Percentiles, Quartiles, and Deciles

Solutions

California Resident's Life Span

(Use Your TI-84 Calculator to Sort the Data)

Life Span Data		L	Sorted Life Span Data
68		1	25
45		2	34
80		3	36
34		4	45
55		5	45
67		6	45
68		7	52
88		8	52
90		9	55
25		10	64
36		11	65
45		12	67
52		13	68
68		14	68
65		15	68
70		16	70
72		17	72
45		18	80
52		19	88
89		20	89
97		21	90
64		22	97

1. Percentile of 52 $= \frac{6}{22} \cdot 100 \approx \boldsymbol{27th}$ **percentile**
2. Percentile of 70$= \frac{15}{22} \cdot 100 \approx \boldsymbol{68th}$ **percentile**
3. Percentile of 45$= \frac{3}{22} \cdot 100 \approx \boldsymbol{14th}$ **percentile**
4. $L = \frac{40}{100} \cdot 22 = 8.8$ *rounded up to* 9; $\boldsymbol{D_4 = P_{40} = 55}$
5. $L = \frac{25}{100} \cdot 22 = 5.5$ *rounded up to* 6; $\boldsymbol{Q_1 = P_{25} = 45}$
6. $L = \frac{90}{100} \cdot 22 = 19.8$ *rounded up to* 20; $\boldsymbol{D_9 = P_{90} = 89}$
7. $L = \frac{50}{100} \cdot 22 = 11$ Whole Number; $\boldsymbol{Q_2 = P_{50} = \frac{65+67}{2} = 66}$

8. $L = \frac{55}{100} \cdot 22 = 12.1\ rounded\ up\ to\ 13;\ \ \boldsymbol{P_{55} = 68}$
9. $L = \frac{10}{100} \cdot 22 = 2.2\ rounded\ up\ to\ 3;\ \boldsymbol{P_{10} = 36}$
10. $L = \frac{75}{100} \cdot 22 = 16.5\ rounded\ up\ to\ 17;\ \boldsymbol{Q_3 = P_{75} = 72}$

In earlier sections of this chapter we described several statist
mean, median, mode, range, and standard deviation. Some other st
using quartiles and percentiles, as in the following:

Interquartile range (or IQR) $= Q_3 - Q_1$

Semi-interquartile range $= \dfrac{Q_3 - Q_1}{2}$

Midquartile $= \dfrac{Q_3 + Q_1}{2}$

10–90 percentile range $= P_{90} - P_{10}$

11. Range$= 97 - 25 = \boldsymbol{72}$
12. IQR$= Q_3 - Q_1 = 72 - 45 = \boldsymbol{27}$
13. 10-90 Percentile Range$= P_{90} - P_{10} = 89 - 36 = \boldsymbol{53}$

Sleep Time

(Use Your TI-84 Calculator to Sort the Data)

Sleep Time Data		L	Sorted Sleep Time Data
6		1	0
0		2	0
7		3	4
4		4	4
6		5	4
7		6	5
7		7	5
6		8	5
5		9	5
8		10	6
10		11	6
4		12	6
8		13	6
5		14	6
6		15	6
7		16	7
6		17	7
7		18	7
7		19	7
5		20	7
8		21	7
6		22	7
0		23	8
7		24	8
5		25	8
4		26	10

14. Percentile of 8 $= \frac{22}{26} \cdot 100 \approx \boldsymbol{85th}$ **percentile**
15. Percentile of 6$= \frac{9}{26} \cdot 100 \approx \boldsymbol{35th}$ **percentile**
16. Percentile of 4$= \frac{2}{26} \cdot 100 \approx \boldsymbol{8th}$ **percentile**
17. $L = \frac{10}{100} \cdot 26 = 2.6$ *rounded up to* 3; $\boldsymbol{D_1 = P_{10} = 4}$
18. $L = \frac{25}{100} \cdot 26 = 6.5$ *rounded up to* 7; $\boldsymbol{Q_1 = P_{25} = 5}$
19. $L = \frac{90}{100} \cdot 26 = 23.4$ *rounded up to* 24; $\boldsymbol{D_9 = P_{90} = 8}$
20. $L = \frac{50}{100} \cdot 26 = 13$ Whole Number; $\boldsymbol{Q_2 = P_{50} = \frac{6+6}{2} = 6}$

