Midterm Exam R12522615 王邑安 ID:2

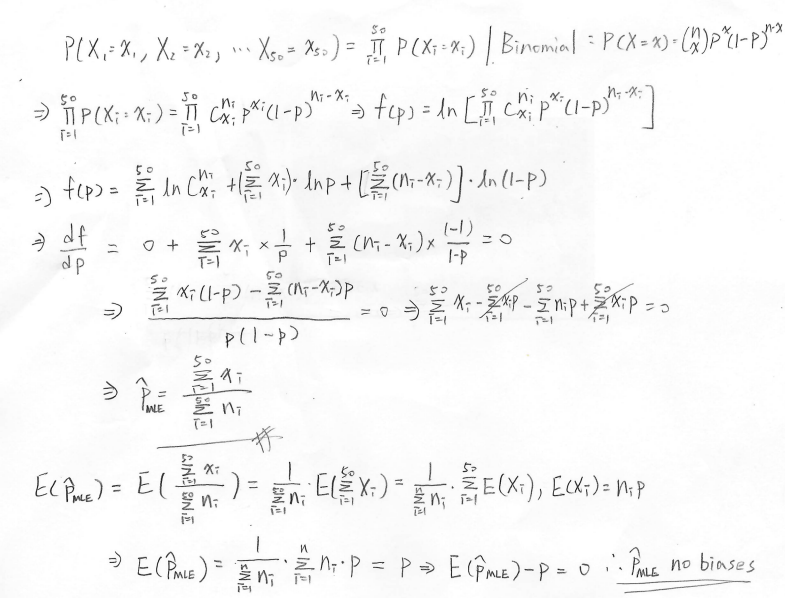


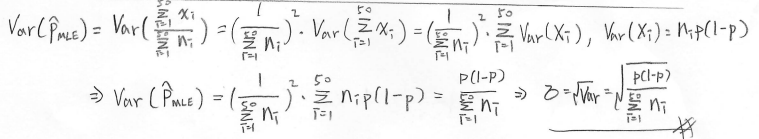
Assumption:

* IDD assumption in each term: Every winning set has identical probability to be chosen independently each term.
* IDD assumption in choosing a number each time: Every number has the identical probability to be chosen independently each time.

There are totally outcomes in Big Lotto. To win the fifth prize, four of six numbers should be the winning numbers in the first set, and the rest should not be the winning numbers. Also, the rest numbers should not be the special number. The probability of fifth prize will be:







|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 開獎日 | 金額 | 注數 | 5獎中獎數 | 開獎日 | 金額 | 注數 | 5獎中獎數 |
| 2024/4/23 | 94533100.00 | 1890662 | 1659 | 2024/2/16 | 188302250.00 | 3766045 | 2846 |
| 2024/4/19 | 91260750.00 | 1825215 | 1736 | 2024/2/15 | 197336000.00 | 3946720 | 3977 |
| 2024/4/16 | 93796550.00 | 1875931 | 1750 | 2024/2/14 | 272001450.00 | 5440029 | 5332 |
| 2024/4/12 | 94919950.00 | 1898399 | 2037 | 2024/2/13 | 190351800.00 | 3807036 | 3120 |
| 2024/4/9 | 110857850.00 | 2217157 | 2101 | 2024/2/12 | 248903050.00 | 4978061 | 3965 |
| 2024/4/9 | 101158800.00 | 2023176 | 1686 | 2024/2/11 | 271083500.00 | 5421670 | 4520 |
| 2024/4/2 | 102237750.00 | 2044755 | 1676 | 2024/2/10 | 311420200.00 | 6228404 | 6475 |
| 2024/3/29 | 98140150.00 | 1962803 | 1608 | 2024/2/9 | 289130550.00 | 5782611 | 5955 |
| 2024/3/26 | 98682250.00 | 1973645 | 1758 | 2024/2/8 | 183653950.00 | 3673079 | 3322 |
| 2024/3/22 | 100908850.00 | 2018177 | 1537 | 2024/2/7 | 147109300.00 | 2942186 | 2488 |
| 2024/3/19 | 102852250.00 | 2057045 | 1907 | 2024/2/6 | 215438650.00 | 4308773 | 3845 |
| 2024/3/15 | 102625750.00 | 2052515 | 1607 | 2024/2/2 | 108994850.00 | 2179897 | 2302 |
| 2024/3/12 | 147291700.00 | 2945834 | 2391 | 2024/1/30 | 106791850.00 | 2135837 | 1842 |
| 2024/3/8 | 132588250.00 | 2651765 | 2237 | 2024/1/26 | 102419000.00 | 2048380 | 1604 |
| 2024/3/5 | 134655600.00 | 2693112 | 2565 | 2024/1/23 | 92997300.00 | 1859946 | 1712 |
| 2024/3/1 | 119882400.00 | 2397648 | 1873 | 2024/1/19 | 102906750.00 | 2058135 | 2054 |
| 2024/2/27 | 114267850.00 | 2285357 | 1923 | 2024/1/16 | 104587000.00 | 2091740 | 1969 |
| 2024/2/24 | 140742000.00 | 2814840 | 2466 | 2024/1/12 | 104749750.00 | 2094995 | 1719 |
| 2024/2/23 | 154793450.00 | 3095869 | 2878 | 2024/1/9 | 104402400.00 | 2088048 | 1759 |
| 2024/2/22 | 136989650.00 | 2739793 | 2445 | 2024/1/5 | 101273350.00 | 2025467 | 1686 |
| 2024/2/21 | 138635750.00 | 2772715 | 2418 | 2024/1/2 | 94153750.00 | 1883075 | 1708 |
| 2024/2/20 | 156102700.00 | 3122054 | 3003 | 2023/12/29 | 157827150.00 | 3156543 | 2843 |
| 2024/2/19 | 148157600.00 | 2963152 | 2844 | 2023/12/26 | 97816250.00 | 1956325 | 1782 |
| 2024/2/18 | 151708250.00 | 3034165 | 2970 | 2023/12/22 | 92432900.00 | 1848658 | 1366 |
| 2024/2/17 | 164832950.00 | 3296659 | 2931 | 2023/12/19 | 96200900.00 | 1924018 | 1501 |

