

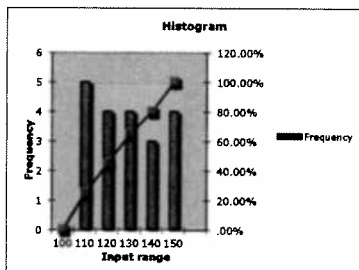
m	Rainfall Data [cm]	Sorted Data	Input range	k - estimate of number of bins	
1	102	102	100	5.29	start with 6
2	110	105	110		
3	117	106	120		
4	133	106	130		
5	105	110	140		
6	144	114	150		
7	149	117			
8	145	119			
9	127	119			
10	124	122			
11	122	124			
12	141	127			
13	138	130			
14	119	133			
15	119	136			
16	106	138			
17	114	141			
18	130	144			
19	106	145			
20	136	149			

Uniform pdfs are constant. This histogram is almost constant. Regular graph paper is OK for uniform distributions.

Number	Sorted Data	Bin	Observed Frequency "O"	Theoretical Frequency "T"	(O-T)^2/T
1	102	110	5.00	2.2	3.6
2	105	120	5.00	2.4	2.8
3	106	130	3.00	2.6	0.1
4	106	140	4.00	2.8	0.5
5	110	150	2.00	3	0.1
6	114		19.00	13	
7	117			total	7.3
8	119			f	3
9	119			m	5
10	122			k	1
11	124			Appendix 3	
12	127			1-0.05	0.95
13	130			Chi-Squared	7.815
14	133				OK
15	136				
16	138				
17	141				
18	144				
19	145				
20	149				

Sorted Data	
Mean	124.35
Standard Error	3.29
Median	123.00
Mode	106.00
Standard Deviation	14.71
Sample Variance	216.34
Kurtosis	-1.21
Skewness	0.10
Range	47.00
Minimum	102.00
Maximum	149.00
Sum	2487.00
Count	20.00

Input range	Observed Frequency	Cumulative %	The CDF is linear.
100	0	.00%	
110	5	25.00%	
120	4	45.00%	
130	4	65.00%	
140	3	80.00%	
150	4	100.00%	



<i>m</i>	<b>Sorted Scores</b>	<b><math>S_n=m/(N+1)</math></b>	<b><i>F Normal</i></b>	<b><math>D_n=abs(F-S_n)</math></b>
1	41	0.0323	0.0057	0.0265
2	45	0.0645	0.0121	0.0524
3	55	0.0968	0.0586	0.0381
4	60	0.1290	0.1108	0.0182
5	61	0.1613	0.1244	0.0369
6	63	0.1935	0.1548	0.0387
7	70	0.2258	0.2966	0.0708
8	71	0.2581	0.3208	0.0627
9	75	0.2903	0.4245	0.1342
10	75	0.3226	0.4245	0.1019
11	77	0.3548	0.4790	0.1241
12	77	0.3871	0.4790	0.0919
13	78	0.4194	0.5064	0.0870
14	79	0.4516	0.5338	0.0822
15	80	0.4839	0.5611	0.0772
16	81	0.5161	0.5880	0.0719
17	82	0.5484	0.6146	0.0662
18	82	0.5806	0.6146	0.0339
19	83	0.6129	0.6406	0.0277
20	85	0.6452	0.6906	0.0455
21	85	0.6774	0.6906	0.0132
22	85	0.7097	0.6906	0.0191
23	87	0.7419	0.7374	0.0046
24	88	0.7742	0.7593	0.0149
25	88	0.8065	0.7593	0.0472
26	91	0.8387	0.8187	0.0200
27	95	0.8710	0.8821	0.0111
28	95	0.9032	0.8821	0.0211
29	99	0.9355	0.9280	0.0075
30	100	0.9677	0.9369	0.0308

