```
(*  1. Группировка данных *)
  nn = Length[seq];
  count = 0;
  For[j = 1, j ≤ nn, j++,
    If[seq[[j]] ≥ start && seq[[j]] < end, count++];
    If[seq[[j]]  ≥ end, Break[]];
   ];
  Return[count];
  );

x = {3.22, 2.58, 3.03, 2, 2.53, 2.61, 1.87, 4.41, 4.48, 3.10,
   4.99, 1.82, 3.3, 2.93, 1.16, 4.12, 2.1, 2.47, 4.16, 2.14,
   2.89, 1.94, 3.29, 2.98, 3.75, 2.51, 3.17, 4.43, 2.83, 3.56,
   4.36, 1.64, 2.74, 4.13, 5.13, 2.44, 2.51, 3.97, 2.86, 2.96,
   2.99, 2.77, 2.43, 2.24, 4.34, 3.05, 2.53, 2.25, 3.64, 3.45};
x = Sort[x];
Print["sort ", x];
n = Length[x];
Print["n=", n];
Δt = (x[[n]] - x[[1]]) / (1 + Log[2, n]);
Print["Δt  = ", Δt ];
NN = Ceiling[(x[[n]] - x[[1]]) / Δt];
Print["N=", NN];
first = Table[{}, {i, NN}, {j, 6}];
For[i = 1, i ≤ NN, i++,
  first[[i, 1]] = i;
  first[[i, 2]] = x[[1]] + (i - 1) * Δt;
  If[i ≠ NN, first[[i, 3]] = x[[1]] + i * Δt, first[[i, 3]] = x[[n]] ];
  first[[i, 4]] = (first[[i, 2]] + first[[i, 3]]) / 2;
  first[[i, 5]] = FindC[first[[i, 2]] , first[[i, 3]] , x];
  If[i == NN , first[[i, 5]] ++];
  first[[i, 6]] = first[[i, 5]] / n;
 ];
Print[TableForm[first, TableHeadings →
    {None, {"№", "Начало", "Конец", "Середина", "Частота", "Частость"}}]];
```

```
sort {1.16, 1.64, 1.82, 1.87, 1.94, 2, 2.1, 2.14, 2.24, 2.25, 2.43, 2.44,
  2.47, 2.51, 2.51, 2.53, 2.53, 2.58, 2.61, 2.74, 2.77, 2.83, 2.86, 2.89,
  2.93, 2.96, 2.98, 2.99, 3.03, 3.05, 3.1, 3.17, 3.22, 3.29, 3.3, 3.45, 3.56,
  3.64, 3.75, 3.97, 4.12, 4.13, 4.16, 4.34, 4.36, 4.41, 4.43, 4.48, 4.99, 5.13}
```

n=50

Δt = 0.597545

N=7

№	Начало	Конец	Середина	Частота	Частость
1	1.16	1.75754	1.45877	2	$\frac{1}{25}$
2	1.75754	2.35509	2.05632	8	$\frac{4}{25}$
3	2.35509	2.95263	2.65386	15	$\frac{3}{10}$
4	2.95263	3.55018	3.25141	11	$\frac{11}{50}$
5	3.55018	4.14772	3.84895	6	$\frac{3}{25}$
6	4.14772	4.74527	4.44649	6	$\frac{3}{25}$
7	4.74527	5.13	4.93763	2	$\frac{1}{25}$

In[89]:=
```
Np = NN - 2;
second = Table[{}, {i, Np}, {j, 6}];
second[[1, 1]] = 1;
second[[1, 2]] = x[[1]] ;
second[[1, 3]] = first[[2, 3]] ;
second[[1, 4]] = (second[[1, 2]] + second[[1, 3]])/2 ;
second[[1, 5]] = first[[1, 5]] + first[[2, 5]] ;
second[[1, 6]] = second[[1, 5]] / n;
For[i = 2, i ≤ Np - 1, i++,
  second[[i, 1]] = i;
  second[[i, 2]] = first[[i + 1, 2]] ;
  second[[i, 3]] = first[[i + 1, 3]] ;
  second[[i, 4]] = first[[i + 1, 4]] ;
  second[[i, 5]] = first[[i + 1, 5]] ;
  second[[i, 6]] = first[[i + 1, 6]] ;
 ];

second[[Np, 1]] = Np;
second[[Np, 2]] = first[[NN - 1, 2]] ;
second[[Np, 3]] = first[[NN, 3]];
second[[Np, 4]] = (second[[Np, 2]] + second[[Np, 3]])/2 ;
second[[Np, 5]] = first[[Np + 1, 5]] + first[[Np + 2, 5]] ;
second[[Np, 6]] = second[[Np, 5]] / n;
Print[TableForm[second, TableHeadings → {None, {"№", "Начало", "Конец", "Середина", "Частота", "Частость"}}]];
```

№	Начало	Конец	Середина	Частота	Частость
1	1.16	2.35509	1.75754	10	$\frac{1}{5}$
2	2.35509	2.95263	2.65386	15	$\frac{3}{10}$
3	2.95263	3.55018	3.25141	11	$\frac{11}{50}$
4	3.55018	4.14772	3.84895	6	$\frac{3}{25}$
5	4.14772	5.13	4.63886	8	$\frac{4}{25}$

```
(*  2. *)
```