The estimated is slightly smaller than . If the sample size is bigger, the difference between and may become smaller.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 開獎日 | 注數 | 5獎中獎數 | p\_0 | Binom\_0.05(lb) | Binom\_0.95(ub) | H\_0 | p value |
| 4月23日 | 1890662 | 1659 | 0.000924 | 1678 | 1815 | reject | 0.036783212 |
| 4月19日 | 1825215 | 1736 | 0.000924 | 1618 | 1753 | accept | 0.216631994 |
| 4月16日 | 1875931 | 1750 | 0.000924 | 1664 | 1801 | accept | 0.663771119 |
| 4月12日 | 1898399 | 2037 | 0.000924 | 1685 | 1822 | reject | 3.53433E-11 |
| 4月9日 | 2217157 | 2101 | 0.000924 | 1974 | 2122 | accept | 0.234795063 |
| 4月9日 | 2023176 | 1686 | 0.000924 | 1798 | 1940 | reject | 1.86386E-05 |
| 4月2日 | 2044755 | 1676 | 0.000924 | 1817 | 1960 | reject | 6.63184E-07 |
| 3月29日 | 1962803 | 1608 | 0.000924 | 1743 | 1883 | reject | 1.00443E-06 |
| 3月26日 | 1973645 | 1758 | 0.000924 | 1753 | 1893 | accept | 0.130612747 |
| 3月22日 | 2018177 | 1537 | 0.000924 | 1793 | 1935 | reject | 6.25301E-15 |
| 3月19日 | 2057045 | 1907 | 0.000924 | 1828 | 1972 | accept | 0.857172953 |
| 3月15日 | 2052515 | 1607 | 0.000924 | 1824 | 1967 | reject | 1.07401E-11 |
| 3月12日 | 2945834 | 2391 | 0.000924 | 2635 | 2807 | reject | 1.15881E-10 |
| 3月8日 | 2651765 | 2237 | 0.000924 | 2368 | 2531 | reject | 1.43869E-05 |
| 3月5日 | 2693112 | 2565 | 0.000924 | 2406 | 2570 | accept | 0.117698208 |
| 3月1日 | 2397648 | 1873 | 0.000924 | 2137 | 2292 | reject | 9.86589E-14 |
| 2月27日 | 2285357 | 1923 | 0.000924 | 2035 | 2186 | reject | 3.5491E-05 |
| 2月24日 | 2814840 | 2466 | 0.000924 | 2516 | 2684 | reject | 0.008462791 |
| 2月23日 | 3095869 | 2878 | 0.000924 | 2772 | 2947 | accept | 0.716620647 |
| 2月22日 | 2739793 | 2445 | 0.000924 | 2448 | 2613 | reject | 0.090174759 |
| 2月21日 | 2772715 | 2418 | 0.000924 | 2478 | 2644 | reject | 0.004561883 |
| 2月20日 | 3122054 | 3003 | 0.000924 | 2795 | 2972 | reject | 0.026085194 |
| 2月19日 | 2963152 | 2844 | 0.000924 | 2651 | 2823 | reject | 0.040168196 |
| 2月18日 | 3034165 | 2970 | 0.000924 | 2716 | 2890 | reject | 0.001622759 |
| 2月17日 | 3296659 | 2931 | 0.000924 | 2954 | 3136 | reject | 0.039197372 |
| 2月16日 | 3766045 | 2846 | 0.000924 | 3382 | 3575 | reject | 1.86567E-28 |
| 2月15日 | 3946720 | 3977 | 0.000924 | 3546 | 3745 | reject | 5.60725E-08 |
| 2月14日 | 5440029 | 5332 | 0.000924 | 4908 | 5141 | reject | 1.63267E-05 |
| 2月13日 | 3807036 | 3120 | 0.000924 | 3419 | 3614 | reject | 1.0295E-11 |
| 2月12日 | 4978061 | 3965 | 0.000924 | 4486 | 4709 | reject | 1.2913E-21 |
| 2月11日 | 5421670 | 4520 | 0.000924 | 4891 | 5124 | reject | 2.63272E-12 |
| 2月10日 | 6228404 | 6475 | 0.000924 | 5628 | 5877 | reject | 0 |
| 2月9日 | 5782611 | 5955 | 0.000924 | 5221 | 5461 | reject | 0 |
| 2月8日 | 3673079 | 3322 | 0.000924 | 3297 | 3488 | accept | 0.229797903 |
| 2月7日 | 2942186 | 2488 | 0.000924 | 2632 | 2803 | reject | 8.50784E-06 |
| 2月6日 | 4308773 | 3845 | 0.000924 | 3876 | 4083 | reject | 0.032867625 |
| 2月2日 | 2179897 | 2302 | 0.000924 | 1940 | 2087 | reject | 2.85147E-10 |
| 1月30日 | 2135837 | 1842 | 0.000924 | 1900 | 2046 | reject | 0.003079375 |
| 1月26日 | 2048380 | 1604 | 0.000924 | 1821 | 1964 | reject | 1.17243E-11 |
| 1月23日 | 1859946 | 1712 | 0.000924 | 1650 | 1786 | accept | 0.901597212 |
| 1月19日 | 2058135 | 2054 | 0.000924 | 1829 | 1973 | reject | 0.000493624 |
| 1月16日 | 2091740 | 1969 | 0.000924 | 1860 | 2004 | accept | 0.391054525 |
| 1月12日 | 2094995 | 1719 | 0.000924 | 1863 | 2007 | reject | 6.04172E-07 |
| 1月9日 | 2088048 | 1759 | 0.000924 | 1857 | 2001 | reject | 9.47733E-05 |
| 1月5日 | 2025467 | 1686 | 0.000924 | 1800 | 1942 | reject | 1.49963E-05 |
| 1月2日 | 1883075 | 1708 | 0.000924 | 1671 | 1808 | accept | 0.463315118 |
| 12月29日 | 3156543 | 2843 | 0.000924 | 2827 | 3004 | accept | 0.18270576 |
| 12月26日 | 1956325 | 1782 | 0.000924 | 1737 | 1877 | accept | 0.569173341 |
| 12月22日 | 1848658 | 1366 | 0.000924 | 1640 | 1776 | reject | 1.24202E-17 |
| 12月19日 | 1924018 | 1501 | 0.000924 | 1708 | 1847 | reject | 1.88994E-11 |



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | CL | UCL | LCL |
| 0.000895935 | 2805962.42 | 1.78609E-05 | 0.000896 | 0.00095 | 0.000842 |

|  |  |  |
| --- | --- | --- |
|  | 1-B(n\*UCL;n\_bar,p\_hat) | B(n\*LCL;n\_bar,p\_hat) |
| binomial dist | 0.001451429 | 0.001224758 |



One of the chosen numbers should be the special number, and the other four number should be the winning numbers. The rest of it should not be either special or winning numbers. The probability in this situation is:



