

# LAMPIRAN

# LAMPIRAN 1

### Uji Normal Denyut Jantung Sebelum Untuk "X" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 87	< 86,95	0	-	-1,54066	0	0,061699	0,061699	2,03607	5,2293	4	0,28897
87,00 - 87,82	86,995 - 87,825	4	-1,540664	-1,0008	0,061699	0,158463	0,096763	3,19319	5,4108	8	1,239041
87,83 - 88,65	87,825 - 88,655	8	-1,000796	-0,46093	0,158463	0,322425	0,163962	5,41076	6,8981	4	1,217611
88,66 - 89,48	88,655 - 89,485	4	-0,460928	0,07894	0,322425	0,531460	0,209035	6,89815	6,6171	9	0,858094
89,49 - 90,31	89,485 - 90,315	9	0,07894	0,61881	0,531460	0,731979	0,200519	6,61712	8,8447	8	0,080672
90,32 - 91,14	90,315 - 91,145	5	0,618808	1,15868	0,731979	0,876706	0,144727	4,776			
91,15 - 91,97	91,145 - 91,975	0	1,158677	1,69854	0,876706	0,955298	0,078592	2,59352			
> 91,01	> 91,975	3	1,698545	-	0,955298	1,000000	0,044702	1,47518			
		33									3,684389

Contoh – contoh Perhitungan :

$$\begin{aligned}
 k &= 3,3 \text{ Log } n + 1 \\
 &= 3,3 \text{ Log } 33 + 1 \\
 &= 6,011 \approx 6 \text{ kelas} \\
 c &= \frac{\text{data max} - \text{data min}}{k} = \frac{92 - 87}{6,011} = 0,8318 \approx 0,83
 \end{aligned}$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{2949}{33} = 89,36$$

$$\begin{aligned}
 S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(88 - 89,36)^2 + (88 - 89,36)^2 + \dots + (87 - 89,36)^2}{33 - 1}} \\
 &= \sqrt{\frac{75,64}{32}} = 1,54
 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{86,95 - 89,36}{1,54} = -1,54$$

$$\begin{aligned}
 E_i &= P(Z_2) - P(Z_1) * n \\
 &= (0,16 - 0,06) * 33 \\
 &= 3,19
 \end{aligned}$$

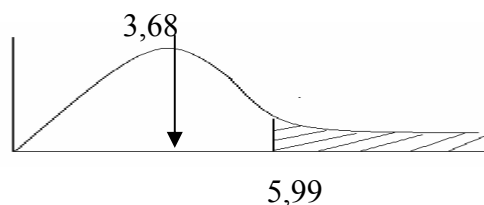
$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{87,87 - 89,36}{1,5} = -1,00$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 3,68$$

$$\begin{aligned}
 v &= k - r - 1 \\
 &= 5 - 2 - 1 \\
 &= 2
 \end{aligned}$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,2)} = 5,99$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $3,68 < 5,99$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sesudah Untuk "X" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 114	< 113,995	0	-	-1,89018	0	0,029367	0,029367	0,96911			
114,00 - 114,82	113,995 - 114,825	3	-1,89018	-1,25232	0,029367	0,105227	0,075860	2,50338	8,8921	7	0,403
114,83 - 115,65	114,825 - 115,655	4	-1,252318	-0,61446	0,105227	0,269457	0,164230	5,41958			
115,66 - 116,48	115,655 - 116,485	9	-0,614457	0,023405	0,269457	0,509336	0,239879	7,91602	7,916	9	0,148
116,49 - 117,31	116,485 - 117,315	11	0,023405	0,661266	0,509336	0,745779	0,236443	7,80262	7,8026	11	1,310
117,32 - 118,14	117,315 - 118,145	4	0,661266	1,299127	0,745779	0,903050	0,157271	5,18994			
118,15 - 118,97	118,145 - 118,975	0	1,299127	1,936989	0,903050	0,973627	0,070577	2,32903	8,3893	6	0,680
> 118,97	> 118,975	2	1,936989	-	0,973627	1,000000	0,026373	0,87032			
		33									2,542

Contoh – contoh Perhitungan :

$$\begin{aligned}
 k &= 3,3 \text{ Log } n + 1 \\
 &= 3,3 \text{ Log } 33 + 1 \\
 &= 6,011 \approx 6 \text{ kelas}
 \end{aligned}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{119 - 114}{6,011} = 0,8318 \approx 0,83$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{3841}{33} = 116,39$$

$$\begin{aligned}
 S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(115 - 116,39)^2 + \dots + (115 - 116,39)^2}{33 - 1}} \\
 &= \sqrt{\frac{54,18}{32}} = 1,3
 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{113,995 - 116,39}{1,3} = -1,89$$

$$\begin{aligned}
 E_i &= P(Z_2) - P(Z_1) * n \\
 &= (0,10 - 0,03) * 33 \\
 &= 2,5
 \end{aligned}$$

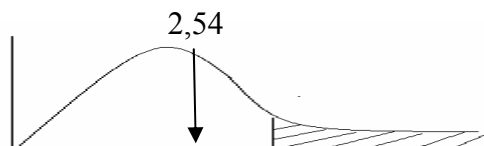
$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{114,825 - 116,39}{1,3} = -1,25$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 2,54$$

$$\begin{aligned}
 v &= k - r - 1 \\
 &= 4 - 2 - 1 \\
 &= 1
 \end{aligned}$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



3,84

Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $2,54 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Konsumsi Energi Untuk "X" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 1,924	< 1,800	0	-	-1,77316	0	0,038101	0,038101	1,25732	5,1104	4	0,241281
1,924 - 1,994	1,919 - 1,999	4	-1,773164	-1,0158	0,038101	0,154861	0,116761	3,8531			
2,004 - 2,074	1,999 - 2,079	10	-1,015804	-0,25844	0,154861	0,398033	0,243171	8,02465	8,0246	10	0,486255
2,084 - 2,154	2,079 - 2,159	10	-0,258443	0,49892	0,398033	0,691081	0,293049	9,67061	9,6706	10	0,011219
2,164 - 2,234	2,159 - 2,239	6	0,498918	1,25628	0,691081	0,895492	0,204411	6,74557	10,194	9	0,139921
2,244 - 2,314	2,239 - 2,319	2	1,256278	2,01364	0,895492	0,977976	0,082484	2,72197			
2,324 - 2,394	2,319 - 2,399	0	2,013639	2,771	0,977976	0,997206	0,019230	0,63457			
> 2,394	> 2,399	1	2,771	-	0,997206	1,000000	0,002794	0,09221			
		33									0,878676

Contoh – contoh Perhitungan :

$$k = 3,3 \text{ Log } n + 1$$

$$= 3,3 \text{ Log } 33 + 1$$

$$= 6,011 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{2,407 - 1,924}{6,011} = 0,08$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{69,507}{33} = 2,11$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(2,228 - 2,11)^2 + \dots + (2,113 - 2,11)^2}{33 - 1}}$$

$$= \sqrt{\frac{0,357}{32}} = 0,106$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{1,919 - 2,11}{0,106} = -1,77$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,155 - 0,038) * 33$$

$$= 3,8531$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{1,999 - 2,11}{0,106} = -1,01$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 0,88$$

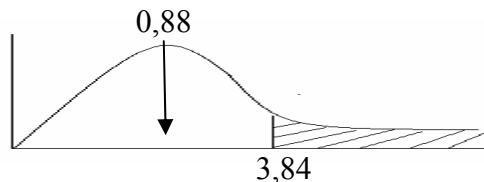
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha,v)}$  ( $0,88 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal R Untuk "X" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 6,369	< 6,364	0	-	-2,05327	0	0,020023	0,020023	0,66077			
6,369 - 7,109	6,364 - 7,114	2	-2,053268	-1,33555	0,020023	0,090847	0,070824	2,3372	8,8552	9	0,002367
7,119 - 7,859	7,114 - 7,864	7	-1,335555	-0,61784	0,090847	0,268340	0,177493	5,85726			
7,869 - 8,609	7,864 - 8,614	10	-0,617841	0,09987	0,268340	0,539777	0,271437	8,95743	8,9574	10	0,121347
8,619 - 9,359	8,614 - 9,364	10	0,099872	0,81759	0,539777	0,793203	0,253426	8,36306	8,3631	10	0,320407
9,369 - 10,109	9,364 - 10,114	3	0,817586	1,5353	0,793203	0,937645	0,144442	4,76658			
10,119 - 10,859	10,114 - 10,864	1	1,5353	2,25301	0,937645	0,987871	0,050226	1,65746	6,8243	4	1,168859
> 10,59	> 10,864	0	2,253013	-	0,987871	1,000000	0,012129	0,40026			
		33									1,61298

Contoh – contoh Perhitungan :

$$k = 3,3 \text{ Log } n + 1$$

$$= 3,3 \text{ Log } 33 + 1$$

$$= 6,011 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{10,881 - 6,369}{6,011} = 0,75$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{280,82}{33} = 8,51$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(7,344 - 8,51)^2 + \dots + (8,274 - 8,51)^2}{33 - 1}}$$

$$= \sqrt{\frac{34,94}{32}} = 1,044$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{6,364 - 8,51}{1,044} = -2,05$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,09 - 0,02) * 33$$

$$= 2,34$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{7,114 - 8,51}{1,044} = -1,33$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 1,61$$

