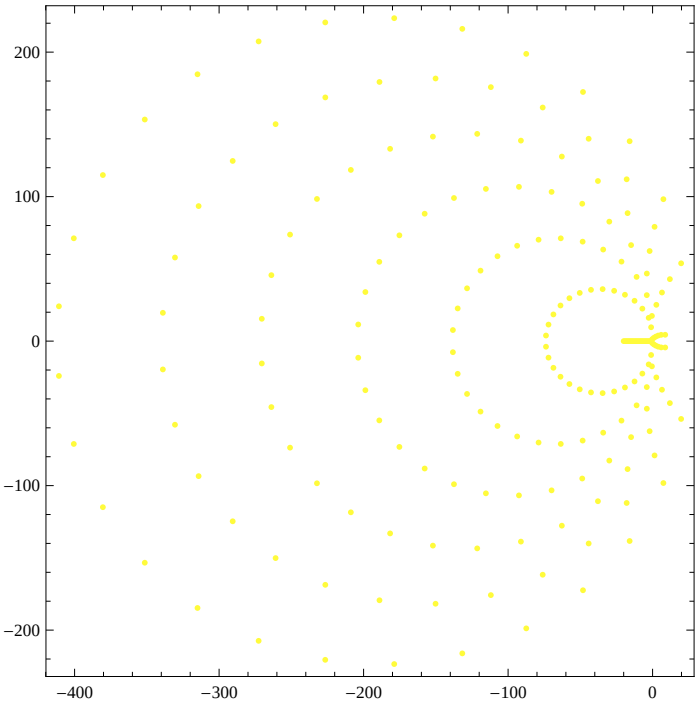
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[400, 100, 1], {n, 1, 1}],
 Frame → True]
```



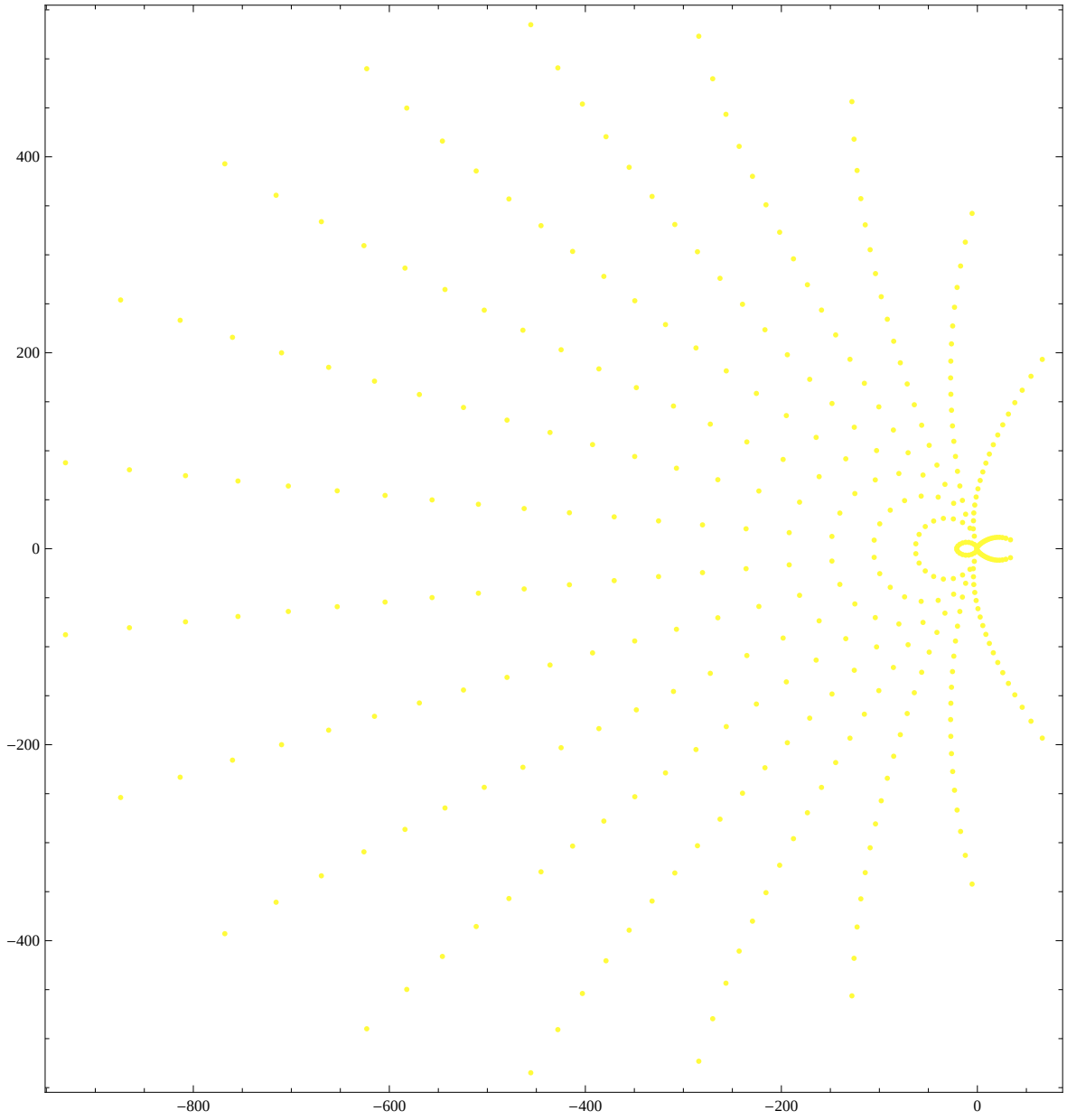
```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[400, 12, 1], {n, 1, 1}],
 Frame → True]
```



