

The values listed (in order) below give the commuting times (in minutes) for 24 randomly selected commuter students.

10 12 12 14 16 16 18 18 18 20 20 22 22 22 24 24 24 26 28 28 30 36 40 40

Steps for finding the  $k^{th}$  Percentile, (i.e. finding  $P_k$ )

Ex Find the 60<sup>th</sup> percentile of the data set above.

1. List the  $n$  data values in increasing order

1. ✓ Already done

2. Find the Location  $L$  of the percentile by computing

2. Location  $L = 60\% \cdot 24 = .60 \cdot 24 = 14.4$

$$L = k\% \times n = \frac{k}{100} \times n$$

3. Is  $L$  a whole number?

3. Since  $L = 14.4$  is not a whole number, round up:  $L = 15$

Yes	No
Keep $L$ the same	Round $L$ up to the next whole number
⇓	⇓

4.

4.  $P_{60}$  is the value in the 15<sup>th</sup> position. i.e.  $P_{60} = 24$

The value of $P_k$ is halfway between the $L^{th}$ value and the next value in the list	The value of $P_k$ is the $L^{th}$ value in the list
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Ex Find the 25<sup>th</sup> percentile of the data set above.

Ex Find the percentile corresponding to a 14 minute commute.

To find which percentile a value  $x$  belongs to, compute:

percentile (of value  $x$ ) =  $\frac{\text{number of values less than } x}{\text{total number of values } n} \times 100$

5. Suppose a that you have a normally distributed data set with a mean of 120 and a standard deviation of 15.

(a). How many standard deviations above the mean is the value 130? What is the  $z$ -score?

(b). How many standard deviations below the mean is the value 45? What is the  $z$ -score?

6. The Beanstalk Club is limited to tall women and men. Women's heights (in general) have a mean height of 63.6 in with a standard deviation of 2.5 in. The minimum height requirement for women is 70 in. Find the  $z$ -score corresponding to a woman with a height of 70 in. and determine whether it is unusual.

7. Given the following data set,

102	103	110	113	114	122	122	130	136	140	160	161
164	169	171	175	183	186	187	188	200	202	203	205
205	207	209	211	216	221	225	229	235	240	240	242
242	242	245	247	249	252	267	269	272	284	285	289

(a). Find  $P_{10}$

(b). Find  $P_{30}$

(c). Find  $Q_3$

(d). Find the percentile corresponding to the data value 171

(e). Find the percentile corresponding to the data value 235

8. Given the following data set

332   364   393   347   350   353   357   296   358   322   337   323   333   299   316   275

(a). Use your calculator to find the 5 number summary.

(b). Construct a boxplot.

9. The following data gives the time (in months) that 20 nurses have been at their current position at General Hospital.

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

The following data gives the time (in months) that 20 people in the clerical staff have been at their current position at General Hospital.

25   22   7   24   26   31   18   14   17   20   31   42   6   25   22   3   29   32   15   72

(a). Construct separate boxplots (on the same scale) for each data set.

(b). Compare the two data sets.

(c). Does the data indicate that General Hospital should be concerned that about a high turnover of nurses compared with the clerical staff?