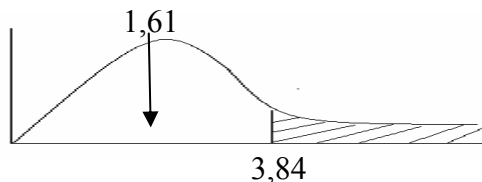
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha,v)}$  ( $1,61 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sebelum Untuk "Y" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 87	< 86,995	0	-	-1,64176	0	0,050320	0,050320	1,66057			
87,00 - 87,82	86,995 - 87,825	4	-1,641757	-1,08082	0,050320	0,139889	0,089569	2,95578	9,952	9	0,091059
87,83 - 88,65	87,825 - 88,655	5	-1,080817	-0,51988	0,139889	0,301574	0,161685	5,33561			
88,66 - 89,48	88,655 - 89,485	7	-0,519878	0,041062	0,301574	0,516377	0,214802	7,08848	7,0885	7	0,001104
89,49 - 90,31	89,485 - 90,315	11	0,041062	0,602001	0,516377	0,726413	0,210037	6,93121	6,9312	11	2,388477
90,32 - 91,14	90,315 - 91,145	2	0,602001	1,162941	0,726413	0,877573	0,151160	4,98828			
91,15 - 91,97	91,145 - 91,975	0	1,162941	1,723881	0,877573	0,957635	0,080062	2,64205	9,0284	6	1,015793
> 91,97	> 91,975	4	1,723881	-	0,957635	1,000000	0,042365	1,39803			
		33									3,496433

Contoh – contoh Perhitungan :

$$k = 3,3 \text{ Log } n + 1$$

$$= 3,3 \text{ Log } 33 + 1$$

$$= 6,011 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{92 - 87}{6,011} = 0,83$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{2951}{33} = 89,42$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(89 - 89,42)^2 + \dots + (92 - 89,42)^2}{33 - 1}}$$

$$= \sqrt{\frac{70,06}{32}} = 1,48$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{86,995 - 89,42}{1,48} = -1,64$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,139 - 0,05) * 33$$

$$= 2,96$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{87,825 - 89,42}{1,48} = -1,08$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 3,49$$

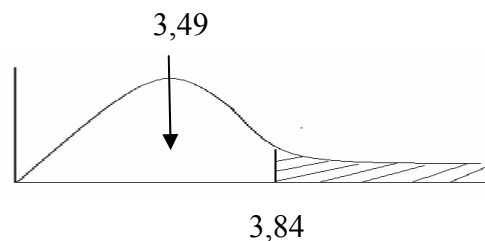
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $3,49 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sesudah Untuk "Y" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 114	< 113,995	0	-	-1,96004	0	0,024995	0,024995	0,82485			
114,00 - 114,82	113,995 - 114,825	2	-1,960044	-1,32218	0,024995	0,093054	0,068058	2,24593	8,1472	6	0,565916
114,83 - 115,65	114,83 - 115,66	4	-1,322183	-0,68432	0,093054	0,246886	0,153833	5,07647			
115,66 - 116,48	115,66 - 116,49	11	-0,684321	-0,04646	0,246886	0,481472	0,234586	7,74133	7,7413	11	1,371721
116,49 - 117,31	116,49 - 117,32	9	-0,04646	0,5914	0,481472	0,722874	0,241402	7,96628	7,9663	9	0,134138
117,32 - 118,14	117,32 - 118,15	4	0,591402	1,22926	0,722874	0,890513	0,167639	5,53209			
118,15 - 118,97	118,15 - 118,98	0	1,229263	1,86712	0,890513	0,969058	0,078545	2,59197	9,1451	7	0,50318
> 119,01	> 119,02	3	1,867124	-	0,969058	1,000000	0,030942	1,02109			
		33									2,5749556

Contoh – contoh Perhitungan :

$$\begin{aligned}
 k &= 3,3 \text{ Log } n + 1 \\
 &= 3,3 \text{ Log } 33 + 1 \\
 &= 6,011 \approx 6 \text{ kelas}
 \end{aligned}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{119 - 114}{6,011} = 0,8318 \approx 0,83$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{3846}{33} = 116,55$$

$$\begin{aligned}
 S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(115 - 116,55)^2 + \dots + (118 - 116,55)^2}{33 - 1}} \\
 &= \sqrt{\frac{54,45}{32}} = 1,3
 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{113,995 - 116,55}{1,3} = -1,96$$

$$\begin{aligned}
 E_i &= P(Z_2) - P(Z_1) * n \\
 &= (0,093 - 0,025) * 33 \\
 &= 2,24
 \end{aligned}$$

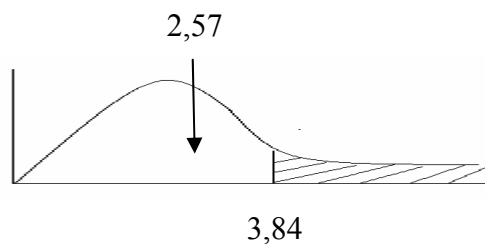
$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{114,825 - 116,55}{1,3} = -1,32$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 2,57$$

$$\begin{aligned}
 v &= k - r - 1 \\
 &= 4 - 2 - 1 \\
 &= 1
 \end{aligned}$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $2,57 < 3,84$ ) berarti data-data mengikuti distribusi Normal.



## Pengujian Konsumsi Energi Untuk "Y" Rute A

### Uji Normal Konsumsi Energi Untuk "Y" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 1,951	< 1,946	0	-	-1,77396	0	0,038035	0,038035	1,25516			
1,951 - 1,991	1,946 - 1,996	5	-1,773958	-1,14794	0,038035	0,125496	0,087461	2,88621	9,9284	12	0,432254
2,001 - 2,041	1,996 - 2,046	7	-1,147943	-0,52193	0,125496	0,300860	0,175364	5,78701			
2,051 - 2,091	2,046 - 2,096	6	-0,521928	0,104086	0,300860	0,541450	0,240589	7,93945	7,9395	6	0,47377
2,101 - 2,141	2,096 - 2,146	6	0,104086	0,730101	0,541450	0,767336	0,225886	7,45424	7,4542	6	0,283708
2,151 - 2,191	2,146 - 2,196	5	0,730101	1,356116	0,767336	0,912469	0,145133	4,78939			
2,201 - 2,241	2,196 - 2,246	4	1,356116	1,982131	0,912469	0,976268	0,063799	2,10536	7,6779	9	0,227653
> 2,361	> 2,366	0	1,982131	-	0,976268	1,000000	0,023732	0,78317			
		33									1,417386

Contoh – contoh Perhitungan :

$$\begin{aligned}
 k &= 3,3 \log n + 1 \\
 &= 3,3 \log 33 + 1 \\
 &= 6,011 \approx 6 \text{ kelas}
 \end{aligned}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{2,229 - 1,951}{6,011} = 0,046$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{68,89}{33} = 2,09$$

$$\begin{aligned}
 S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(2,228 - 2,09)^2 + \dots + (2,069 - 2,09)^2}{33 - 1}} \\
 &= \sqrt{\frac{0,204}{32}} = 0,08
 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{1,946 - 2,09}{0,08} = -1,773$$

$$\begin{aligned}
 E_i &= P(Z_2) - P(Z_1) * n \\
 &= (0,12 - 0,04) * 33 \\
 &= 2,89
 \end{aligned}$$

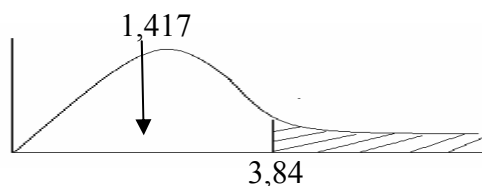
$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{2,016 - 2,09}{0,08} = -1,14$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 1,417$$

$$\begin{aligned}
 v &= k - r - 1 \\
 &= 4 - 2 - 1 \\
 &= 1
 \end{aligned}$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $1,417 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal R Untuk "Y" Rute A

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 7,338	<7,288	0	-	-1,58504	0	0,056479	0,056479	1,86381	6,2512	5	0,250431
7,338 - 7,838	7,288 - 7,888	5	-1,585037	-0,88	0,056479	0,189430	0,132951	4,38739	7,5021	10	0,83167
7,848 - 8,348	7,798 - 8,398	10	-0,985754	-0,28071	0,162127	0,389465	0,227338	7,50214	9,0882	6	1,049362
8,358 - 8,858	8,308 - 8,908	6	-0,386471	0,318568	0,349574	0,624973	0,275399	9,08817	7,8008	7	0,08221
8,868 - 9,368	8,818 - 9,418	7	0,212812	0,917851	0,584263	0,820652	0,236388	7,80081	7,353	5	0,752979
9,378 - 9,878	9,328 - 9,928	3	0,812095	1,517134	0,791632	0,935384	0,143752	4,74382			
9,888 - 10,388	9,838 - 10,438	2	1,411379	2,116418	0,920933	0,982845	0,061912	2,04309			
> 10,338	> 10,438				2,116418	-	0,982845	1,000000	0,017155	0,5661	
		33									2,9666514

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 33 + 1$$

$$= 6,011 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{10,387 - 7,338}{6,011} = 0,51$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{285,0175}{33} = 8,64$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(7,344 - 8,64)^2 + \dots + (8,726 - 8,64)^2}{33 - 1}}$$

$$= \sqrt{\frac{23,710}{32}} = 0,85$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{7,288 - 8,64}{0,85} = -1,58$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,19 - 0,056) * 33$$

$$= 4,39$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{7,888 - 8,64}{0,85} = -0,88$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 2,97$$

