PES University, Bangalore

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UE19CS203 – STATISTICS FOR DATA SCIENCE

Unit - 3 - Probability Distributions

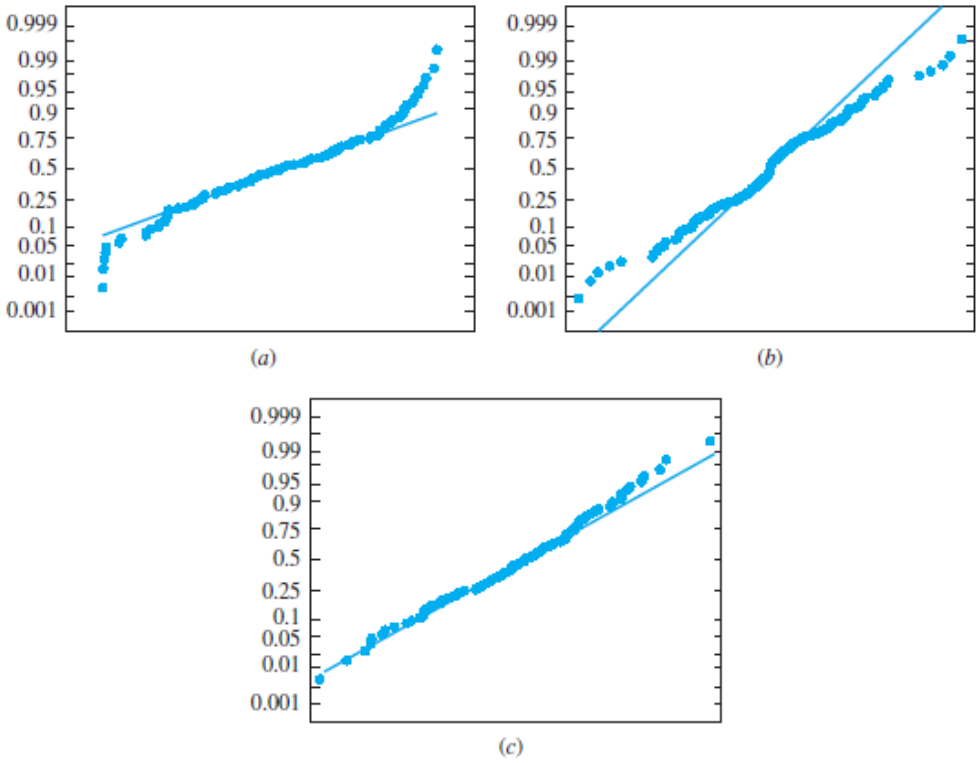
QUESTION BANK

Normal Probability Plot

Exercises for Section 4.10

[Text Book Exercise – Section 4.10 – Q. No. [1 – 8] – Pg. No. [289 - 290]]

1. Each of three samples has been plotted on a normal probability plot. For each, say whether the sample appears to have come from an approximately normal population.



2. As part of a quality-control study aimed at improving a production line, the weights (in ounces) of 50 bars of soap are measured. The results are as follows, sorted from smallest to largest.

11.6	12.6	12.7	12.8	13.1	13.3	13.6	13.7	13.8	14.1
14.3	14.3	14.6	14.8	15.1	15.2	15.6	15.6	15.7	15.8
15.8	15.9	15.9	16.1	16.2	16.2	16.3	16.4	16.5	16.5
16.5	16.6	17.0	17.1	17.3	17.3	17.4	17.4	17.4	17.6
17.7	18.1	18.3	18.3	18.3	18.5	18.5	18.8	19.2	20.3

Construct a normal probability plot for these data. Do these data appear to come from an approximately normal distribution?

3. Below are the durations (in minutes) of 40 eruptions of the geyser Old Faithful in Yellowstone National Park.

4.1	1.8	3.2	1.9	4.6	2.0	4.5	3.9	4.3	2.3
3.8	1.9	4.6	1.8	4.7	1.8	4.6	1.9	3.5	4.0
3.7	3.7	4.3	3.6	3.8	3.8	3.8	2.5	4.5	4.1
3.7	3.8	3.4	4.0	2.3	4.4	4.1	4.3	3.3	2.0

Construct a normal probability plot for these data. Do the data appear to come from an approximately normal distribution?

4. Below are the durations (in minutes) of 40 time intervals between eruptions of the geyser Old Faithful in Yellowstone National Park.

91	51	79	53	82	51	76	82	84	53
86	51	85	45	88	51	80	49	82	75
73	67	68	86	72	75	75	66	84	70
79	60	86	71	67	81	76	83	76	55

Construct a normal probability plot for these data. Do they appear to come from an approximately normal distribution?

5. Construct a normal probability plot for the PM data in Table 1.2 (page 21). Do the PM data appear to come from a normal population?

6. Construct a normal probability plot for the logs of the PM data in Table 1.2. Do the logs of the PM data appear to come from a normal population?

7. Can the plot in Exercise 6 be used to determine whether the PM data appear to come from a lognormal population? Explain. **(Exclude)**

8. In the article "Assessment of Dermatopharmacokinetic Approach in the Bioequivalence Determination of Topical Tretinoin Gel Products" (L. Pershing, J. Nelson, et al., Journal of the American Academy of Dermatology, 2003:740–751), measurements of the concentration of an anti-fungal gel, in ng per square centimeter of skin, were made one

hour after application for 49 individuals. Following are the results. The authors claim that these data are well-modeled by a lognormal distribution. Construct an appropriate probability plot and use it to determine whether the data support this claim. **(Exclude)**

132.44	76.73	258.46	177.46	73.01	130.62	235.63
107.54	75.95	70.37	88.76	104	19.07	174.3
82.87	68.73	41.47	120.44	136.52	82.46	67.04
96.92	93.26	72.92	138.15	82.43	245.41	104.68
82.53	122.59	147.12	129.82	54.83	65.82	75.24
135.52	132.21	85.63	135.79	65.98	349.71	77.84
89.19	102.94	166.11	168.76	155.2	44.35	202.51