**mean 77.8**  
**stdev 14.5**

**Appendix 4**      **max**      **0.1342**  
**D30,0.05**      **0.242**

OK

<i>m</i>	<b>Sorted Scores</b>	<b>LN(Sorted Scores)</b>	<b><math>S_n = m / (N + 1)</math></b>	<b>F Normal</b>	<b><math>D_n = \text{abs}(F - S_n)</math></b>
1	41	3.7136	0.0323	0.0018	0.0305
2	45	3.8067	0.0645	0.0067	0.0578
3	55	4.0073	0.0968	0.0627	0.0341
4	60	4.0943	0.1290	0.1305	0.0015
5	61	4.1109	0.1613	0.1477	0.0136
6	63	4.1431	0.1935	0.1854	0.0081
7	70	4.2485	0.2258	0.3445	0.1187
8	71	4.2627	0.2581	0.3693	0.1113
9	75	4.3175	0.2903	0.4696	0.1793
10	75	4.3175	0.3226	0.4696	0.1470
11	77	4.3438	0.3548	0.5189	0.1640
12	77	4.3438	0.3871	0.5189	0.1318
13	78	4.3567	0.4194	0.5429	0.1236
14	79	4.3694	0.4516	0.5666	0.1150
15	80	4.3820	0.4839	0.5897	0.1058
16	81	4.3944	0.5161	0.6122	0.0961
17	82	4.4067	0.5484	0.6341	0.0857
18	82	4.4067	0.5806	0.6341	0.0534
19	83	4.4188	0.6129	0.6553	0.0424
20	85	4.4427	0.6452	0.6955	0.0503
21	85	4.4427	0.6774	0.6955	0.0180
22	85	4.4427	0.7097	0.6955	0.0142
23	87	4.4659	0.7419	0.7326	0.0094
24	88	4.4773	0.7742	0.7499	0.0243
25	88	4.4773	0.8065	0.7499	0.0565
26	91	4.5109	0.8387	0.7972	0.0415
27	95	4.5539	0.8710	0.8493	0.0216
28	95	4.5539	0.9032	0.8493	0.0539
29	99	4.5951	0.9355	0.8901	0.0454
30	100	4.6052	0.9677	0.8987	0.0690
<b>mean</b>	<b>77.8</b>	<b>4.3</b>	<b>Lambda</b>		
<b>stdev</b>	<b>14.5</b>	<b>0.2</b>	<b>Zeta</b>	<b>max</b>	<b>0.1793</b>
			<b>Appendix 4</b>	<b>D30,0.05</b>	<b>0.242</b>

OK, not as good as Normal

Limit State Equation		Y = g(X) = F <sub>y</sub> Z - 1140				
$\mu_{F_y}$ aka $\bar{F}_y$	38	$\zeta$	0.0998	Lognormal parameter, p. 69 of text; eqn 4-11		
$\sigma_{F_y}$	3.8	$\lambda$	3.63	Lognormal Parameter, eqn 4.10		
$\mu_z$	54					
$\sigma_z$	2.7					
$\beta$	3	3.5	4	4.5	5	<b>5.15</b>
Starting points						
$f_y^*$	38	25.95	26.62	25.51	24.46	24.20
$z^*$	54	49.77	48.84	48.11	47.38	47.10
$F_{F_y}(f_y^*)$	0.5199	8.05E-05	2.18E-04	3.99E-05	6.32E-06	3.87E-06
$f(f_y^*)$	1.05E-01	1.25E-04	3.09E-04	6.54E-05	1.184E-05	7.496E-06
$\Phi^{-1}[F_{F_y}(f_y^*)]$	0.0499	-3.7736	-3.5172	-3.9450	-4.3664	-4.4723
Equivalent Normal						
$\sigma_{F_y}^N$	3.79	2.59	2.66	2.54	2.44	2.41
$\mu_{F_y}^N$ equivalent Normal mean of $F_y$ p.206	37.81	35.72	35.96	35.55	35.11	35.00
$\mu_z = \mu_z^N$	54	54	54	54	54	54
$\sigma_z = \sigma_z^N$	2.7	2.7	2.7	2.7	2.7	2.7
Derivatives						
dg/Fy	54	49.77	48.84	48.11	47.38	47.10
dg/dz	38	25.95	26.62	25.51	24.46	24.20
Direction Cosines						
$\alpha_{F_y}$ eqn (7.66) p. 207	0.894	0.878	0.875	0.872	0.868	0.867
$\alpha_z$ eqn (7.66) p. 207	0.448	0.478	0.485	0.490	0.496	0.498
Evaluate g(X) at the point						
g( )	9.12E+02	1.51E+02	1.60E+02	8.73E+01	1.9E+01	4.21E-02
Final values						
$f_y^*$	38	20.36	23.86	24.22	24.22	<b>24.22</b>
$z^*$	54	47.77	47.15	47.08	47.07	<b>47.07</b>
product	2052	972.54	1125.05	1139.98	1140.10	<b>1140.10</b>

$\beta_{FOSM}$  3.98