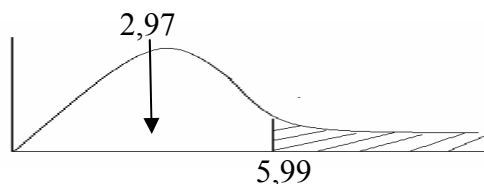
$$v = k - r - 1$$

$$= 5 - 2 - 1$$

$$= 2$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,2)} = 5,99$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $2,97 < 5,99$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sebelum Untuk "X" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 87	< 86,95	0	-	-1,56993	0	0,058216	0,058216	1,74647	5,7691	4	0,542513
87,00 - 87,84	86,995 - 87,845	4	-1,569929	-0,86944	0,058216	0,192304	0,134089	4,02266			
87,85 - 88,69	87,845 - 88,695	7	-0,869436	-0,16894	0,192304	0,432921	0,240617	7,2185	7,2185	7	0,006614
88,70 - 89,54	88,695 - 89,545	10	-0,168943	0,53155	0,432921	0,702481	0,269560	8,08681	8,0868	10	0,452623
89,55 - 90,39	89,545 - 90,395	7	0,531551	1,23204	0,702481	0,891034	0,188552	5,65657	8,9256	9	0,000621
90,40 - 91,24	90,395 - 91,245	1	1,232044	1,93254	0,891034	0,973353	0,082320	2,46959			
91,25 - 92,09	91,245 - 92,095	1	1,932537	2,63303	0,973353	0,995769	0,022415	0,67246			
> 92,09	> 92,095	0	2,633031	-	0,995769	1,000000	0,004231	0,12694			
		30									1,00237

Contoh – contoh Perhitungan :

$$\begin{aligned}
 k &= 3,3 \text{ Log } n + 1 \\
 &= 3,3 \text{ Log } 30 + 1 \\
 &= 5,87 \approx 6 \text{ kelas}
 \end{aligned}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{92 - 87}{5,87} = 0,85$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{2667}{30} = 88,9$$

$$\begin{aligned}
 S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(88 - 88,9)^2 + \dots + (87 - 88,9)^2}{30 - 1}} \\
 &= \sqrt{\frac{51,92}{29}} = 1,21
 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{86,995 - 88,9}{1,21} = -1,57$$

$$\begin{aligned}
 E_i &= P(Z_2) - P(Z_1) * n \\
 &= (0,19 - 0,058) * 33 \\
 &= 4,02
 \end{aligned}$$

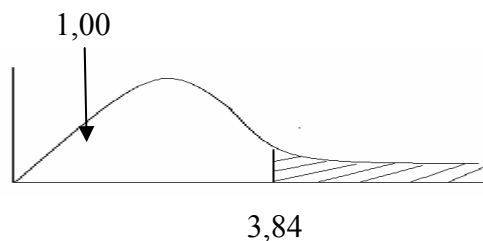
$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{87,845 - 88,9}{1,21} = -0,87$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 1,00$$

$$\begin{aligned}
 v &= k - r - 1 \\
 &= 4 - 2 - 1 \\
 &= 1
 \end{aligned}$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha,v)}$  ( $1,00 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sesudah Untuk "X" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 114	< 113,995	0	-	-1,84333	0	0,032641	0,032641	0,97922	9,2223	9	0,00536
114,00 - 114,84	113,995 - 114,845	1	-1,843325	-1,17326	0,032641	0,120345	0,087704	2,63113			
114,85 - 115,69	114,845 - 115,695	8	-1,173264	-0,5032	0,120345	0,307411	0,187066	5,61198			
115,70 - 116,54	115,695 - 116,545	8	-0,503203	0,16686	0,307411	0,566259	0,258848	7,76545	7,7655	8	0,007084
116,55 - 117,39	116,545 - 117,395	8	0,166858	0,83692	0,566259	0,798681	0,232422	6,97266	6,9727	8	0,151368
117,40 - 118,24	117,395 - 118,245	3	0,83692	1,50698	0,798681	0,934092	0,135411	4,06233			
118,25 - 119,09	118,245 - 119,095	2	1,506981	2,17704	0,934092	0,985261	0,051169	1,53507	6,0396	5	0,178936
> 119,09	> 119,095	0	2,177042	-	0,985261	1,000000	0,014739	0,44216			
		30									0,342748

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{119 - 114}{5,87} = 0,85$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{3490}{30} = 116,33$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(88 - 116,33)^2 + \dots + (87 - 116,33)^2}{30 - 1}}$$

$$= \sqrt{\frac{46,67}{29}} = 1,27$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{113,995 - 116,33}{1,27} = -1,84$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{114,845 - 116,33}{1,27} = -1,17$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 0,34$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$

$$E_i = P(Z_2) - P(Z_1) * n$$

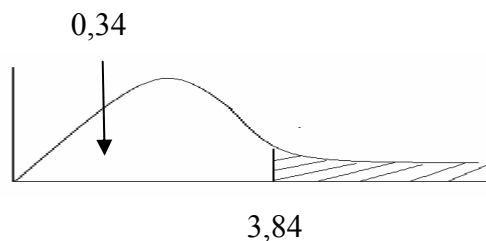
$$= (0,12 - 0,03) * 30$$

$$= 2,63$$

$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $0,34 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

## Uji Normal Konsumsi Energi Untuk "X" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 1,99	< 1,985	0	-	-1,48671	0	0,068545	0,068545	2,05636	5,2283	7	0,600387
1,99 - 2,03	1,985 - 2,035	7	-1,486713	-0,9374	0,068545	0,174276	0,105731	3,17192	5,241	3	0,958201
2,04 - 2,08	2,035 - 2,085	3	-0,937402	-0,38809	0,174276	0,348975	0,174699	5,24096	6,452	7	0,046549
2,09 - 2,13	2,085 - 2,135	7	-0,38809	0,16122	0,348975	0,564040	0,215066	6,45197	5,9182	4	0,621713
2,14 - 2,18	2,135 - 2,185	4	0,161221	0,71053	0,564040	0,761313	0,197273	5,91818	7,1606	9	0,472495
2,19 - 2,23	2,185 - 2,235	6	0,710532	1,25984	0,761313	0,896137	0,134824	4,04472			
2,24 - 2,28	2,235 - 2,285	3	1,259844	1,80915	0,896137	0,964787	0,068649	2,05948			
> 2,28	> 2,285	0	1,809155	-	0,964787	1,000000	0,035213	1,0564			
		30									2,699345

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{2,29 - 1,99}{5,87} = 0,05$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{63,61}{30} = 2,12$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(2,228 - 2,12)^2 + \dots + (2,113 - 2,12)^2}{30 - 1}}$$

$$= \sqrt{\frac{0,246}{29}} = 0,09$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{1,985 - 2,12}{0,09} = -1,49$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,17 - 0,069) * 30$$

$$= 3,17$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{2,035 - 2,12}{0,09} = -0,94$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 2,699$$

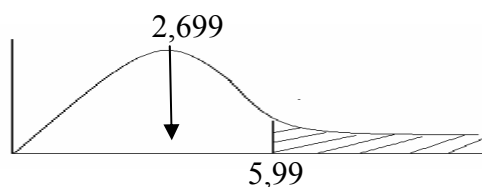
$$v = k - r - 1$$

$$= 5 - 2 - 1$$

$$= 2$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,2)} = 5,99$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $2,699 < 5,99$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal R Untuk "X" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> )/e <sub>i</sub>
< 6,969	< 6,965	0	-	-1,53294	0	0,062645	0,062645	1,87935			
6,97 - 7,43	6,969 - 7,435	6	-1,532943	-1,00757	0,062645	0,156830	0,094185	2,82555	9,4449	11	0,25603
7,44 - 7,90	7,435 - 7,901	5	-1,007572	-0,4822	0,156830	0,314832	0,158002	4,74005			
7,90 - 8,37	7,901 - 8,367	8	-0,482201	0,04317	0,314832	0,517217	0,202385	6,07156	6,0716	8	0,612508
8,37 - 8,83	8,367 - 8,833	2	0,04317	0,56854	0,517217	0,715166	0,197949	5,93847	5,9385	2	2,612048
8,83 - 9,30	8,833 - 9,299	4	0,568541	1,09391	0,715166	0,863003	0,147837	4,43511			
9,30 - 9,76	9,299 - 9,765	5	1,093911	1,61928	0,863003	0,947307	0,084304	2,52911	8,545	9	0,024226
> 9,78	> 9,785	0	1,619282	-	0,947307	1,000000	0,052693	1,5808			
		30									3,504811

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{9,707 - 6,97}{5,87} = 0,469$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{249,85}{30} = 8,33$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(7,344 - 8,33)^2 + \dots + (8,274 - 8,33)^2}{30 - 1}}$$

$$= \sqrt{\frac{22,82}{29}} = 0,89$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{6,969 - 8,33}{0,89} = -1,53$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,157 - 0,06) * 30$$

$$= 2,82$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{7,435 - 8,33}{0,89} = -1,00$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 3,5$$

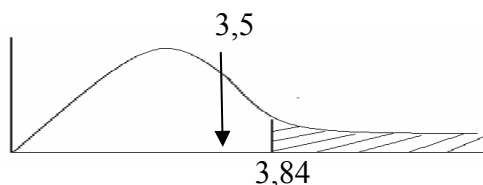
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $3,5 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal Denyut Jantung Sebelum Untuk "Y" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 87	< 86,95	0	-	-1,61322	0	0,053348	0,053348	1,60045	5,4757	4	0,397709
87,00 - 87,84	86,995 - 87,845	4	-1,613219	-0,90579	0,053348	0,182524	0,129175	3,87526	7,1658	6	0,189651
87,85 - 88,69	87,845 - 88,695	6	-0,905788	-0,19836	0,182524	0,421383	0,238859	7,16576	8,198	11	0,957695
88,70 - 89,54	88,695 - 89,545	11	-0,198358	0,50907	0,421383	0,694649	0,273267	8,198	9,1605	9	
89,55 - 90,39	89,545 - 90,395	7	0,509072	1,2165	0,694649	0,888103	0,193454	5,80362			
90,40 - 91,24	90,395 - 91,245	1	1,216503	1,92393	0,888103	0,972819	0,084715	2,54146			
91,25 - 92,09	91,245 - 92,095	1	1,923933	2,63136	0,972819	0,995748	0,022929	0,68788			
> 92,09	> 92,095	0	2,631364	-	0,995748	1,000000	0,004252	0,12756			2,81E-03
		30									1,547867