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 開獎日 | 注數 | 5獎中獎數 | p\_0 | Binom\_0.05(lb) | Binom\_0.95(ub) | P\_new(lb) | P\_new(ub) | β |
| 4月23日 | 1890662 | 1659 | 0.000924 | 1678 | 1815 | 1 | 1 | 0 |
| 4月19日 | 1825215 | 1736 | 0.000924 | 1618 | 1753 | 1 | 1 | 0 |
| 4月16日 | 1875931 | 1750 | 0.000924 | 1664 | 1801 | 1 | 1 | 0 |
| 4月12日 | 1898399 | 2037 | 0.000924 | 1685 | 1822 | 1 | 1 | 0 |
| 4月9日 | 2217157 | 2101 | 0.000924 | 1974 | 2122 | 1 | 1 | 0 |
| 4月9日 | 2023176 | 1686 | 0.000924 | 1798 | 1940 | 1 | 1 | 0 |
| 4月2日 | 2044755 | 1676 | 0.000924 | 1817 | 1960 | 1 | 1 | 0 |
| 3月29日 | 1962803 | 1608 | 0.000924 | 1743 | 1883 | 1 | 1 | 0 |
| 3月26日 | 1973645 | 1758 | 0.000924 | 1753 | 1893 | 1 | 1 | 0 |
| 3月22日 | 2018177 | 1537 | 0.000924 | 1793 | 1935 | 1 | 1 | 0 |
| 3月19日 | 2057045 | 1907 | 0.000924 | 1828 | 1972 | 1 | 1 | 0 |
| 3月15日 | 2052515 | 1607 | 0.000924 | 1824 | 1967 | 1 | 1 | 0 |
| 3月12日 | 2945834 | 2391 | 0.000924 | 2635 | 2807 | 1 | 1 | 0 |
| 3月8日 | 2651765 | 2237 | 0.000924 | 2368 | 2531 | 1 | 1 | 0 |
| 3月5日 | 2693112 | 2565 | 0.000924 | 2406 | 2570 | 1 | 1 | 0 |
| 3月1日 | 2397648 | 1873 | 0.000924 | 2137 | 2292 | 1 | 1 | 0 |
| 2月27日 | 2285357 | 1923 | 0.000924 | 2035 | 2186 | 1 | 1 | 0 |
| 2月24日 | 2814840 | 2466 | 0.000924 | 2516 | 2684 | 1 | 1 | 0 |
| 2月23日 | 3095869 | 2878 | 0.000924 | 2772 | 2947 | 1 | 1 | 0 |
| 2月22日 | 2739793 | 2445 | 0.000924 | 2448 | 2613 | 1 | 1 | 0 |
| 2月21日 | 2772715 | 2418 | 0.000924 | 2478 | 2644 | 1 | 1 | 0 |
| 2月20日 | 3122054 | 3003 | 0.000924 | 2795 | 2972 | 1 | 1 | 0 |
| 2月19日 | 2963152 | 2844 | 0.000924 | 2651 | 2823 | 1 | 1 | 0 |
| 2月18日 | 3034165 | 2970 | 0.000924 | 2716 | 2890 | 1 | 1 | 0 |
| 2月17日 | 3296659 | 2931 | 0.000924 | 2954 | 3136 | 1 | 1 | 0 |
| 2月16日 | 3766045 | 2846 | 0.000924 | 3382 | 3575 | 1 | 1 | 0 |
| 2月15日 | 3946720 | 3977 | 0.000924 | 3546 | 3745 | 1 | 1 | 0 |
| 2月14日 | 5440029 | 5332 | 0.000924 | 4908 | 5141 | 1 | 1 | 0 |
| 2月13日 | 3807036 | 3120 | 0.000924 | 3419 | 3614 | 1 | 1 | 0 |
| 2月12日 | 4978061 | 3965 | 0.000924 | 4486 | 4709 | 1 | 1 | 0 |
| 2月11日 | 5421670 | 4520 | 0.000924 | 4891 | 5124 | 1 | 1 | 0 |
| 2月10日 | 6228404 | 6475 | 0.000924 | 5628 | 5877 | 1 | 1 | 0 |
| 2月9日 | 5782611 | 5955 | 0.000924 | 5221 | 5461 | 1 | 1 | 0 |
| 2月8日 | 3673079 | 3322 | 0.000924 | 3297 | 3488 | 1 | 1 | 0 |
| 2月7日 | 2942186 | 2488 | 0.000924 | 2632 | 2803 | 1 | 1 | 0 |
| 2月6日 | 4308773 | 3845 | 0.000924 | 3876 | 4083 | 1 | 1 | 0 |
| 2月2日 | 2179897 | 2302 | 0.000924 | 1940 | 2087 | 1 | 1 | 0 |
| 1月30日 | 2135837 | 1842 | 0.000924 | 1900 | 2046 | 1 | 1 | 0 |
| 1月26日 | 2048380 | 1604 | 0.000924 | 1821 | 1964 | 1 | 1 | 0 |
| 1月23日 | 1859946 | 1712 | 0.000924 | 1650 | 1786 | 1 | 1 | 0 |
| 1月19日 | 2058135 | 2054 | 0.000924 | 1829 | 1973 | 1 | 1 | 0 |
| 1月16日 | 2091740 | 1969 | 0.000924 | 1860 | 2004 | 1 | 1 | 0 |
| 1月12日 | 2094995 | 1719 | 0.000924 | 1863 | 2007 | 1 | 1 | 0 |
| 1月9日 | 2088048 | 1759 | 0.000924 | 1857 | 2001 | 1 | 1 | 0 |
| 1月5日 | 2025467 | 1686 | 0.000924 | 1800 | 1942 | 1 | 1 | 0 |
| 1月2日 | 1883075 | 1708 | 0.000924 | 1671 | 1808 | 1 | 1 | 0 |
| 12月29日 | 3156543 | 2843 | 0.000924 | 2827 | 3004 | 1 | 1 | 0 |
| 12月26日 | 1956325 | 1782 | 0.000924 | 1737 | 1877 | 1 | 1 | 0 |
| 12月22日 | 1848658 | 1366 | 0.000924 | 1640 | 1776 | 1 | 1 | 0 |
| 12月19日 | 1924018 | 1501 | 0.000924 | 1708 | 1847 | 1 | 1 | 0 |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | ) | β |  |
| 4.51E-05 | 1 | 1 | 0 | 1 |



