BOXPLOT HOMEWORK

TEXT: 2.3, 2.4

LAST NAME	FIRST NAME	DATE

Consider the sample:

14, 10, 18, 13, 20

1. Find the z-score of 35.

2. Find the z-score of -1.

3. If the sample is representative of a normally distributed population, which observation would be more likely (and least surprising), 35 or -1?

4. If the population distribution parameters are fairly well estimated by the sample statistics, find a measurement that would have z-score 17.

Consider the following sample of size $n = 80$:

```
 6, 17, 17, 24, 29, 30, 31, 31, 31, 31,
31, 33, 34, 34, 35, 36, 36, 36, 38, 38,
38, 38, 40, 41, 41, 41, 41, 42, 43, 43,
44, 44, 45, 45, 47, 47, 48, 49, 51, 52,
53, 53, 53, 53, 55, 55, 56, 57, 58, 59,
60, 60, 60, 62, 62, 62, 62, 64, 66, 66,
66, 67, 67, 67, 70, 71, 71, 72, 72, 73,
74, 75, 75, 76, 77, 78, 78, 79, 79, 87
```

5. Find the 30th percentile

6. Find the 60th percentile

7. Find the percentile of the data value 73

8. Find the percentile of the data value 28

Consider the following sample data:

```
-37, -4, -2, -1, 2, 7, 10, 11, 14, 15, 16, 17, 18, 18, 20
```

Find the following statistics **by hand**:

9. first quartile

10. median

11. third quartile

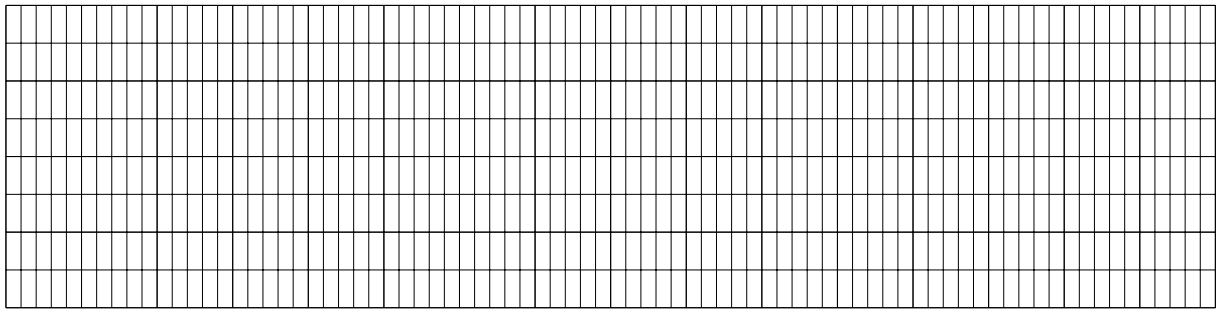
12. IQR

13. lower fence

14. upper fence

15. outliers (if any)

16. Construct a box-and-whisker plot for the sample:



Additionally, **use R** to find

17. sample mean $\overline{x}$

18. sample standard deviation s

19. z-score of the data point -37

20. measurement with z-score 3

21. 85th percentile of the sample data

22. percentile of the data value -1

23. Find the 10th percentile of the `state.area` dataset. State your answer as an English sentence describing what this percentile represents.

24. What percentile of the `state.area` dataset does the area of Nevada represent, at 110540 square miles?

25. What percentile of the `faithful$waiting` does an 80 minute measurement represent?

26. Find the 95th percentile of the `faithful$waiting` dataset. State your answer as an English sentence describing what this percentile represents.

Consider the dataset `quakes$mag` of earthquake magnitudes.