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{92 - 87}{5,87} = 0,85$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{2668}{30} = 88,93$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(90 - 88,93)^2 + \dots + (92 - 88,93)^2}{30 - 1}}$$

$$= \sqrt{\frac{41,87}{29}} = 1,2$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{86,995 - 88,93}{1,2} = -1,61$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,182 - 0,053) * 30$$

$$= 3,87$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{87,845 - 88,93}{1,2} = -0,90$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 1,55$$

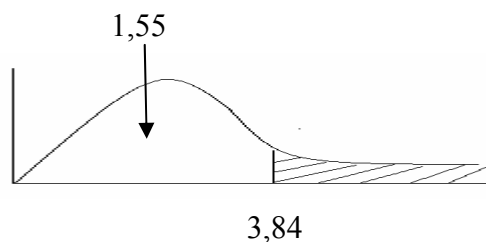
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha,v)}$  ( $1,55 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

## Uji Normal Denyut Jantung Sesudah Untuk "Y" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 114	< 113,995	0	-	-1,48727	0	0,068472	0,068472	2,05416	5,9625	5	0,155368
114,00 - 114,84	113,995 - 114,845	5	-1,487268	-0,8461	0,068472	0,198750	0,130278	3,90833	6,602	5	0,388727
114,85 - 115,69	114,845 - 115,695	5	-0,846096	-0,20492	0,198750	0,418816	0,220066	6,60199	7,4957	11	1,638312
115,70 - 116,54	115,695 - 116,545	11	-0,204924	0,436249	0,418816	0,668672	0,249856	7,49568	9,9398	9	0,088865
116,55 - 117,39	116,545 - 117,395	5	0,436249	1,077421	0,668672	0,859354	0,190682	5,72046			
117,40 - 118,24	117,395 - 118,245	3	1,077421	1,718593	0,859354	0,957156	0,097802	2,93406			
118,25 - 119,09	118,245 - 119,095	1	1,718593	2,359766	0,957156	0,990857	0,033701	1,01103			
> 119,09	> 119,095	0	2,359766	-	0,990857	1,000000	0,009143	0,2743			
		30									2,2712725

Contoh – contoh Perhitungan :

$$\begin{aligned} k &= 3,3 \log n + 1 \\ &= 3,3 \log 30 + 1 \\ &= 5,87 \approx 6 \text{ kelas} \end{aligned}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{119 - 114}{5,87} = 0,85$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{3479}{30} = 115,97$$

$$\begin{aligned} S &= \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(116 - 115,97)^2 + \dots + (116 - 115,97)^2}{30 - 1}} \\ &= \sqrt{\frac{58,1}{29}} = 1,33 \end{aligned}$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{113,995 - 115,97}{1,33} = -1,49$$

$$\begin{aligned} E_i &= P(Z_2) - P(Z_1) * n \\ &= (0,1988 - 0,07) * 30 \\ &= 3,9 \end{aligned}$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{114,845 - 115,97}{1,33} = -0,85$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 2,27$$

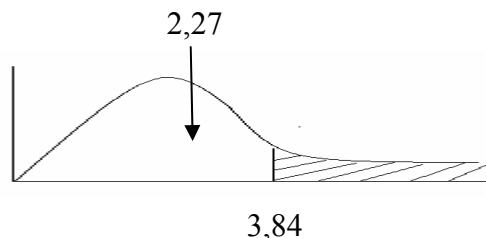
$$v = k - r - 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$= 4 - 2 - 1$$

$$\chi^2_{(0,05,1)} = 3,84$$

$$= 1$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $2,27 < 3,84$ ) berarti data-data mengikuti distribusi Normal.



### Uji Normal Konsumsi Energi Untuk "Y" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 1,907	< 1,885	0	-	-1,70056	0	0,044513	0,044513	1,3354			
1,91 - 1,97	1,902 - 1,972	5	-1,700555	-1,04407	0,044513	0,148226	0,103713	3,11138	10,475	9	0,20764
1,98 - 2,04	1,972 - 2,042	4	-1,044073	-0,38759	0,148226	0,349159	0,200934	6,02801			
2,05 - 2,11	2,042 - 2,112	8	-0,387591	0,26889	0,349159	0,605993	0,256834	7,70502	7,705	8	0,011293
2,12 - 2,18	2,112 - 2,182	7	0,268891	0,92537	0,605993	0,822614	0,216621	6,49863	6,4986	7	0,038682
2,19 - 2,25	2,182 - 2,252	5	0,925373	1,58186	0,822614	0,943159	0,120545	3,61634			
2,26 - 2,32	2,252 - 2,322	1	1,581856	2,23834	0,943159	0,987400	0,044242	1,32725	5,3216	6	0,086489
> 2,36	> 2,365	0	2,238338	-	0,987400	1,000000	0,012600	0,37799			
		30									0,344104

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{2,301 - 1,892}{5,87} = 0,07$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{62,5}{30} = 2,08$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n - 1}} = \sqrt{\frac{(2,018 - 2,08)^2 + \dots + (2,082 - 2,08)^2}{30 - 1}}$$

$$= \sqrt{\frac{0,33}{29}} = 0,11$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{1,902 - 2,08}{0,11} = -1,7$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,15 - 0,044) * 30$$

$$= 3,11$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{1,972 - 2,08}{0,11} = -1,04$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 0,34$$

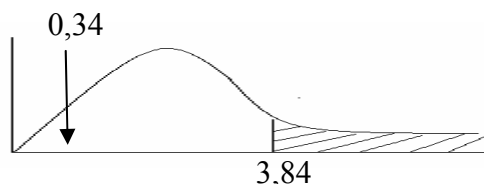
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha,v)}$  ( $0,34 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Normal R Untuk "Y" Rute B

Interval Kelas	Batas Kelas	O <sub>i</sub>	Z <sub>1</sub>	Z <sub>2</sub>	P(Z <sub>1</sub> )	P(Z <sub>2</sub> )	P(Z <sub>2</sub> )-P(Z <sub>1</sub> )	E <sub>i</sub>	E <sub>i</sub> Gab	O <sub>i</sub> Gab	(o <sub>i</sub> -e <sub>i</sub> ) <sup>2</sup> /e <sub>i</sub>
< 6,89	< 6,885	0	-	-1,49726	0	0,067163	0,067163	2,01488			
6,89 - 7,66	6,885 - 7,665	6	-1,497261	-0,88476	0,067163	0,188143	0,120981	3,62943	11,781	13	0,126049
7,67 - 8,44	7,665 - 8,445	7	-0,884758	-0,27226	0,188143	0,392713	0,204569	6,13708			
8,45 - 9,22	8,445 - 9,225	7	-0,272255	0,34025	0,392713	0,633165	0,240452	7,21356	7,2136	7	0,006323
9,23 - 10,00	9,225 - 10,005	5	0,340247	0,95275	0,633165	0,829642	0,196477	5,8943	5,8943	5	0,135687
10,01 - 10,78	10,005 - 10,785	1	0,95275	1,56525	0,829642	0,941238	0,111597	3,3479			
10,79 - 11,56	10,785 - 11,565	4	1,565253	2,17776	0,941238	0,985288	0,044050	1,32149	5,1107	5	0,0024
> 11,56	> 11,565	0	2,177756	-	0,985288	1,000000	0,014712	0,44136			
		30									0,270458

Contoh – contoh Perhitungan :

$$k = 3,3 \log n + 1$$

$$= 3,3 \log 30 + 1$$

$$= 5,87 \approx 6 \text{ kelas}$$

$$c = \frac{\text{data max} - \text{data min}}{k} = \frac{11,58 - 6,89}{5,87} = 0,78$$

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{n} = \frac{263,75}{30} = 8,79$$

$$S = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N - 1}} = \sqrt{\frac{(9,348 - 8,79)^2 + \dots + (9,348 - 8,79)^2}{30 - 1}}$$

$$= \sqrt{\frac{49,42}{29}} = 1,27$$

$$Z_1 = \frac{\text{batas bawah} - \bar{X}}{S} = \frac{6,885 - 8,79}{1,27} = -1,5$$

$$E_i = P(Z_2) - P(Z_1) * n$$

$$= (0,188 - 0,067) * 30$$

$$= 3,62$$

$$Z_2 = \frac{\text{batas atas} - \bar{X}}{S} = \frac{7,665 - 8,79}{1,27} = -0,88$$

$$\chi^2 = \sum \frac{(O_{ig} - E_{ig})^2}{E_{ig}} = 0,27$$

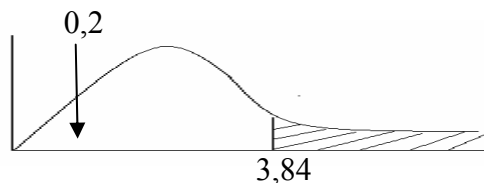
$$v = k - r - 1$$

$$= 4 - 2 - 1$$

$$= 1$$

$$\alpha = 1 - \text{tingkat kepercayaan} = 1 - 0,95 = 0,05$$

$$\chi^2_{(0,05,1)} = 3,84$$



Karena  $\chi^2 < \chi^2_{(\alpha, v)}$  ( $0,2 < 3,84$ ) berarti data-data mengikuti distribusi Normal.