Death in a month = sum of number of death from New Taipei, Taipei, …, Keelung

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **n** | | **max death number** | | **min death number** | | | **k** |
| 84 | | 139 | | 64 | | | 78 |
| **death number** | **x\_i** | | **frequence** | | **p\_i(poisson, λ=10)** | | **np\_i** | **(X\_i-np\_i)^2/np\_i** | | |
| ~63 | 0 | | 0 | | 1 | | 84 | 84 | | |
| 64 | 2 | | 0.02381 | | 3.578E-30 | | 3.01E-28 | 1.33089E+28 | | |
| 65 | 0 | | 0 | | 5.505E-31 | | 4.62E-29 | 4.62386E-29 | | |
| 66 | 0 | | 0 | | 8.34E-32 | | 7.01E-30 | 7.00584E-30 | | |
| 67 | 0 | | 0 | | 1.245E-32 | | 1.05E-30 | 1.04565E-30 | | |
| 68 | 1 | | 0.011905 | | 1.831E-33 | | 1.54E-31 | 6.50315E+30 | | |
| 69 | 0 | | 0 | | 2.653E-34 | | 2.23E-32 | 2.22858E-32 | | |
| 70 | 2 | | 0.02381 | | 3.79E-35 | | 3.18E-33 | 1.25641E+33 | | |
| 71 | 0 | | 0 | | 5.338E-36 | | 4.48E-34 | 4.48406E-34 | | |
| 72 | 1 | | 0.011905 | | 7.414E-37 | | 6.23E-35 | 1.60569E+34 | | |
| 73 | 0 | | 0 | | 1.016E-37 | | 8.53E-36 | 8.53131E-36 | | |
| 74 | 4 | | 0.047619 | | 1.372E-38 | | 1.15E-36 | 1.38783E+37 | | |
| 75 | 1 | | 0.011905 | | 1.83E-39 | | 1.54E-37 | 6.50545E+36 | | |
| 76 | 1 | | 0.011905 | | 2.408E-40 | | 2.02E-38 | 4.94414E+37 | | |
| 77 | 2 | | 0.02381 | | 3.127E-41 | | 2.63E-39 | 1.5228E+39 | | |
| 78 | 0 | | 0 | | 4.009E-42 | | 3.37E-40 | 3.36763E-40 | | |
| 79 | 7 | | 0.083333 | | 5.075E-43 | | 4.26E-41 | 1.14947E+42 | | |
| 80 | 3 | | 0.035714 | | 6.343E-44 | | 5.33E-42 | 1.68902E+42 | | |
| 81 | 2 | | 0.02381 | | 7.831E-45 | | 6.58E-43 | 6.08049E+42 | | |
| 82 | 1 | | 0.011905 | | 9.551E-46 | | 8.02E-44 | 1.2465E+43 | | |
| 83 | 1 | | 0.011905 | | 1.151E-46 | | 9.67E-45 | 1.03459E+44 | | |
| 84 | 2 | | 0.02381 | | 1.37E-47 | | 1.15E-45 | 3.47624E+45 | | |
| 85 | 1 | | 0.011905 | | 1.612E-48 | | 1.35E-46 | 7.38701E+45 | | |
| 86 | 0 | | 0 | | 1.874E-49 | | 1.57E-47 | 1.5741E-47 | | |
| 87 | 3 | | 0.035714 | | 2.154E-50 | | 1.81E-48 | 4.97426E+48 | | |
| 88 | 0 | | 0 | | 2.448E-51 | | 2.06E-49 | 2.05604E-49 | | |
| 89 | 0 | | 0 | | 2.75E-52 | | 2.31E-50 | 2.31016E-50 | | |
| 90 | 0 | | 0 | | 3.056E-53 | | 2.57E-51 | 2.56684E-51 | | |
| 91 | 1 | | 0.011905 | | 3.358E-54 | | 2.82E-52 | 3.54522E+51 | | |
| 92 | 4 | | 0.047619 | | 3.65E-55 | | 3.07E-53 | 5.21856E+53 | | |
| 93 | 3 | | 0.035714 | | 3.925E-56 | | 3.3E-54 | 2.72996E+54 | | |
| 94 | 5 | | 0.059524 | | 4.175E-57 | | 3.51E-55 | 7.12822E+55 | | |
| 95 | 0 | | 0 | | 4.395E-58 | | 3.69E-56 | 3.69177E-56 | | |
| 96 | 2 | | 0.02381 | | 4.578E-59 | | 3.85E-57 | 1.04015E+57 | | |
| 97 | 1 | | 0.011905 | | 4.72E-60 | | 3.96E-58 | 2.52236E+57 | | |
| 98 | 0 | | 0 | | 4.816E-61 | | 4.05E-59 | 4.04544E-59 | | |
| 99 | 3 | | 0.035714 | | 4.865E-62 | | 4.09E-60 | 2.20248E+60 | | |
| 100 | 1 | | 0.011905 | | 4.865E-63 | | 4.09E-61 | 2.4472E+60 | | |
| 101 | 1 | | 0.011905 | | 4.816E-64 | | 4.05E-62 | 2.47167E+61 | | |
| 102 | 1 | | 0.011905 | | 4.722E-65 | | 3.97E-63 | 2.5211E+62 | | |
| 103 | 1 | | 0.011905 | | 4.585E-66 | | 3.85E-64 | 2.59674E+63 | | |
| 104 | 2 | | 0.02381 | | 4.408E-67 | | 3.7E-65 | 1.08024E+65 | | |
| 105 | 1 | | 0.011905 | | 4.198E-68 | | 3.53E-66 | 2.83564E+65 | | |
| 106 | 2 | | 0.02381 | | 3.961E-69 | | 3.33E-67 | 1.20231E+67 | | |
| 107 | 2 | | 0.02381 | | 3.702E-70 | | 3.11E-68 | 1.28647E+68 | | |
| 108 | 2 | | 0.02381 | | 3.427E-71 | | 2.88E-69 | 1.38939E+69 | | |
| 109 | 1 | | 0.011905 | | 3.144E-72 | | 2.64E-70 | 3.78609E+69 | | |
| 110 | 0 | | 0 | | 2.858E-73 | | 2.4E-71 | 2.40114E-71 | | |
| 111 | 3 | | 0.035714 | | 2.575E-74 | | 2.16E-72 | 4.16053E+72 | | |
| 112 | 1 | | 0.011905 | | 2.299E-75 | | 1.93E-73 | 5.17755E+72 | | |
| 113 | 2 | | 0.02381 | | 2.035E-76 | | 1.71E-74 | 2.34025E+74 | | |
| 114 | 0 | | 0 | | 1.785E-77 | | 1.5E-75 | 1.49931E-75 | | |
| 115 | 2 | | 0.02381 | | 1.552E-78 | | 1.3E-76 | 3.06807E+76 | | |
| 116 | 0 | | 0 | | 1.338E-79 | | 1.12E-77 | 1.12392E-77 | | |
| 117 | 0 | | 0 | | 1.144E-80 | | 9.61E-79 | 9.60618E-79 | | |
| 118 | 0 | | 0 | | 9.691E-82 | | 8.14E-80 | 8.14083E-80 | | |
| 119 | 1 | | 0.011905 | | 8.144E-83 | | 6.84E-81 | 1.46177E+80 | | |
| 120 | 2 | | 0.02381 | | 6.787E-84 | | 5.7E-82 | 7.01648E+81 | | |
| 121 | 2 | | 0.02381 | | 5.609E-85 | | 4.71E-83 | 8.48994E+82 | | |
| 122 | 0 | | 0 | | 4.597E-86 | | 3.86E-84 | 3.86185E-84 | | |
| 123 | 1 | | 0.011905 | | 3.738E-87 | | 3.14E-85 | 3.185E+84 | | |
| 124 | 0 | | 0 | | 3.014E-88 | | 2.53E-86 | 2.53203E-86 | | |
| 125 | 0 | | 0 | | 2.411E-89 | | 2.03E-87 | 2.02562E-87 | | |
| 126 | 0 | | 0 | | 1.914E-90 | | 1.61E-88 | 1.60764E-88 | | |
| 127 | 0 | | 0 | | 1.507E-91 | | 1.27E-89 | 1.26586E-89 | | |
| 128 | 0 | | 0 | | 1.177E-92 | | 9.89E-91 | 9.8895E-91 | | |
| 129 | 0 | | 0 | | 9.127E-94 | | 7.67E-92 | 7.66628E-92 | | |
| 130 | 0 | | 0 | | 7.02E-95 | | 5.9E-93 | 5.89714E-93 | | |
| 131 | 0 | | 0 | | 5.359E-96 | | 4.5E-94 | 4.50163E-94 | | |
| 132 | 0 | | 0 | | 4.06E-97 | | 3.41E-95 | 3.41033E-95 | | |
| 133 | 1 | | 0.011905 | | 3.053E-98 | | 2.56E-96 | 3.89992E+95 | | |
| 134 | 0 | | 0 | | 2.28E-99 | | 1.91E-97 | 1.91355E-97 | | |
| 135 | 0 | | 0 | | 1.69E-100 | | 1.42E-98 | 1.41744E-98 | | |
| 136 | 0 | | 0 | | 1.24E-101 | | 1E-99 | 1.0422E-99 | | |
| 137 | 0 | | 0 | | 9.06E-103 | | 7.6E-101 | 7.6076E-101 | | |
| 138 | 1 | | 0.011905 | | 6.56E-104 | | 5.5E-102 | 1.814E+101 | | |
| 139 | 1 | | 0.011905 | | 4.72E-105 | | 4E-103 | 2.5214E+102 | | |
| 140~ | 0 | | 0 | | 0 | | 0 | infinity | | |



