

Answer all questions using complete sentences.

1. Angela took a general aptitude test and scored in the 82nd percentile for aptitude in accounting. What percentage of the scores were at or below her score? What percentage were above?

82% were at or below

18% were above.

2. The town of Butler, Nebraska, decided to give a teacher-competency exam and defined the passing scores to be those in the 70th percentile or higher. The raw test scores ranged from 0 to 100. Was a raw score of 82 necessarily a passing score? Explain.

No, the raw score of 82 might have a percentile rank less than 70.

3. Consider the following ordered data: 2 5 | 5 6 $\overset{\textcircled{7}}{m}$ 7 8 | 9 10

a. Find the low, Q_1 , median, Q_3 , high. 5 8.5

Low: 2

Q_3 : 8.5

Q_1 : 5

High: 10

median: 7

- b. Find the interquartile range.

$$IQR = 8.5 - 5 = 3.5$$

- c. Make a box-and-whisker plot.

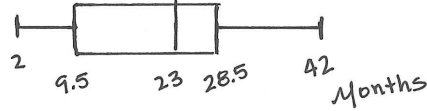


4. At Center Hospital there is some concern about the high turnover rate of nurses. A survey was done to determine how long (in months) nurses had been in their current positions. The responses (in months) of 20 nurses were

2	5	7	8	8	11	12	14	20	23
23	2	8	14	25	36	27	42	12	8 — Median
7	23	29	26	28	11	20	31	8	36
23	25	26	27	28	28.5	29	31	36	42

Make a box-and-whisker plot of the data. Find the interquartile range.

Low: 2
 Q_1 : 9.5
 median 23
 Q_3 : 28.5
 High: 42
 IQR = 19

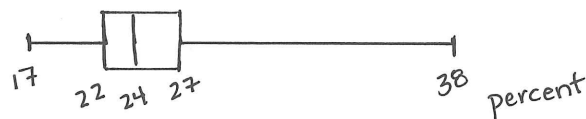


5. What percentage of the general U.S. population have bachelor's degrees? The *Statistical Abstract of the United States*, 120th Edition, gives the percentage of bachelor's degrees by state. For convenience, the data are sorted in increasing order.

17	18	18	18	19	20	20	20	21	21
21	21	22	22	22	22	22	22	23	23
24	24	24	24	24	24	24	24	25	26
26	26	26	26	26	27	27	27	27	27
28	28	29	31	31	32	32	34	35	38

- a. Make a box-and-whisker plot and find the interquartile range.

Low: 17
 Q_1 : 22
 Median: 24
 Q_3 : 27
 High: 38
 IQR = 5



- b. Illinois has a bachelor's degree percentage rate of about 26%. Into what quartile does this rate fall?

The 3rd Quartile since $24\% < 26\% < 27\%$

6. Some data sets include values so high or so low that they seem to stand apart from the rest of the data. These data are called *outliers*. Outliers may represent data collection errors, data entry errors, or simply valid but unusual data values. It is important to identify outliers in the data set and examine the outliers carefully to determine if they are in error. One way to detect outliers in to use a box-and-whisker plot. Data values that fall beyond the limits,

$$\text{Lower limit: } Q_1 - 1.5 \times (IQR)$$

$$\text{Upper limit: } Q_3 + 1.5 \times (IQR)$$

where IQR is the interquartile range, are suspected outliers.

Students from a statistics class were asked to record their heights in inches. The heights (as recorded) were

4	50	52	55	60	61	62	63	64	64	65	65	
55	72	68	64	60	55	73	71	52	63	61	74	Median
59	67	74	50	4	75	67	62	66	80	64	65	
66	67	67	68	69	71	72	73	74	74	75	80	

- a. Make a box-and-whisker plot of the data.

Low: 4

Q_1 : 61.5

Median: 65.5

Q_3 : 71.5

High: 80

$IQR = 10$



- b. Find the value of the interquartile range (IQR).

$$IQR = 10$$

- c. Multiply the IQR by 1.5 and find the lower and upper limits.

$$\text{lower limit: } 61.5 - 10(1.5) = 46.5$$

$$\text{upper limit: } 71.5 + 10(1.5) = 86.5$$

- d. Are there any data values below the lower limit? above the upper limit? List any suspected outliers. What might be some explanations for the outliers?

outlier: 4

- incorrectly wrote the wrong number
- could be in feet