### Uji Seragam Denyut Jantung Sebelum Untuk "X" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	88	88	90	88,67
2	92	89	88	89,67
3	90	90	92	90,67
4	89	92	88	89,67
5	87	90	90	89
6	89	88	88	88,33
7	91	91	88	90
8	90	91	90	90,33
9	90	89	91	90
10	88	90	87	88,33
11	87	91	87	88,33
	$\bar{x}$			89,364

$$\bar{x} = \frac{\sum x_i}{k} = \frac{938}{11} = 89,36$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{X})^2}{n-1}} = \sqrt{\frac{(88-89,36)^2 + (88-89,36)^2 + \dots + (87-89,36)^2}{33-1}}$$

$$= \sqrt{\frac{75,64}{32}} = 1,53$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,53}{\sqrt{3}} = 0,89$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

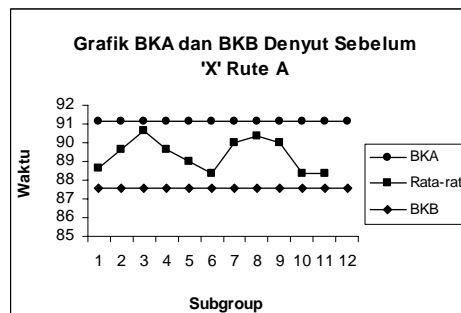
$$= 89,36 + (2 * 0,89)$$

$$= 91,14$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 89,36 - (2 * 0,89)$$

$$= 87,59$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sesudah Untuk "X" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	117	116	117	116,7
2	118	116	118	117,3
3	117	114	118	116,3
4	118	117	114	116,3
5	116	117	116	116,3
6	116	116	117	116,3
7	119	117	117	117,7
8	117	115	116	116
9	115	117	119	117
10	116	115	114	115
11	116	117	115	116
	$\bar{x}$			116,45

$$\bar{x} = \frac{\sum x_i}{k} = \frac{1281}{11} = 116,45$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(115-116,45)^2 + \dots + (119-116,45)^2}{33-1}}$$

$$= \sqrt{\frac{54,18}{32}} = 1,3$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,3}{\sqrt{3}} = 0,79$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

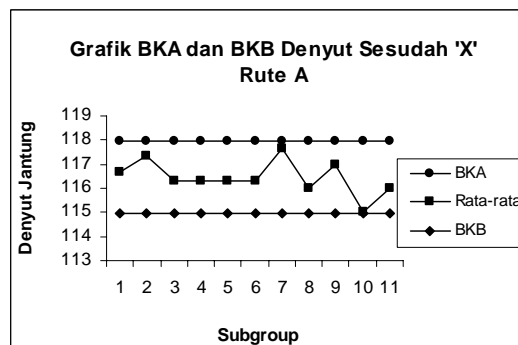
$$= 116,45 + (2 * 0,75)$$

$$= 117,957$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 116,45 - (2 * 0,75)$$

$$= 114,95$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Konsumsi Energi Untuk "X" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	2,228	2,14	2,106	2,158
2	2,069	2,08	2,407	2,185
3	2,285	2,018	2,069	2,124
4	2,257	1,98	1,967	2,068
5	2,2	2,106	2,018	2,108
6	2,124	2,14	1,924	2,063
7	2,044	2,132	2,228	2,135
8	2,106	2,044	2,018	2,056
9	2,018	2,168	2,177	2,121
10	2,14	1,931	2,027	2,033
11	2,2	2,044	2,113	2,119
	$\bar{x}$			2,1063

$$\bar{x} = \frac{\sum x_i}{k} = \frac{23,16}{11} = 2,10$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(2,228 - 2,1)^2 + \dots + (2,113 - 2,1)^2}{33-1}}$$

$$= \sqrt{\frac{0,357}{32}} = 0,09$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{0,09}{\sqrt{3}} = 0,054$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

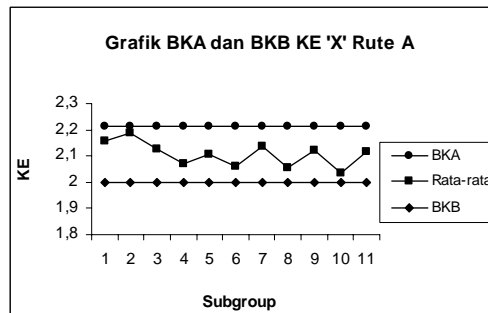
$$= 2,1 + (2 * 0,054)$$

$$= 2,21$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 2,1 - (2 * 0,054)$$

$$= 1,99$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam R Untuk "X" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	7,344	8,023	8,34	7,902
2	8,726	8,611	6,369	7,902
3	6,987	9,348	8,726	8,354
4	7,159	9,897	10,11	9,054
5	7,544	8,34	9,348	8,411
6	8,174	8,023	10,88	9,026
7	9,023	8,092	7,344	8,153
8	8,34	9,023	9,348	8,904
9	9,348	7,792	7,715	8,285
10	8,023	10,75	9,233	9,336
11	7,544	9,023	8,274	8,28
	$\bar{x}$			8,5096

$$\bar{x} = \frac{\sum x_i}{k} = \frac{93,606}{11} = 8,509$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(7,344 - 8,509)^2 + \dots + (8,274 - 8,509)^2}{33-1}}$$

$$= \sqrt{\frac{34,94}{32}} = 0,93$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{0,93}{\sqrt{3}} = 0,54$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

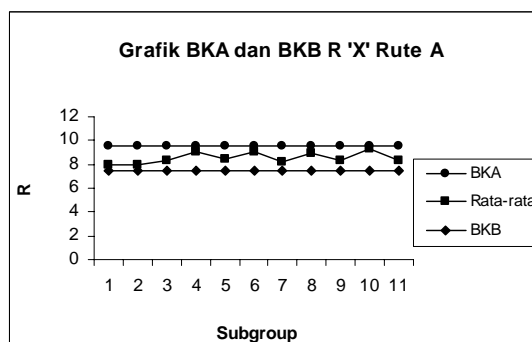
$$= 8,509 + (2 * 0,54)$$

$$= 9,59$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 8,509 - (2 * 0,54)$$

$$= 7,43$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sebelum Untuk "Y" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	88	88	90	88,67
2	91	92	90	91
3	87	90	87	88
4	90	88	89	89
5	90	89	90	89,67
6	88	89	92	89,67
7	90	90	89	89,67
8	89	89	87	88,33
9	90	91	87	89,33
10	89	92	90	90,33
11	88	90	92	90
	$\bar{x}$			89,424

$$\bar{x} = \frac{\sum x_i}{k} = \frac{983,67}{11} = 89,42$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(89-89,42)^2 + \dots + (92-89,42)^2}{33-1}}$$

$$= \sqrt{\frac{70,06}{32}} = 1,48$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,48}{\sqrt{3}} = 0,85$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

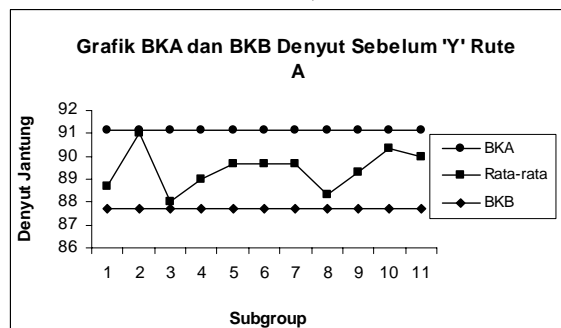
$$= 89,42 + (2 * 0,85)$$

$$= 91,13$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 89,42 - (2 * 0,85)$$

$$= 87,716$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sesudah Untuk "Y" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	117	114	116	115,7
2	117	119	116	117,3
3	114	118	116	116
4	117	115	119	117
5	116	117	118	117
6	116	117	119	117,3
7	115	116	118	116,3
8	116	115	116	115,7
9	117	117	115	116,3
10	116	117	116	116,3
11	116	117	118	117
	$\bar{x}$			116,55

$$\bar{x} = \frac{\sum x_i}{k} = \frac{1282}{11} = 116,55$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(117-116,55)^2 + \dots + (118-116,55)^2}{33-1}} = \sqrt{\frac{54,45}{32}} = 1,3$$

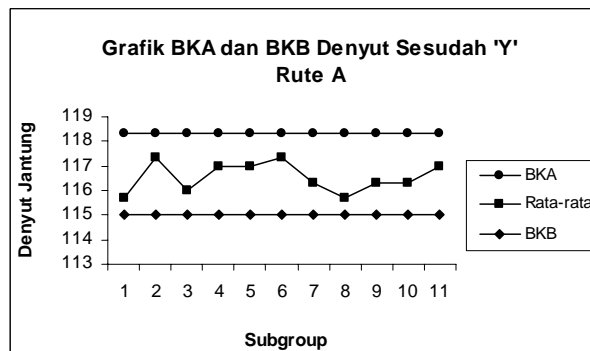
$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,3}{\sqrt{3}} = 0,75$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$\begin{aligned} BKA &= \bar{x} + c \cdot \sigma_x \\ &= 116,55 + (2 * 0,75) \\ &= 118,32 \end{aligned}$$

$$\begin{aligned} BKB &= \bar{x} - c \cdot \sigma_x \\ &= 116,55 - (2 * 0,75) \\ &= 115,04 \end{aligned}$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.



