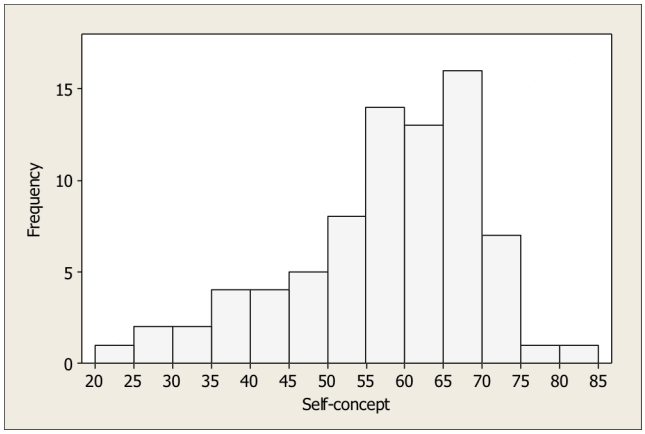
1. A group of 78 third-grade students in a Midwestern elementary school took a "self-concept" test that measured how well they felt about themselves. Higher scores indicate more positive self-concepts. A histogram and some summary statistics from Minitab for these students' self-concept scores are given below.



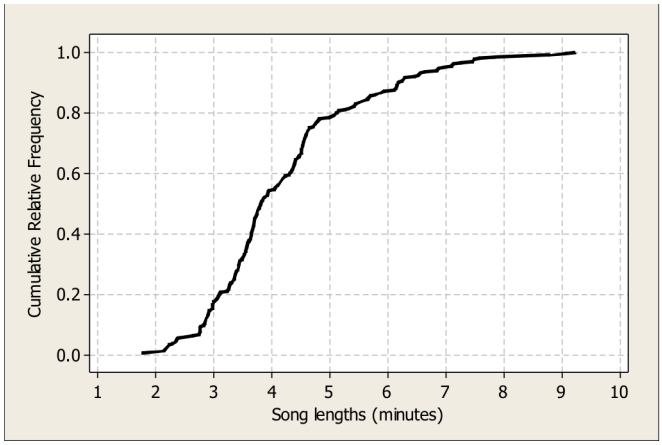
Descriptive Statistics: SelfConc

Variable	N	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
SelfConc	78	56.85	1.40	12.35	20.00	50.00	59.00	65.00	80.00

(a) Thirty-three students had self-concept scores higher than 62. One student in the group had a self-concept score of 62. Calculate and interpret this student's percentile and *z*-score.

(b) What is a "typical" self-concept score for a third-grader in this group? Justify your answer.

2. Below is a cumulative relative frequency graph for the lengths, in minutes, of 200 songs recorded by the Rolling Stones.



(a) What are the median and interquartile range of song lengths? Draw lines on the graph to show how you arrived at your answers.

(b) According to these data, the mean song length was 4.23 minutes, and the standard deviation was 1.38 minutes. A music lover who wants to create a mix of songs wants to have 5 seconds of silence between songs, so he needs to add five seconds to the length of each song. He also wants to express the times in seconds, rather than minutes. Find the mean and standard deviation of the transformed data.

(c) What are the mean and standard deviation of the *z*-scores of song lengths? Justify your answer.

3. A study of elite distance runners found a mean body weight of 63.1 kilograms (kg), with a standard deviation of 4.8 kg.

(a) Assuming that the distribution of weights is approximately Normal, make an accurate sketch of the weight distribution with the horizontal axis marked in kilograms.

(b) Use the 68–95–99.7 rule to find the proportion of runners whose body weight is between 48.7 and 67.9 kg.

(c) What proportion of runners have body weights below 60 kg?

(d) What proportion of runners have body weights above 70 kg?

(e) Calculate and interpret the 45th percentile of the runners' body weight distribution.

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4. (a) Find the proportion of observations from a standard Normal distribution that satisfies $-1.51 < z < 0.84$. Sketch the Normal curve and shade the area under the curve that is the answer to the question.

(b) What z-score in a Normal distribution has 33% of all scores above it?

5. A Normal probability plot for the amount of lactic acid in a sample of 30 pieces of cheese is shown below. Is the lactic acid distribution approximately Normal? Justify your answer.