PRACTICAL NUMBER 12

**Fitting of exponential distribution and graphical representation of probabilities.**

**FORMULA USED :**

P(x)=

P(a<=x<=b)=

**Question 1:** Graphically represent exponential distribution curve for λ=1.5 .

***Using function expondist:***

|  |  |
| --- | --- |
| X | P(X) |
| 0 | 1.5 |
| 0.5 | 0.70855 |
| 1 | 0.334695 |
| 1.5 | 0.158099 |
| 2 | 0.074681 |
| 2.5 | 0.035277 |
| 3 | 0.016663 |
| 3.5 | 0.007871 |
| 4 | 0.003718 |
| 4.5 | 0.001756 |
| 5 | 0.00083 |
| 5.5 | 0.000392 |
| 6 | 0.000185 |
| 6.5 | 8.74E-05 |
| 7 | 4.13E-05 |
| 7.5 | 1.95E-05 |
| 8 | 9.22E-06 |
| 8.5 | 4.35E-06 |
| 9 | 2.06E-06 |
| 9.5 | 9.71E-07 |
| 10 | 4.59E-07 |
| 10.5 | 2.17E-07 |
| 11 | 1.02E-07 |
| 11.5 | 4.84E-08 |
| 12 | 2.28E-08 |
| 12.5 | 1.08E-08 |
| 13 | 5.1E-09 |
| 13.5 | 2.41E-09 |
| 14 | 1.14E-09 |
| 14.5 | 5.37E-10 |
| 15 | 2.54E-10 |
| 15.5 | 1.2E-10 |
| 16 | 5.66E-11 |
| 16.5 | 2.67E-11 |
| 17 | 1.26E-11 |
| 17.5 | 5.97E-12 |
| 18 | 2.82E-12 |
| 18.5 | 1.33E-12 |
| 19 | 6.29E-13 |
| 19.5 | 2.97E-13 |
| 20 | 1.4E-13 |

***Using mathematical function:***

|  |  |
| --- | --- |
| X | P(x) |
| 0 | 1.5 |
| 0.5 | 0.70855 |
| 1 | 0.334695 |
| 1.5 | 0.158099 |
| 2 | 0.074681 |
| 2.5 | 0.035277 |
| 3 | 0.016663 |
| 3.5 | 0.007871 |
| 4 | 0.003718 |
| 4.5 | 0.001756 |
| 5 | 0.00083 |
| 5.5 | 0.000392 |
| 6 | 0.000185 |
| 6.5 | 8.74E-05 |
| 7 | 4.13E-05 |
| 7.5 | 1.95E-05 |
| 8 | 9.22E-06 |
| 8.5 | 4.35E-06 |
| 9 | 2.06E-06 |
| 9.5 | 9.71E-07 |
| 10 | 4.59E-07 |
| 10.5 | 2.17E-07 |
| 11 | 1.02E-07 |
| 11.5 | 4.84E-08 |
| 12 | 2.28E-08 |
| 12.5 | 1.08E-08 |
| 13 | 5.1E-09 |
| 13.5 | 2.41E-09 |
| 14 | 1.14E-09 |
| 14.5 | 5.37E-10 |
| 15 | 2.54E-10 |
| 15.5 | 1.2E-10 |
| 16 | 5.66E-11 |
| 16.5 | 2.67E-11 |
| 17 | 1.26E-11 |
| 17.5 | 5.97E-12 |
| 18 | 2.82E-12 |
| 18.5 | 1.33E-12 |
| 19 | 6.29E-13 |
| 19.5 | 2.97E-13 |
| 20 | 1.4E-13 |

**Question 2:** Fit the exponential distribution of the given 300 families whose divorce took place in the following ranges of years.

|  |  |
| --- | --- |
| X | F |
| 0-3 | 190 |
| 3-6 | 70 |
| 6-9 | 25 |
| 9-12 | 10 |
| 12-15 | 4 |
| 15-18 | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | F | Xi | Di | Ui | FiUi |
| 0-3 | 190 | 1.5 | -9 | -3 | -570 |
| 3-6 | 70 | 4.5 | -6 | -2 | -140 |
| 6-9 | 25 | 7.5 | -3 | -1 | -25 |
| 9-12 | 10 | **10.5** | 0 | 0 | 0 |
| 12-15 | 4 | 13.5 | 3 | 1 | 4 |
| 15-18 | 1 | 16.5 | 6 | 2 | 2 |
|  | 300 |  |  |  | -729 |

|  |  |
| --- | --- |
| **MEAN=** | 3.21 |
| **THETA=** | 0.311526 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | F | P(X) | N\*P(X) |  |  |
| 0-3 | 190 | 0.607248428 | 182.1745 |  |  |
| 3-6 | 70 | 0.238497653 | 71.5493 |  |  |
| 6-9 | 25 | 0.093670193 | 28.10106 |  |  |
| 9-12 | 10 | 0.036789063 | 11.03672 |  |  |
| 12-15 | 4 | 0.014448941 | 4.334682 |  |  |
| 15-18 | 1 | 0.005674836 | 1.702451 |  |  |