### Uji Seragam Konsumsi Energi Untuk "Y" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	2,228	1,967	2,018	2,071
2	2,044	1,98	2,018	2,014
3	2,027	2,195	2,113	2,112
4	2,106	2,053	2,168	2,109
5	2,062	2,168	2,195	2,142
6	2,14	2,168	1,951	2,086
7	2,018	2,018	2,212	2,083
8	2,08	1,993	2,229	2,1
9	2,106	2,044	2,113	2,088
10	2,08	1,98	2,062	2,041
11	2,14	2,15	2,069	2,12
	$\bar{x}$			2,0877

$$\bar{x} = \frac{\sum x_i}{k} = \frac{22,965}{11} = 2,088$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(2,228 - 2,088)^2 + \dots + (2,069 - 2,088)^2}{33-1}}$$

$$= \sqrt{\frac{0,204}{32}} = 0,0799$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{0,07999}{\sqrt{3}} = 0,046$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

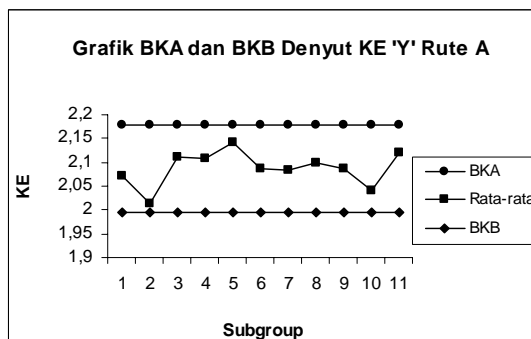
$$= 2,088 + (2 * 0,046)$$

$$= 2,179$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 2,088 - (2 * 0,046)$$

$$= 1,995$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam R Untuk "Y" Rute A

Subgrup ke-	Waktu ke-			Waktu rata-
	1	2	3	
1	7,344	10,11	9,348	8,933
2	9,023	9,897	9,348	9,423
3	9,233	7,58	8,274	8,362
4	8,34	8,907	7,792	8,347
5	8,806	7,792	7,58	8,06
6	8,023	7,792	10,39	8,734
7	9,348	9,348	7,457	8,718
8	8,611	9,708	7,338	8,552
9	8,34	9,023	8,274	8,545
10	8,611	9,897	8,806	9,105
11	8,023	7,935	8,726	8,228
	$\bar{x}$			8,6369

$$\bar{x} = \frac{\sum xi}{k} = \frac{95,006}{11} = 8,64$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(7,344 - 8,64)^2 + \dots + (8,726 - 8,64)^2}{33-1}}$$

$$= \sqrt{\frac{23,71}{32}} = 0,85$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{0,85}{\sqrt{3}} = 0,49$$

$$BKA = \bar{x} + c \cdot \sigma_x$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

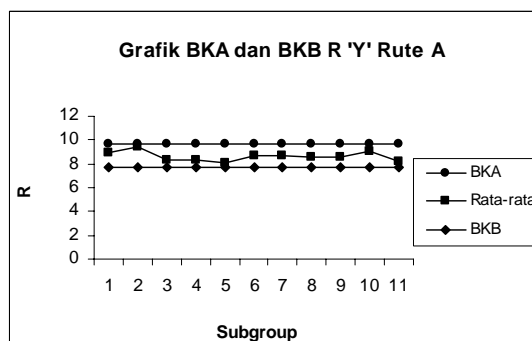
$$= 8,64 + (2 * 0,49)$$

$$= 9,62$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 8,64 - (2 * 0,49)$$

$$= 7,65$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sebelum "X" Rute B

Subgrup ke-	Waktu ke-					Rata-rata
	1	2	3	4	5	
1	88	89	89	89	91	89,2
2	88	88	88	87	92	88,6
3	89	88	89	89	90	89
4	89	89	88	90	90	89,2
5	88	87	87	90	90	88,4
6	89	90	90	89	87	89
	$\bar{x}$					88,9

$$\bar{x} = \frac{\sum xi}{k} = \frac{533,4}{6} = 88,9$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (Xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(88-88,9)^2 + \dots + (87-88,9)^2}{30-1}}$$

$$= \sqrt{\frac{49,15}{29}} = 1,21$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,21}{\sqrt{5}} = 0,5$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x$$

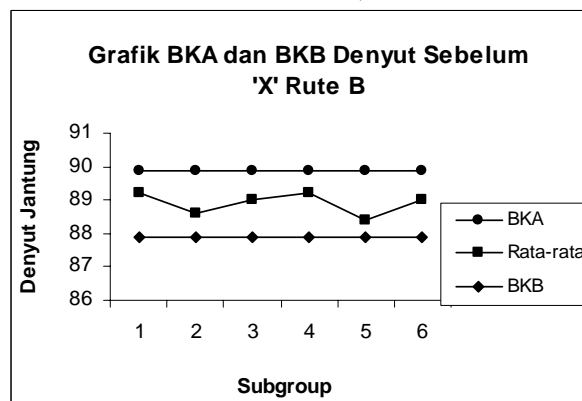
$$= 88,9 + (2 * 0,5)$$

$$= 89,89$$

$$BKB = \bar{x} - c \cdot \sigma_x$$

$$= 88,9 - (2 * 0,5)$$

$$= 87,906$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sesudah Untuk "X" Rute B

Subgrup ke-	Waktu ke-					Rata-rata
	1	2	3	4	5	
1	117	115	115	115	117	115,8
2	115	116	117	116	119	116,6
3	118	116	115	116	118	116,6
4	116	115	116	118	119	116,8
5	116	114	117	117	117	116,2
6	117	116	117	115	115	116
	$\bar{x}$					116,3

$$\bar{x} = \frac{\sum xi}{k} = \frac{698}{6} = 116,3$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(88-116,3)^2 + \dots + (87-116,3)^2}{30-1}}$$

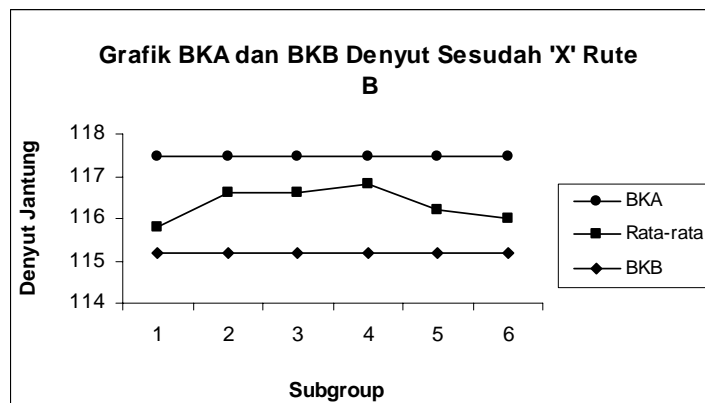
$$= \sqrt{\frac{46,67}{29}} = 1,27$$

$$\sigma_x = \frac{\sigma}{\sqrt{n}} = \frac{1,27}{\sqrt{5}} = 0,55$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_x = 116,3 + (2 * 0,57) = 117,47$$

$$BKB = \bar{x} - c \cdot \sigma_x = 116,3 - (2 * 0,57) = 115,2$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Konsumsi Energi Untuk "X" Rute B

Subgrup ke-	Waktu ke-					Waktu rata-
	1	2	3	4	5	
1	2,228	1,993	1,993	1,993	2,044	2,05
2	2,053	2,14	2,228	2,2	2,114	2,147
3	2,257	2,184	1,993	2,109	2,195	2,147
4	2,124	2,036	2,097	2,195	2,24	2,138
5	2,228	2,027	2,288	2,106	2,15	2,16
6	2,168	2,018	2,106	1,993	2,113	2,079
					$\bar{x}$	2,1203

$$\bar{x} = \frac{\sum x_i}{k} = \frac{12,722}{6} = 2,12$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(2,228 - 2,12)^2 + \dots + (2,113 - 2,12)^2}{30-1}}$$

$$= \sqrt{\frac{0,25}{29}} = 0,091$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{0,091}{\sqrt{5}} = 0,041$$

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

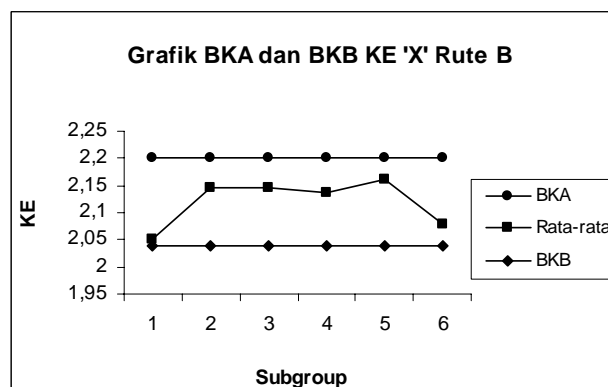
$$= 2,12 + (2 * 0,041)$$

$$= 2,20$$

$$BKB = \bar{x} - c \cdot \sigma_{\bar{x}}$$

$$= 2,12 - (2 * 0,041)$$

$$= 2,04$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

Uji Seragam R Untuk "X" Rute B

Subgrup ke-	Waktu ke-					Waktu rata-
	1	2	3	4	5	
1	7,344	9,708	9,708	9,708	9,023	9,098
2	8,907	8,023	7,344	7,544	8,264	8,016
3	7,159	7,662	9,708	8,313	7,58	8,084
4	8,174	9,116	8,434	7,58	7,266	8,114
5	7,344	9,233	6,969	8,34	7,935	7,964
6	7,792	9,348	8,34	9,708	8,274	8,692
					$\bar{x}$	8,3282

$$\bar{x} = \frac{\sum xi}{k} = \frac{49,97}{6} = 8,33$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(7,344 - 8,33)^2 + \dots + (8,274 - 8,33)^2}{30-1}}$$

$$= \sqrt{\frac{22,82}{29}} = 0,887$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{0,887}{\sqrt{5}} = 0,397$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