21. $L = \frac{62}{100} \cdot 26 = 16.12 \ \ rounded\ up\ to\ 17\ ;\ \ \boldsymbol{P_{62} = 7}$

22. $L = \frac{38}{100} \cdot 26 = 9.88 \ \ rounded\ up\ to\ 10\ ;\ \ \boldsymbol{P_{38} = 6}$

23. $L = \frac{75}{100} \cdot 26 = 19.5 \ \ rounded\ up\ to\ 20;\ \ \boldsymbol{Q_3 = P_{75} = 7}$

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10–90 percentile range $= P_{90} - P_{10}$

24. Range$= 10 - 0 = \boldsymbol{10}$

25. IQR$= Q_3 - Q_1 = 7 - 5 = \boldsymbol{2}$

26. 10-90 Percentile Range$= P_{90} - P_{10} = 8 - 4 = \boldsymbol{4}$

Annual Rainfall (inches) for St. Vegas

(Use Your TI-84 Calculator to Sort the Data)

Annual Rain Fall Data
14.7
12.8
13.6
6.5
12.2
10.8
16.5
13.2
7.8
14.9
22.3
5.4
10.9

L	Sorted Annual Rainfall Data
1	5.4
2	6.5
3	7.8
4	10.8
5	10.9
6	12.2
7	12.8
8	13.2
9	13.6
10	14.7
11	14.9
12	16.5
13	22.3

27. Percentile of 12.8 $= \frac{6}{13} \cdot 100 \approx \boldsymbol{46th}$ **percentile**
28. Percentile of 14.9 $= \frac{10}{13} \cdot 100 \approx \boldsymbol{77th}$ **percentile**
29. Percentile of 7.8 $= \frac{2}{13} \cdot 100 \approx \boldsymbol{15th}$ **percentile**
30. $L = \frac{10}{100} \cdot 13 = 1.3\ rounded\ up\ to\ 2;\ \boldsymbol{D_1 = P_{10} = 6.5}$
31. $L = \frac{25}{100} \cdot 13 = 3.25\ \ rounded\ up\ to\ 4;\ \boldsymbol{Q_1 = P_{25} = 10.8}$
32. $L = \frac{70}{100} \cdot 13 = 9.1\ rounded\ up\ to\ 10;\ \boldsymbol{D_7 = P_{70} = 14.7}$
33. $L = \frac{50}{100} \cdot 13 = 6.5\ rounded\ up\ to\ 7;\ \boldsymbol{Q_2 = P_{50} = 12.8}$
34. $L = \frac{55}{100} \cdot 13 = 7.15\ rounded\ up\ to\ 8;\ \ \boldsymbol{P_{55} = 13.2}$
35. $L = \frac{90}{100} \cdot 13 = 11.7\ \ rounded\ up\ to\ 12;\ \ \boldsymbol{P_{90} = 16.5}$
36. $L = \frac{75}{100} \cdot 13 = 9.75\ \ rounded\ up\ to\ 10;\ \ \boldsymbol{Q_3 = P_{75} = 14.7}$

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$$\text{Semi-interquartile range} = \frac{Q_3 - Q_1}{2}$$

$$\text{Midquartile} = \frac{Q_3 + Q_1}{2}$$

$$\text{10–90 percentile range} = P_{90} - P_{10}$$

37. Range$= 22.3 - 5.4 = \mathbf{16.9}$
38. Inter quartile Range$= 14.7 - 10.8 = \mathbf{3.9}$
39. 10-90 Range$= P_{90} - P_{10} = 16.5 - 6.5 = \mathbf{10}$