Since Poisson distribution is discrete model, and there isn’t Poisson inverse in Excel. I use the p-value to do the Hypothesis test. If the p-value is smaller than α=0.05, the death number in that month reject H0.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| month | death in Taoyuan | p-value | H\_0 | month | death in Taoyuan | p-value | H\_0 |
| 1-Jan | 7 | 0.4404413 | accept | 1-Mar | 18 | 0.01437301 | reject |
| 1-Feb | 7 | 0.4404413 | accept | 1-Apr | 16 | 0.05408322 | accept |
| 1-Mar | 5 | 0.1341719 | accept | 1-May | 18 | 0.01437301 | reject |
| 1-Apr | 4 | 0.0585054 | accept | 1-Jun | 7 | 0.44044129 | accept |
| 1-May | 9 | 0.9158594 | accept | 1-Jul | 15 | 0.09748081 | accept |
| 1-Jun | 7 | 0.4404413 | accept | 1-Aug | 14 | 0.16691695 | accept |
| 1-Jul | 10 | 0.8339205 | accept | 1-Sep | 15 | 0.09748081 | accept |
| 1-Aug | 6 | 0.2602828 | accept | 1-Oct | 13 | 0.27107115 | accept |
| 1-Sep | 14 | 0.1669169 | accept | 1-Nov | 18 | 0.01437301 | reject |
| 1-Oct | 6 | 0.2602828 | accept | 1-Dec | 22 | 0.00059147 | reject |
| 1-Nov | 13 | 0.2710712 | accept | 1-Jan | 18 | 0.01437301 | reject |
| 1-Dec | 5 | 0.1341719 | accept | 1-Feb | 10 | 0.8339205 | accept |
| 1-Jan | 21 | 0.0013993 | reject | 1-Mar | 24 | 9.3899E-05 | reject |
| 1-Feb | 13 | 0.2710712 | accept | 1-Apr | 13 | 0.27107115 | accept |
| 1-Mar | 13 | 0.2710712 | accept | 1-May | 12 | 0.41688705 | accept |
| 1-Apr | 11 | 0.6064477 | accept | 1-Jun | 13 | 0.27107115 | accept |
| 1-May | 22 | 0.0005915 | reject | 1-Jul | 19 | 0.00690868 | reject |
| 1-Jun | 17 | 0.0285552 | reject | 1-Aug | 9 | 0.91585943 | accept |
| 1-Jul | 9 | 0.9158594 | accept | 1-Sep | 15 | 0.09748081 | accept |
| 1-Aug | 16 | 0.0540832 | accept | 1-Oct | 24 | 9.3899E-05 | reject |
| 1-Sep | 22 | 0.0005915 | reject | 1-Nov | 14 | 0.16691695 | accept |
| 1-Oct | 16 | 0.0540832 | accept | 1-Dec | 12 | 0.41688705 | accept |
| 1-Nov | 11 | 0.6064477 | accept | 1-Jan | 18 | 0.01437301 | reject |
| 1-Dec | 17 | 0.0285552 | reject | 1-Feb | 15 | 0.09748081 | accept |
| 1-Jan | 21 | 0.0013993 | reject | 1-Mar | 23 | 0.00024024 | reject |
| 1-Feb | 24 | 9.39E-05 | reject |  |  |  |  |



The upper bound in the Hypothesis test is 17, and the lower bound is 4.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **σ** | **CL** | **UCL** | **LCL** |
| 95 | 9.771908518 | 95 | 124.805922 | 66.17447053 |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | α |  |
| 0.002178917 | 0.000899138 | 0.003078 | 324.880425 |







|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| average | sample variance | standard error | estimated α | estimated β |
| 348.7412 | 138.1941 | 11.7556 | 880.0694 | 0.396266 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| thickness | number x\_i | p\_i (gamma.dist) | np\_i | thickness | number x\_i | p\_i (gamma.dist) | np\_i |
| <334 | 1 | 0.087913 | 7.472574 | 347 | 5 | 0.03373 | 2.867063 |
| 334 | 1 | 0.015776 | 1.340944 | 348 | 2 | 0.033938 | 2.884713 |
| 335 | 1 | 0.017513 | 1.488584 | 349 | 10 | 0.0339 | 2.88148 |
| 336 | 0 | 0.019289 | 1.639587 | 350 | 6 | 0.033618 | 2.857553 |
| 337 | 0 | 0.021081 | 1.791899 | 351 | 12 | 0.033101 | 2.813561 |
| 338 | 0 | 0.022862 | 1.943262 | 352 | 9 | 0.032359 | 2.75055 |
| 339 | 0 | 0.024603 | 2.091256 | 353 | 5 | 0.031411 | 2.669941 |
| 340 | 1 | 0.026275 | 2.233372 | 354 | 4 | 0.030276 | 2.573474 |
| 341 | 1 | 0.027848 | 2.367076 | 355 | 2 | 0.028978 | 2.463154 |
| 342 | 0 | 0.029293 | 2.48989 | 356 | 4 | 0.027543 | 2.341175 |
| 343 | 2 | 0.030582 | 2.599466 | 357 | 4 | 0.025998 | 2.209855 |
| 344 | 5 | 0.03169 | 2.693662 | 358 | 1 | 0.024371 | 2.071564 |
| 345 | 4 | 0.032595 | 2.770613 | >358 | 1 | 0.214193 | 18.20639 |
| 346 | 4 | 0.03328 | 2.828792 | k=27 |  |  |  |