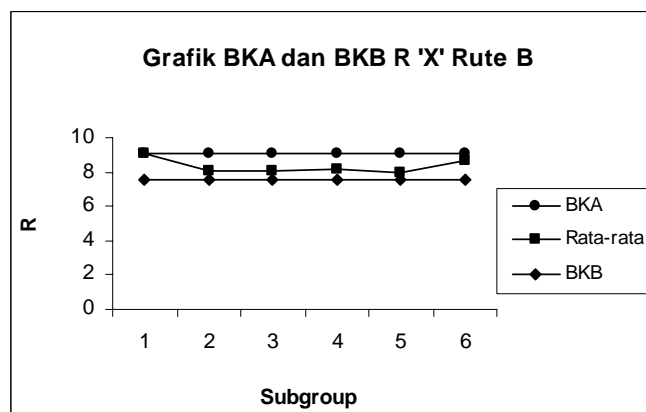
$$= 8,33 + (2 * 0,397)$$

$$= 9,12$$

$$BKB = \bar{x} - c \cdot \sigma_{\bar{x}}$$

$$= 8,33 - (2 * 0,397)$$

$$= 7,53$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

### Uji Seragam Denyut Jantung Sebelum Untuk "Y" Rute B

Subgrup ke-	Waktu ke-					Rata-rata
	1	2	3	4	5	
1	90	88	90	88	91	89,4
2	88	90	89	92	89	89,6
3	89	87	88	90	89	88,6
4	88	89	89	89	89	88,8
5	89	89	90	90	87	89
6	87	87	88	90	89	88,2
	$\bar{x}$					88,93

$$\bar{x} = \frac{\sum x_i}{k} = \frac{533,6}{6} = 88,93$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(90-88,93)^2 + \dots + (92-88,93)^2}{30-1}}$$

$$= \sqrt{\frac{41,87}{29}} = 1,2$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{1,20}{\sqrt{5}} = 0,54$$

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

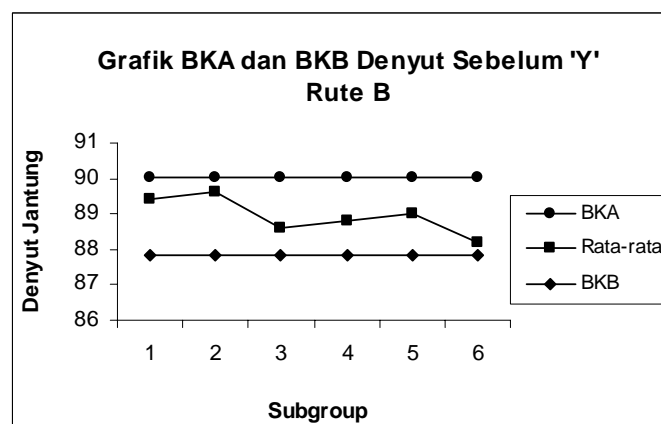
$$= 88,93 + (2 * 0,54)$$

$$= 90,00$$

$$BKB = \bar{x} - c \cdot \sigma_{\bar{x}}$$

$$= 88,93 - (2 * 0,54)$$

$$= 87,86$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

Uji Seragam Denyut Jantung Sesudah Untuk "Y" Rute B

Subgrup ke-	Waktu ke-					Rata-rata
	1	2	3	4	5	
1	116	116	118	117	117	116,8
2	117	116	114	116	116	115,8
3	119	115	114	118	117	116,6
4	116	114	114	117	116	115,4
5	116	115	116	118	114	115,8
6	115	115	115	116	116	115,4
					$\bar{x}$	116

$$\bar{x} = \frac{\sum xi}{k} = \frac{695,8}{6} = 116$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(116-116)^2 + \dots + (116-116)^2}{30-1}} = \sqrt{\frac{58,11}{29}} = 1,33$$

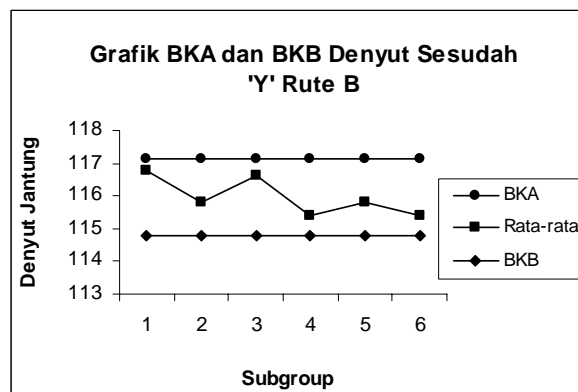
$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{1,33}{\sqrt{5}} = 0,59$$

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$\begin{aligned} BKA &= \bar{x} + c \cdot \sigma_{\bar{x}} \\ &= 116 + (2 * 0,59) \\ &= 117,152 \end{aligned}$$

$$\begin{aligned} BKB &= \bar{x} - c \cdot \sigma_{\bar{x}} \\ &= 116 - (2 * 0,59) \\ &= 114,78 \end{aligned}$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

Uji Seragam Konsumsi Energi Untuk "Y" Rute B



Subgrup ke-	Waktu ke-					Waktu rata-
	1	2	3	4	5	
1	2,018	2,14	2,195	2,228	2,044	2,125
2	2,228	2,018	1,907	1,892	2,08	2,025
3	2,301	2,113	1,967	2,195	2,168	2,149
4	2,169	1,907	1,907	2,168	2,08	2,046
5	2,08	1,993	2,062	2,195	2,027	2,071
6	2,156	2,113	2,053	2,018	2,08	2,084
					$\bar{x}$	2,0833

$$\bar{x} = \frac{\sum_{i=1}^k x_i}{k} = \frac{12,5}{6} = 2,08$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{n-1}} = \sqrt{\frac{(2,018 - 2,08)^2 + \dots + (2,08 - 2,08)^2}{30-1}}$$

$$= \sqrt{\frac{0,33}{29}} = 0,099$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{0,099}{\sqrt{5}} = 0,0441$$

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

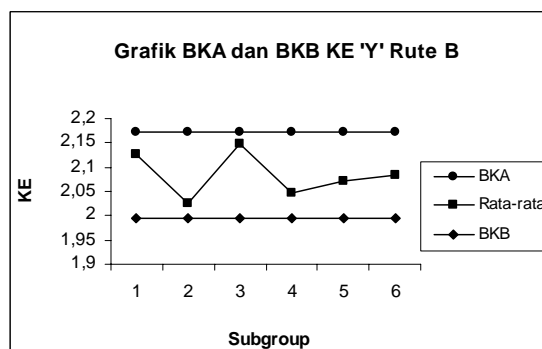
$$= 2,08 + (2 * 0,0441)$$

$$= 2,17$$

$$BKB = \bar{x} - c \cdot \sigma_{\bar{x}}$$

$$= 2,08 - (2 * 0,0441)$$

$$= 1,99$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

Uji Seragam R Untuk "Y" Route B

Subgrup ke-	Waktu ke-					Waktu rata-
	1	2	3	4	5	
1	9,348	8,023	7,58	7,344	9,023	8,264
2	7,344	9,348	11,25	11,58	8,611	9,627
3	6,893	8,274	10,11	7,58	7,792	8,129
4	7,777	11,25	11,25	7,792	8,611	9,338
5	8,611	9,708	8,806	7,58	9,233	8,788
6	7,886	8,274	8,907	8,611	9,348	8,605
					$\bar{x}$	8,7917

$$\bar{x} = \frac{\sum xi}{k} = \frac{52,75}{6} = 8,79$$

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (Xi - \bar{X})^2}{n-1}} = \sqrt{\frac{(9,348 - 8,79)^2 + \dots + (9,348 - 8,79)^2}{30-1}}$$

$$= \sqrt{\frac{49,42}{29}} = 1,27$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{1,27}{\sqrt{5}} = 0,57$$

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

Dimana : c = Nilai yang didapat dari tingkat kepercayaan, 95% = 2

$$BKA = \bar{x} + c \cdot \sigma_{\bar{x}}$$

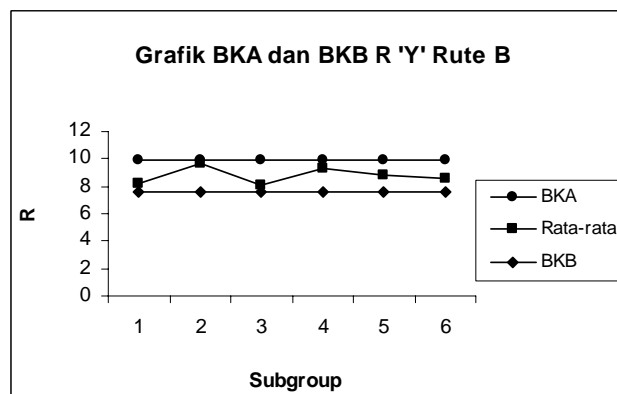
$$= 8,79 + (2 * 0,57)$$

$$= 9,93$$

$$BKB = \bar{x} - c \cdot \sigma_{\bar{x}}$$

$$= 8,79 - (2 * 0,57)$$

$$= 7,65$$



Semua data seragam karena tidak ada hasil dari rata – rata yang tidak seragam atau melebihi dari batas BKA dan BKB dan itu bisa dilihat pada grafik diatas.