```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[200, 30, 1], {n, 1, 1}],
 Frame → True]
```



```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[400, 20, 1], {n, 1, 1}],
 Frame → True]
```




```
poccrootsa[8]
```

```
{-8, -7, -6, -5, -4, -3, -2, -1}
```

```
Expand@pocc[8, z]
```

$$1+\frac{761\,z}{280}+\frac{29\,531\,z^2}{10\,080}+\frac{267\,z^3}{160}+\frac{1069\,z^4}{1920}+\frac{9\,z^5}{80}+\frac{13\,z^6}{960}+\frac{z^7}{1120}+\frac{z^8}{40\,320}$$

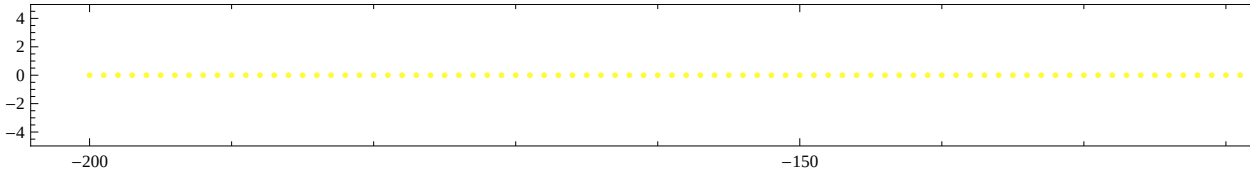
```
Expand@(Product[(z + k), {k, 1, 8}] / 8!)
```

$$1 + \frac{761\,z}{280} + \frac{29\,531\,z^2}{10\,080} + \frac{267\,z^3}{160} + \frac{1069\,z^4}{1920} + \frac{9\,z^5}{80} + \frac{13\,z^6}{960} + \frac{z^7}{1120} + \frac{z^8}{40\,320}$$

```
Expand[Pochhammer[z + 1, 8] / 8!]
```

$$1 + \frac{761\,z}{280} + \frac{29\,531\,z^2}{10\,080} + \frac{267\,z^3}{160} + \frac{1069\,z^4}{1920} + \frac{9\,z^5}{80} + \frac{13\,z^6}{960} + \frac{z^7}{1120} + \frac{z^8}{40\,320}$$

```
Graphics[Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@poccrootsa[200], {n, 1, 1}],
 Frame → True]
```




```
Graphics[
 Table[{colfunc[100], Point[{Re[#], Im[#]}]} & /@ N@pocxrootsa[20, 20, 1], {n, 1, 1}],
 Frame → True]
```

```
pts4 = Table[{Point[{Re[#], Im[#]}]} & /@ pocxrootsa[n, 12, 1], {n, 1, 200}];
```

```
ListAnimate[Table[Graphics[pts4[[k]], Frame → True, Axes → True,
   AxesOrigin → {0, 0}, PlotRange → {{-1000, 100}, {-500, 500}}], {k, 1, Length[pts4]}]]
```

```
pts4
```

```
pocx[50, 1, 2, -4]
```

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