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | sample variance | standard error σ | CL | UCL | LCL |
| 354.3911 | 26.34174 | 5.13242 | 354.3911 | 369.7884 | 338.9939 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | sample variance | standard error σ | CL | UCL | LCL |
| 9.822222 | 6.740404 | 2.596229 | 9.822222 | 17.61091 | 2.033536 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | sample variance | standard error σ | CL | UCL | LCL |
| 354.9707 | 6.561122 | 2.561469 | 354.9707 | 362.6551 | 347.2863 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | sample variance | standard error σ | CL | UCL | LCL |
| 9.902439 | 5.290244 | 2.300053 | 9.902439 | 16.8026 | 3.00228 |



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| average | sample variance | standard error σ |  |  | Δ | α | β | accept (if lower) | accept (if higher) |
| 354.3911 | 26.34174 | 5.13242 | 350 | 341.7881 | -8.21187 | 0.003 | 0.2 | -17.9186 | 5.153057 |

Sequential likelihood ratio test shows that most of the are below the . It accepts and rejects .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| average | sample variance | standard error σ |  | k | K | h | H |
| 354.3911 | 26.34174 | 5.13242 | 350 | 0.8 | 4.105936 | 6 | 30.79452 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| average | sample variance | standard error σ |  | k | K | h | H |
| 354.3911 | 26.34174 | 5.13242 | 350 | 0.5 | 2.56621 | 5 | 25.6621 |

There is an out -of-control signal in Tabular CUSUM chart with (k,h)=(0.5,5). The new process mean is :



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| shift | δ | k\* | h' |  |
| 0.5σ | 0.5 | 0.8 | 4.475606 | 60.87891 |
| 1.0σ | 1 | 0.8 | 4.475606 | 11.96443 |
| 1.5σ | 1.5 | 0.8 | 4.475606 | 5.375253 |
| 2.0σ | 2 | 0.8 | 4.475606 | 3.382457 |

There is an out -of-control signal in optimal Tabular CUSUM chart. The new process mean is :



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| shift | δ | λ\* | L\* | g | w | φ(w) | Φ(w) |  |
| 0.5σ | 0.5 | 0.232431 | 3.12491 | 2.130589 | 2.055716 | 0.048223 | 0.980095 | 42.53612 |
| 1.0σ | 1 | 0.232431 | 3.12491 | 1.065295 | 0.753675 | 0.300306 | 0.774478 | 14.72196 |
| 1.5σ | 1.5 | 0.232431 | 3.12491 | 0.710196 | -0.58667 | 0.33587 | 0.278711 | 5.806391 |
| 2.0σ | 2 | 0.232431 | 3.12491 | 0.532647 | -1.94685 | 0.059961 | 0.025776 | 3.95144 |



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | sample variance | standard error |  | USL | LSL |  |  |
| 352.2776 | 350 | 82.62084 | 9.089601 | 9.37062 | 360 | 335 | 0.849581 | -1.90081 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | out-of-spec% |
| 0.458399 | 0.283194 | 0.444652 | 0.355722 | 22.64% |