Uji Cukup Denyut Jantung Sebelum Untuk "X" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$\left[ \left( \frac{2}{0,05} \right) * \sqrt{(33 * 263609) - 8696601} \right]^2$$

Karena  $N' < N$  ( $0,115 < 33$ ), maka data dikatakan cukup

Uji Cukup Denyut Jantung Sesudah Untuk "X" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$
$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 447589) - 14768649}}{3843} \right]^2$$
$$= 0,05$$

Karena  $N' < N$  ( $0,05 < 33$ ), maka data dikatakan cukup.

Uji Cukup Konsumsi Energi Untuk "X" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$
$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 146,76) - 4831,345}}{69,51} \right]^2$$
$$= 0,98$$

Karena  $N' < N$  ( $0,98 < 33$ ), maka data dikatakan cukup.

Uji Cukup R Untuk "X" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 2424,60) - 78858,72}}{280,82} \right]^2$$

$$= 5,85$$

Karena  $N' < N$  ( $5,85 < 33$ ), maka data dikatakan cukup.

Uji Cukup Denyut Jantung Sebelum Untuk "Y" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 263961) - 8708401}}{2951} \right]^2$$

$$= 0,33$$

Karena  $N' < N$  ( $0,33 < 33$ ), maka data dikatakan cukup

Uji Cukup Denyut Jantung Sesudah Untuk "Y" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 448288) - 14791716}}{3846} \right]^2$$

$$= 0,22$$

Karena  $N' < N$  ( $0,22 < 33$ ), maka data dikatakan cukup

Uji Cukup Konsumsi Energi Untuk "Y" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 448288) - 14791716}}{3846} \right]^2$$

Karena  $N' < N$  ( $0,75 < 33$ ), maka data dikatakan cukup.

Uji Cukup R Untuk "Y" Rute A

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$
$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 2484,84) - 81234,96}}{285,018} \right]^2$$
$$= 1,94$$

Karena  $N' < N$  ( $1,94 < 33$ ), maka data dikatakan cukup.

Uji Cukup Denyut Jantung Sebelum Untuk "X" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$
$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 237139) - 7112889}}{2667} \right]^2$$
$$= 0,072$$

Karena  $N' < N$  ( $0,0855 < 30$ ), maka data dikatakan cukup

Uji Cukup Denyut Jantung Sesudah Untuk "X" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 406050) - 12180100}}{3490} \right]^2$$

$$= 0,05$$

Karena  $N' < N$  ( $0,05 < 30$ ), maka data dikatakan cukup.

Uji Cukup Konsumsi Energi Untuk "X" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(30 * 135,11) - 4046,20}}{63,61} \right]^2$$

$$= 0,71$$

Karena  $N' < N$  ( $0,71 < 30$ ), maka data dikatakan cukup.

Uji Cukup R Untuk "X" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(30 * 2103,588) - 62423,15}}{249,85} \right]^2$$

$$= 4,39$$

Karena  $N' < N$  ( $4,39 < 30$ ), maka data dikatakan cukup.

Uji Cukup Denyut Jantung Sebelum Untuk "Y" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 227210) - 7118224}}{3490} \right]^2$$

Karena  $N' < N$  ( $0,071 < 30$ ), maka data dikatakan cukup

Uji Cukup Denyut Jantung Sesudah Untuk "Y" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 403499) - 12103441}}{3479} \right]^2$$

$= 0,05$   
 Karena  $N' < N$  ( $0,05 < 30$ ), maka data dikatakan cukup.

Uji Cukup Konsumsi Energi Untuk "Y" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * 130,54) - 3906,23}}{62,5} \right]^2$$

$$= 1,01$$

Karena  $N' < N$  ( $1,01 < 30$ ), maka data dikatakan cukup.

Uji Cukup R Untuk "Y" Rute B

$$N' = \left[ \frac{\left( \frac{c}{\alpha} \right) * \sqrt{(N * \sum x_i^2) - (\sum x_i)^2}}{\sum x_i} \right]^2$$

$$= \left[ \frac{\left( \frac{2}{0,10} \right) * \sqrt{(33 * \dots) - \dots}}{\dots} \right]^2$$

Karena  $N' < N$  ( $6,38 < 30$ ), maka data dikatakan cukup.

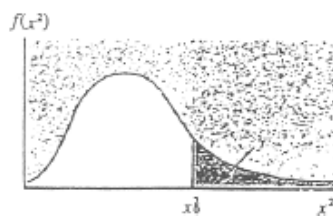


# LAMPIRAN 2

TABLE B\* RIGHT TAIL AREA OF THE  $\chi^2$  DISTRIBUTION†

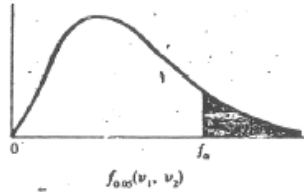
$\nu$	$\gamma$										
	0.995	0.990	0.975	0.950	0.900	0.500	0.100	0.050	0.025	0.010	0.005
1	0.00	0.00	0.00	0.00	0.02	0.45	2.71	3.84	5.02	6.63	7.88
2	0.01	0.02	0.05	0.10	0.21	1.39	4.61	5.99	7.38	9.21	10.60
3	0.07	0.11	0.22	0.35	0.58	2.37	6.25	7.81	9.35	11.34	12.84
4	0.21	0.30	0.48	0.71	1.06	3.36	7.78	9.49	11.14	13.28	14.86
5	0.41	0.55	0.83	1.15	1.61	4.35	9.24	11.07	12.83	15.09	16.75
6	0.68	0.87	1.24	1.64	2.20	5.35	10.65	12.59	14.45	16.81	18.55
7	0.99	1.24	1.69	2.17	2.83	6.35	12.02	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	3.49	7.34	13.36	15.51	17.53	20.09	21.96
9	1.73	2.09	2.70	3.33	4.17	8.34	14.68	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	4.87	9.34	15.99	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	5.58	10.34	17.28	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	6.30	11.34	18.55	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	7.04	12.34	19.81	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	7.79	13.34	21.06	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	8.55	14.34	22.31	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	9.31	15.34	23.54	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	10.09	16.34	24.77	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	10.87	17.34	25.99	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	11.65	18.34	27.20	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	12.44	19.34	28.41	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	13.24	20.34	29.62	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	14.04	21.34	30.81	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	14.85	22.34	32.01	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	15.66	23.34	33.20	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	16.47	24.34	34.38	37.65	40.65	44.31	46.93
26	11.16	12.20	13.84	15.38	17.29	25.34	35.56	38.89	41.92	45.64	48.29
27	11.81	12.88	14.57	16.15	18.11	26.34	36.74	40.11	43.19	46.96	49.65
28	12.46	13.57	15.31	16.93	18.94	27.34	37.92	41.34	44.46	48.28	50.99
29	13.12	14.26	16.05	17.71	19.77	28.34	39.09	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	20.60	29.34	40.26	43.77	46.98	50.89	53.67
40	20.71	22.16	24.43	26.51	29.05	39.34	51.80	55.76	59.34	63.69	66.77
50	27.99	29.71	32.36	34.76	37.69	49.33	63.17	67.50	71.42	76.15	79.49
70	43.28	45.44	48.76	51.74	55.33	69.33	85.53	90.53	95.02	100.42	104.22
100	67.33	70.06	74.22	77.93	82.36	99.33	118.50	124.34	129.56	135.81	140.17

†Taken by permission from Leland Blank, *Statistical Procedures for Engineering, Management, and Science*, McGraw-Hill Book Company, New York, 1980.



Given  $\gamma$ , the table gives the  $x_0^2$  value with  $\gamma$  of the area above it; that is,  $P(\chi^2 \geq x_0^2) = \gamma$

TABEL A.7  
Nilai Kritis Sebaran F



v <sub>2</sub>	v <sub>1</sub>								
	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.59	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.58	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96
∞	3.85	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

Lampiran

TABEL A.7 (lanjutan)  
Nilai Kritis Sebaran F  
 $f_{\alpha}(v_1, v_2)$

v <sub>2</sub>	v <sub>1</sub>									
	10	12	15	20	24	30	40	60	120	∞
1	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3
2	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36
6	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
∞	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00

TABEL A.7 (lanjutan)  
 Nilai Kriuk Sebaran  $F$   
 $f_{\alpha, \nu_1, \nu_2}$

$\nu_2$	$\nu_1$								
	1	2	3	4	5	6	7	8	9
1	4052	4999.5	5403	5625	5764	5859	5928	5981	6022
2	98.56	99.60	99.17	99.25	99.30	99.33	99.36	99.37	99.39
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16
6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.05	4.94
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56
$\infty$	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41

TABEL A.7 (lanjutan)  
 Nilai Kriuk Sebaran  $F$   
 $f_{\alpha, \nu_1, \nu_2}$

$\nu_2$	$\nu_1$										
	10	12	15	20	24	30	40	60	120	$\infty$	
1	6056	6106	6157	6209	6235	6261	6287	6313	6339	6366	
2	99.40	99.42	99.43	99.45	99.46	99.47	99.47	99.48	99.49	99.50	
3	27.23	27.05	26.87	26.69	26.60	26.50	26.41	26.32	26.22	26.13	
4	14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46	
5	10.05	9.89	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02	
6	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88	
7	6.66	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65	
8	5.81	5.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86	
9	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31	
10	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91	
11	4.56	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60	
12	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36	
13	4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17	
14	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00	
15	3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87	
16	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75	
17	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65	
18	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57	
19	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49	
20	3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42	
21	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36	
22	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31	
23	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26	
24	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21	
25	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17	
26	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13	
27	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10	
28	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06	
29	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.04	
30	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01	
40	2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80	
60	2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60	
120	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38	
$\infty$	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00	