In[105]:=
```
a = 0;
a = (∑_{i=1}^{Np} second[[i, 4]] * second[[i, 5]])/n;
Print["a=", a];
```

```
a=3.06707
```

In[108]:=
```
d = (∑_{i=1}^{Np} ((second[[i, 4]] - a)^2 * second[[i, 5]]))/n;
Print["d=", d];
```

```
d=0.870314
```

In[110]:=
$$avg = \frac{\sum_{i=1}^{n} x[[i]]}{n};$$

```
Print["Выборочное среднее = ", avg];
Print["difference=", Abs[avg - a]];
```

```
Выборочное среднее = 3.056

difference=0.0110685
```

In[113]:=
$$disp = \frac{\sum_{i=1}^{n} (x[[i]] - avg)^2}{n};$$

```
Print["Выборочная дисперсия = ", disp];
Print["difference = ", Abs[disp - d]];
```

```
Выборочная дисперсия = 0.797108

difference = 0.0732063
```

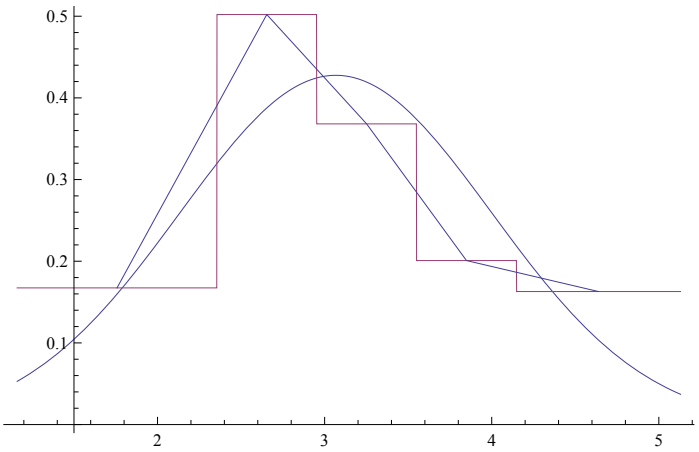
```
(*  3. Построение *)
```

In[116]:=
```
Clear[result, gist];
gist[t_] := (
   result;
   For[j = 1, j ≤ Np, j++,
    If[t ≥ second[[j, 2]] && t < second[[j, 3]],
      result = second[[j, 6]] / (second[[j, 3]] - second[[j, 2]]);
       Return[result]];
   ];
   If[t == second[[Np, 3]], result = second[[Np, 6]]];
   Return[result];
  );
```

In[118]:=
```
list = {};
For[i = 1, i ≤ Np , i++,
  AppendTo[list,
    {second[[i, 4]], second[[i, 6]] / (second[[i, 3]] - second[[i, 2]])}];
 ];
```

In[120]:=
$$\text{Show}\left[\text{Plot}\left[\left\{\frac{1}{\text{Sqrt}[2\,\pi\,d]}\,e^{-\frac{(t-a)^2}{2d}},\ \text{gist}[t]\right\},\ \{t, 1.16, 5.13\}\right],\ \text{ListLinePlot}[list]\right]$$

Out[120]=



```
(*4.Нахождение доверительных интервалов*)
p = 0.95;
aI = Interval[{avg - Quantile[StudentTDistribution[Length[x] - 1], (1 + p)/2] Sqrt[disp]/Sqrt[n - 1],
    avg + Quantile[StudentTDistribution[Length[x] - 1], (1 + p)/2] Sqrt[disp]/Sqrt[n - 1]}]
```

Out[124]= Interval[{2.82716, 3.28484}]

In[127]:=
```
σI = Interval[{n disp/Quantile[ChiSquareDistribution[n - 1], (1+p)/2],
    n disp/Quantile[ChiSquareDistribution[n - 1], (1-p)/2]}]
```

Out[127]= Interval[{0.56756, 1.26305}]

```
(*  5. Проверка гипотезы о нормальном
 распределении с помощью критерия согласия Пирсона*)
```

In[276]:=
```
ν = {};
p0 = {};
Clear[t];
For[i = 1, i ≤ Np, i++,
  AppendTo[ν , second[[i, 5]]];
  AppendTo[p0 , Integral_second[[i,2]]^second[[i,3]] 1/Sqrt[2 π d] e^-((t-avg)^2/(2 disp)) dt ];
 ];
Print["Вектор частот попадания = ", ν ];
Print["Вектор вероятностей попадания в интервал при условии H0 = ", p0 ];

t = Sum_{j=1}^{Np} ν[[j]]^2/(n p0[[j]]) - n;
Print["t=", t];
α = 0.05;
χ = 9.5;
If[t >= χ , Print["Гипотеза отвергается"], Print["Гипотеза не отвергается"] ];
```

```
Вектор частот попадания = {10, 15, 11, 6, 8}

Вектор вероятностей попадания в интервал при условии H0 =
 {0.190789, 0.227489, 0.245119, 0.171549, 0.0962896}

t=7.62692

Гипотеза не отвергается
```