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wafer number | X\_bar | σ\_X | σ^~ | Z\_U | Z\_L |
| 1 | 354.6 | 3.209361 | 5.608921 | 1.682578 | -6.10713 |
| 2 | 353.8 | 3.114482 | 4.913247 | 1.9907 | -6.03632 |
| 3 | 353.6 | 3.130495 | 4.770744 | 2.044405 | -5.94155 |
| 4 | 357.6 | 3.847077 | 8.518216 | 0.62385 | -5.87459 |
| 5 | 353.8 | 2.774887 | 4.705316 | 2.234325 | -6.77505 |
| 6 | 352.4 | 2.19089 | 3.249615 | 3.46891 | -7.94198 |
| 7 | 355.6 | 5.029911 | 7.527284 | 0.874767 | -4.0955 |
| 8 | 353.2 | 3.563706 | 4.789572 | 1.908126 | -5.10704 |
| 9 | 355 | 3.24037 | 5.958188 | 1.543033 | -6.17213 |
| 10 | 354.4 | 3.435113 | 5.582114 | 1.630223 | -5.64756 |
| 11 | 354 | 3 | 5 | 2 | -6.33333 |
| 12 | 353.2 | 4.207137 | 5.28583 | 1.616301 | -4.32598 |
| 13 | 354.2 | 5.357238 | 6.807349 | 1.082647 | -3.58394 |
| 14 | 353.8 | 4.868265 | 6.175759 | 1.273554 | -3.86175 |
| 15 | 354.6 | 4.929503 | 6.742403 | 1.095445 | -3.97606 |
| 16 | 353.2 | 4.494441 | 5.517246 | 1.51298 | -4.04945 |
| 17 | 370.4 | 3.507136 | 20.69928 | -2.96538 | -10.0937 |
| 18 | 357.2 | 4.147288 | 8.309031 | 0.67514 | -5.3529 |
| 19 | 359.4 | 6.0663 | 11.18749 | 0.098907 | -4.02222 |
| 20 | 356.6 | 5.412947 | 8.535807 | 0.628124 | -3.99043 |
| 21 | 357.8 | 5.674504 | 9.645724 | 0.387699 | -4.01797 |
| 22 | 356.8 | 3.03315 | 7.445804 | 1.055009 | -7.18725 |
| 23 | 360.6 | 4.97996 | 11.71153 | -0.12048 | -5.1406 |
| 24 | 360.2 | 4.969909 | 11.34637 | -0.04024 | -5.07051 |
| 25 | 358.8 | 5.357238 | 10.30243 | 0.223996 | -4.44259 |
| 26 | 338 | 4.949747 | 12.98075 | 4.444671 | -0.60609 |
| 27 | 354.6 | 5.899152 | 7.480642 | 0.915386 | -3.32251 |
| 28 | 349.2 | 0.83666 | 1.157584 | 12.90847 | -16.9722 |
| 29 | 356.6 | 5.549775 | 8.623224 | 0.612637 | -3.89205 |
| 30 | 357 | 5.09902 | 8.660254 | 0.588348 | -4.31455 |
| 31 | 356.8 | 5.761944 | 8.912912 | 0.555368 | -3.78345 |
| 32 | 355.4 | 6.580274 | 8.512344 | 0.699059 | -3.10018 |
| 33 | 354.8 | 6.180615 | 7.825599 | 0.84134 | -3.20356 |
| 34 | 352.6 | 6.426508 | 6.932532 | 1.151481 | -2.73866 |
| 35 | 351 | 5.244044 | 5.338539 | 1.716233 | -3.05108 |
| 36 | 351.2 | 1.923538 | 2.267157 | 4.574902 | -8.42198 |
| 37 | 348 | 4.795832 | 5.196152 | 2.502173 | -2.71069 |
| 38 | 357.8 | 4.816638 | 9.167333 | 0.45675 | -4.73359 |
| 39 | 354.6 | 5.458938 | 7.138627 | 0.989203 | -3.59044 |
| 40 | 352.4 | 3.286335 | 4.069398 | 2.312606 | -5.29465 |
| 41 | 354.6 | 4.97996 | 6.779381 | 1.084346 | -3.93577 |
| 42 | 336.2 | 4.816638 | 14.61643 | 4.941206 | -0.24914 |
| 43 | 352.6 | 5.412947 | 6.004998 | 1.367093 | -3.25146 |
| 44 | 356 | 5.522681 | 8.154753 | 0.724286 | -3.8025 |
| 45 | 353.4 | 4.27785 | 5.46443 | 1.542831 | -4.30123 |
| 46 | 355.2 | 4.868265 | 7.123202 | 0.985978 | -4.14932 |
| 47 | 355.6 | 4.560702 | 7.222188 | 0.964764 | -4.51685 |
| 48 | 317.6 | 55.55448 | 64.31221 | 0.763215 | 0.313206 |
| 49 | 359 | 4.582576 | 10.0995 | 0.218218 | -5.23723 |
| 50 | 354 | 4.582576 | 6.082763 | 1.309307 | -4.14614 |
| 51 | 354.8 | 4.764452 | 6.763135 | 1.091416 | -4.15578 |
| 52 | 357 | 4.690416 | 8.42615 | 0.639602 | -4.69042 |
| 53 | 351.8 | 5.263079 | 5.562374 | 1.558023 | -3.19205 |
| 54 | 353.4 | 5.128353 | 6.153048 | 1.286963 | -3.5879 |
| 55 | 352.2 | 4.868265 | 5.342284 | 1.602214 | -3.53309 |
| 56 | 348.6 | 1.516575 | 2.063977 | 7.516937 | -8.96757 |
| 57 | 349 | 1.581139 | 1.870829 | 6.957011 | -8.85438 |
| 58 | 349.4 | 5.128353 | 5.163332 | 2.066941 | -2.80792 |
| 59 | 349.4 | 6.14817 | 6.177378 | 1.72409 | -2.34216 |
| 60 | 352.6 | 5.029911 | 5.662155 | 1.471199 | -3.49907 |
| 61 | 353.2 | 4.32435 | 5.379591 | 1.572491 | -4.20873 |
| 62 | 353 | 3.674235 | 4.743416 | 1.905159 | -4.89898 |
| 63 | 350 | 5.244044 | 5.244044 | 1.906925 | -2.86039 |
| 64 | 351.8 | 5.263079 | 5.562374 | 1.558023 | -3.19205 |
| 65 | 352.4 | 5.176872 | 5.706137 | 1.468068 | -3.3611 |
| 66 | 344.2 | 2.683282 | 6.390618 | 5.888312 | -3.42864 |
| 67 | 350.4 | 4.722288 | 4.739198 | 2.032913 | -3.26113 |
| 68 | 349.2 | 4.494441 | 4.565085 | 2.402968 | -3.15946 |
| 69 | 348.2 | 4.38178 | 4.737088 | 2.692969 | -3.01247 |
| 70 | 348.6 | 4.09878 | 4.331282 | 2.781315 | -3.31806 |
| 71 | 350.8 | 4.868265 | 4.933559 | 1.88979 | -3.24551 |
| 72 | 343.8 | 3.49285 | 7.116179 | 4.638047 | -2.51943 |
| 73 | 349.4 | 5.176872 | 5.211526 | 2.047569 | -2.7816 |
| 74 | 348.2 | 4.91935 | 5.23832 | 2.398691 | -2.68328 |
| 75 | 346.8 | 5.263079 | 6.159545 | 2.508038 | -2.24203 |
| 76 | 351 | 5.477226 | 5.567764 | 1.643168 | -2.92119 |
| 77 | 346.8 | 4.38178 | 5.425864 | 3.012474 | -2.69297 |
| 78 | 349.6 | 5.458938 | 5.473573 | 1.905133 | -2.67451 |
| 79 | 350.6 | 5.412947 | 5.4461 | 1.736577 | -2.88198 |
| 80 | 351 | 5.612486 | 5.700877 | 1.603567 | -2.85079 |
| 81 | 349.4 | 5.366563 | 5.4 | 1.975193 | -2.68328 |
| 82 | 351.4 | 5.59464 | 5.767148 | 1.537186 | -2.93138 |
| 83 | 345.2 | 1.788854 | 5.122499 | 8.273452 | -5.70197 |
| 84 | 353.4 | 4.722288 | 5.818935 | 1.397628 | -3.89642 |
| 85 | 348 | 4.582576 | 5 | 2.618615 | -2.83683 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wafer number | C\_p | C\_pk | C\_pm | C\*\_pm | out-of-spec% |
| 1 | 1.298285 | 0.560859 | 0.742864 | 0.594291 | 0.046228429 |
| 2 | 1.337836 | 0.663567 | 0.848047 | 0.678438 | 0.023256939 |
| 3 | 1.330993 | 0.681468 | 0.873379 | 0.698703 | 0.020456778 |