27. Find the magnitude of an earthquake such that only 3% of all earthquakes in the dataset are more intense.

28. Which percentile is the magnitude in the previous question?

Consider the sample data:

```
-20, -12, -1, 4, 4, 7, 8, 10, 10, 12, 12, 14, 18, 40
```

Find the following statistics **by hand**:

29. Q_1

30. Q_2

31. Q_3

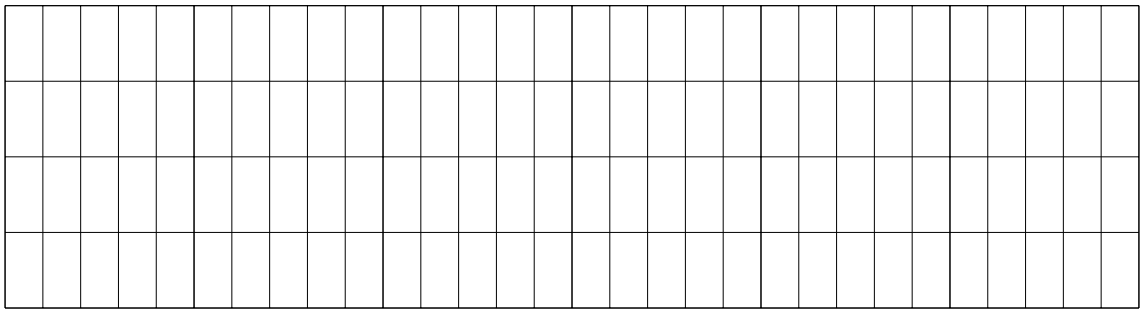
32. IQR

33. lower fence

34. upper fence

35. outliers (if any)

36. Use the statistics you've found to construct a box and whiskers plot:



Consider the sample data:

```
22, 18, 28, 29, 10, 12, 23, 26, 21, 30
```

Find the following sample statistics:

37. five-number summary

38. IQR

39. fences

40. outliers (if any)

Consider the following (sorted) sample of air temperatures in degrees Fahrenheit, $n = 60$:

```
-19, -19, -18, -17, -17, -17, -17, -16, -16, -15,
-13, -13, -12, -11, -11, -11, -10,  -9,  -8,  -7,
 -5,  -5,  -4,  -4,  -3,  -1,   1,   2,   6,   6,
  6,   8,   9,  10,  11,  11,  12,  14,  15,  15,
 15,  20,  21,  22,  24,  27,  27,  27,  27,  27,
 28,  28,  28,  32,  32,  33,  34,  35,  38,  39
```

41. Which percentile would a measurement of 30 degrees represent?

42. Find the 17th percentile of this sample data.

Consider the sample data:

```
-5, -4, -2, -1, 2, 7, 10, 11, 14, 15, 16, 17, 18, 18, 37
```

Find the following statistics **by hand**:

43. Q_1

44. Q_2

45. Q_3

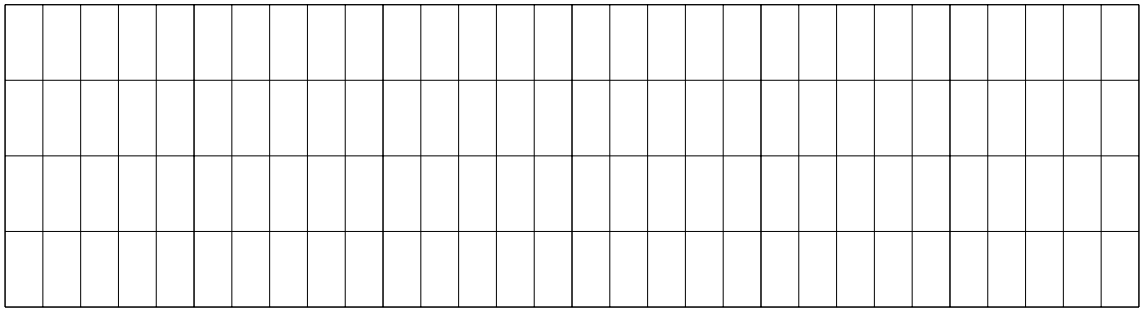
46. IQR

47. lower fence

48. upper fence

49. outliers (if any)

50. Use the statistics you've found to construct a box and whiskers plot:



ANSWERS

1. 5

3. -1 would be less surprising, with z-score closer to zero.

5. 41

7. 87.5%

9. -1

11. 17

13. -28

15. -37

17. 6.933333

19. -3.022995

21. 17.9

23. About 10% of all US states have the area of 8214.9 square miles or less.

25. 69th percentile

27. 5.5

29. 4

31. 12

33. -8

35. -20, -12, and 40

37. 10, 18, 22.5, 28, 30 (Q_1 and Q_3

39. lower fence: 3, upper fence: 43

41. 88th percentile