PRACTICAL NUMBER: 8

**Fitting Of Poisson distribution and graphical representation of probabilities.**

**Question 1:** Represent graphically a Poisson distribution when out of 1000 families, probability of finding black family is 0.02 .Plot the frequency curve and column chart:

|  |  |
| --- | --- |
| X | P(X) |
| 0 | 2.06115E-09 |
| 1 | 4.12231E-08 |
| 2 | 4.12231E-07 |
| 3 | 2.7482E-06 |
| 4 | 1.3741E-05 |
| 5 | 5.49641E-05 |
| 6 | 0.000183214 |
| 7 | 0.000523468 |
| 8 | 0.001308669 |
| 9 | 0.002908153 |
| 10 | 0.005816307 |

|  |  |
| --- | --- |
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| 6 | 0.000183214 |
| 7 | 0.000523468 |
| 8 | 0.001308669 |
| 9 | 0.002908153 |
| 10 | 0.005816307 |
| 11 | 0.010575103 |
| 12 | 0.017625171 |
| 13 | 0.027115648 |
| 14 | 0.03873664 |
| 15 | 0.051648854 |
| 16 | 0.064561067 |
| 17 | 0.075954196 |
| 18 | 0.084393552 |
| 19 | 0.088835317 |
| 20 | 0.088835317 |

|  |  |
| --- | --- |
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| 1 | 4.12231E-08 |
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| 3 | 2.7482E-06 |
| 4 | 1.3741E-05 |
| 5 | 5.49641E-05 |
| 6 | 0.000183214 |
| 7 | 0.000523468 |
| 8 | 0.001308669 |
| 9 | 0.002908153 |
| 10 | 0.005816307 |
| 11 | 0.010575103 |
| 12 | 0.017625171 |
| 13 | 0.027115648 |
| 14 | 0.03873664 |
| 15 | 0.051648854 |
| 16 | 0.064561067 |
| 17 | 0.075954196 |
| 18 | 0.084393552 |
| 19 | 0.088835317 |
| 20 | 0.088835317 |
| 21 | 0.084605064 |
| 22 | 0.076913695 |
| 23 | 0.066881474 |
| 24 | 0.055734561 |
| 25 | 0.044587649 |
| 26 | 0.034298192 |
| 27 | 0.025406068 |
| 28 | 0.018147191 |
| 29 | 0.012515304 |
| 30 | 0.008343536 |
| 31 | 0.005382927 |
| 32 | 0.003364329 |
| 33 | 0.002038987 |
| 34 | 0.001199404 |
| 35 | 0.000685374 |
| 36 | 0.000380763 |
| 37 | 0.000205818 |
| 38 | 0.000108325 |
| 39 | 5.55514E-05 |
| 40 | 2.77757E-05 |
| 41 | 1.35491E-05 |
| 42 | 6.45196E-06 |
| 43 | 3.00091E-06 |
| 44 | 1.36405E-06 |
| 45 | 6.06245E-07 |
| 46 | 2.63585E-07 |
| 47 | 1.12164E-07 |
| 48 | 4.67349E-08 |
| 49 | 1.90755E-08 |
| 50 | 7.63019E-09 |

**Question 2:** Fit a Poisson distribution to the following data with respect to the number of red blood cells(X)

|  |  |
| --- | --- |
| X | F |
| 0 | 162 |
| 1 | 193 |
| 2 | 115 |
| 3 | 83 |
| 4 | 44 |
| 5 | 24 |
| 6 | 19 |
| 7 | 8 |
| 8 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | F | XF | P(x) | N\*P(x) |
| 0 | 162 | 0 | 0.169418 | 110.1218 |
| 1 | 193 | 193 | 0.300783 | 195.5087 |
| 2 | 115 | 230 | 0.267002 | 173.5516 |
| 3 | 83 | 249 | 0.158011 | 102.707 |
| 4 | 44 | 176 | 0.070132 | 45.58609 |
| 5 | 24 | 120 | 0.024902 | 16.18657 |
| 6 | 19 | 114 | 0.007369 | 4.789567 |
| 7 | 8 | 56 | 0.001869 | 1.214761 |
| 8 | 2 | 16 | 0.000415 | 0.269583 |
|  | 650 | 1154 |  |  |

M=1.775385

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | F | X-M | (X-M)^2 | F(X-M)^2 | P(x) | N\*P(X) |
| 0 | 162 | -1.77539 | 3.151992 | 510.6227 | 0.057251 | 37.2129 |
| 1 | 193 | -0.77539 | 0.601222 | 116.0358 | 0.163755 | 106.4407 |
| 2 | 115 | 0.224615 | 0.050452 | 5.801968 | 0.234195 | 152.227 |
| 3 | 83 | 1.224615 | 1.499682 | 124.4736 | 0.223291 | 145.1392 |
| 4 | 44 | 2.224615 | 4.948912 | 217.7521 | 0.159671 | 103.786 |
| 5 | 24 | 3.224615 | 10.39814 | 249.5554 | 0.091342 | 59.37219 |
| 6 | 19 | 4.224615 | 17.84737 | 339.1001 | 0.043544 | 28.30388 |
| 7 | 8 | 5.224615 | 27.2966 | 218.3728 | 0.017793 | 11.56544 |
| 8 | 2 | 6.224615 | 38.74583 | 77.49166 | 0.006362 | 4.135103 |
|  | 650 |  |  | 1859.206 |  |  |

|  |  |
| --- | --- |
| VARIANCE= | 2.860317 |
|  |  |