| 4 | 1.083073 | 0.20795 | 0.489148 | 0.391318 | 0.266362955 |
| 5 | 1.501562 | 0.744775 | 0.885523 | 0.708419 | 0.012730851 |
| 6 | 1.901814 | 1.156303 | 1.282203 | 1.025762 | 0.000261288 |
| 7 | 0.828378 | 0.291589 | 0.553542 | 0.442833 | 0.190871397 |
| 8 | 1.169195 | 0.636042 | 0.869946 | 0.695956 | 0.028187629 |
| 9 | 1.285861 | 0.514344 | 0.699318 | 0.559454 | 0.061411324 |
| 10 | 1.212964 | 0.543408 | 0.746432 | 0.597145 | 0.051527193 |
| 11 | 1.388889 | 0.666667 | 0.833333 | 0.666667 | 0.022750132 |
| 12 | 0.990381 | 0.538767 | 0.788271 | 0.630617 | 0.053022203 |
| 13 | 0.777764 | 0.360882 | 0.612084 | 0.489667 | 0.139651703 |
| 14 | 0.855883 | 0.424518 | 0.674681 | 0.539745 | 0.101466972 |
| 15 | 0.845251 | 0.365148 | 0.617979 | 0.494384 | 0.136695872 |
| 16 | 0.927071 | 0.504327 | 0.755208 | 0.604166 | 0.065168021 |
| 17 | 1.188054 | -0.98846 | 0.201295 | 0.161036 | 0.998488468 |
| 18 | 1.004673 | 0.225047 | 0.501462 | 0.40117 | 0.24979347 |
| 19 | 0.686855 | 0.032969 | 0.37244 | 0.297952 | 0.460634853 |
| 20 | 0.769759 | 0.209375 | 0.48814 | 0.390512 | 0.264994466 |
| 21 | 0.734279 | 0.129233 | 0.43197 | 0.345576 | 0.349148727 |
| 22 | 1.373709 | 0.35167 | 0.559599 | 0.447679 | 0.14571066 |
| 23 | 0.836687 | -0.04016 | 0.355775 | 0.28462 | 0.547949824 |
| 24 | 0.838379 | -0.01341 | 0.367225 | 0.29378 | 0.516050174 |
| 25 | 0.777764 | 0.074665 | 0.404435 | 0.323548 | 0.411384645 |
| 26 | 0.841794 | 0.202031 | 0.320988 | 0.25679 | 0.27223139 |
| 27 | 0.706316 | 0.305129 | 0.556993 | 0.445595 | 0.180440639 |
| 28 | 4.980119 | 4.302823 | 3.599452 | 2.879561 | 6.58965E-65 |
| 29 | 0.750781 | 0.204212 | 0.483191 | 0.386553 | 0.270107737 |
| 30 | 0.817151 | 0.196116 | 0.481125 | 0.3849 | 0.278157227 |
| 31 | 0.723136 | 0.185123 | 0.467487 | 0.373989 | 0.289398787 |
| 32 | 0.633206 | 0.23302 | 0.489485 | 0.391588 | 0.243224585 |
| 33 | 0.674151 | 0.280447 | 0.532441 | 0.425952 | 0.200757364 |
| 34 | 0.648356 | 0.383827 | 0.601031 | 0.480825 | 0.127851784 |
| 35 | 0.794552 | 0.572078 | 0.780488 | 0.624391 | 0.044199832 |
| 36 | 2.166147 | 1.524967 | 1.837838 | 1.47027 | 2.38221E-06 |
| 37 | 0.86881 | 0.834058 | 0.801875 | 0.6415 | 0.009528875 |
| 38 | 0.865057 | 0.15225 | 0.454512 | 0.36361 | 0.323926427 |
| 39 | 0.763274 | 0.329734 | 0.583679 | 0.466943 | 0.161446861 |
| 40 | 1.267876 | 0.770869 | 1.023902 | 0.819122 | 0.010372206 |
| 41 | 0.836687 | 0.361449 | 0.614609 | 0.491687 | 0.139147152 |
| 42 | 0.865057 | 0.083045 | 0.285067 | 0.228054 | 0.40162801 |
| 43 | 0.769759 | 0.455698 | 0.693866 | 0.555093 | 0.086372216 |
| 44 | 0.754465 | 0.241429 | 0.510949 | 0.40876 | 0.234516716 |
| 45 | 0.97401 | 0.514277 | 0.762507 | 0.610006 | 0.061444371 |
| 46 | 0.855883 | 0.328659 | 0.584943 | 0.467954 | 0.162088717 |
| 47 | 0.913602 | 0.321588 | 0.576926 | 0.461541 | 0.167334699 |
| 48 | 0.075001 | -0.1044 | 0.064788 | 0.05183 | 0.845605599 |
| 49 | 0.909241 | 0.072739 | 0.412561 | 0.330049 | 0.413629755 |
| 50 | 0.909241 | 0.436436 | 0.684996 | 0.547997 | 0.095232038 |
| 51 | 0.874532 | 0.363805 | 0.616085 | 0.492868 | 0.137561092 |
| 52 | 0.888336 | 0.213201 | 0.494492 | 0.395594 | 0.261217006 |
| 53 | 0.791679 | 0.519341 | 0.749081 | 0.599265 | 0.060320194 |
| 54 | 0.812477 | 0.428988 | 0.677171 | 0.541737 | 0.09922027 |
| 55 | 0.855883 | 0.534071 | 0.779941 | 0.623953 | 0.054759554 |
| 56 | 2.747419 | 2.505646 | 2.018757 | 1.615005 | 2.80888E-14 |
| 57 | 2.635231 | 2.319004 | 2.227177 | 1.781742 | 1.73783E-12 |
| 58 | 0.812477 | 0.68898 | 0.806972 | 0.645578 | 0.021863013 |
| 59 | 0.677708 | 0.574697 | 0.674504 | 0.539603 | 0.051932029 |
| 60 | 0.828378 | 0.4904 | 0.73588 | 0.588704 | 0.07085208 |
| 61 | 0.963536 | 0.524164 | 0.774532 | 0.619626 | 0.057931228 |
| 62 | 1.134023 | 0.635053 | 0.87841 | 0.702728 | 0.028380205 |
| 63 | 0.794552 | 0.635642 | 0.794552 | 0.635642 | 0.030380755 |
| 64 | 0.791679 | 0.519341 | 0.749081 | 0.599265 | 0.060320194 |
| 65 | 0.804862 | 0.489356 | 0.730208 | 0.584166 | 0.071431025 |
| 66 | 1.552825 | 1.142879 | 0.651997 | 0.521598 | 0.000303311 |
| 67 | 0.882341 | 0.677638 | 0.879192 | 0.703354 | 0.021585498 |
| 68 | 0.927071 | 0.800989 | 0.912725 | 0.73018 | 0.008921608 |
| 69 | 0.950907 | 0.897656 | 0.879584 | 0.703667 | 0.004836578 |
| 70 | 1.016563 | 0.927105 | 0.961994 | 0.769595 | 0.003160182 |
| 71 | 0.855883 | 0.62993 | 0.844556 | 0.675645 | 0.029979197 |
| 72 | 1.192913 | 0.839811 | 0.58552 | 0.468416 | 0.005878964 |
| 73 | 0.804862 | 0.682523 | 0.79951 | 0.639608 | 0.023005704 |
| 74 | 0.846995 | 0.799564 | 0.79542 | 0.636336 | 0.011872073 |
| 75 | 0.791679 | 0.747345 | 0.676457 | 0.541165 | 0.018549786 |
| 76 | 0.760726 | 0.547723 | 0.748355 | 0.598684 | 0.051917626 |
| 77 | 0.950907 | 0.897656 | 0.767927 | 0.614341 | 0.004836578 |
| 78 | 0.763274 | 0.635044 | 0.761233 | 0.608987 | 0.032123312 |
| 79 | 0.769759 | 0.578859 | 0.765074 | 0.612059 | 0.043206863 |
| 80 | 0.742392 | 0.534522 | 0.730882 | 0.584705 | 0.056585277 |
| 81 | 0.776412 | 0.658398 | 0.771605 | 0.617284 | 0.027768282 |
| 82 | 0.74476 | 0.512395 | 0.722483 | 0.577986 | 0.063811258 |
| 83 | 2.329237 | 1.900658 | 0.813405 | 0.650724 | 5.92142E-09 |
| 84 | 0.882341 | 0.465876 | 0.716053 | 0.572843 | 0.081161259 |
| 85 | 0.909241 | 0.872872 | 0.833333 | 0.666667 | 0.006692555 |