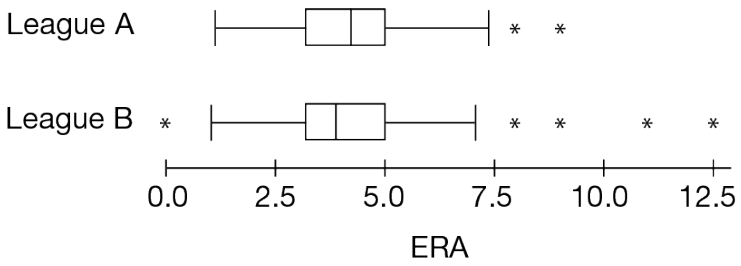
Comparing Distributions of a Quantitative Variable Quiz

1. One statistic calculated for pitchers in baseball is called the earned run average, or ERA. The following boxplots summarize the ERA for pitchers in two leagues, A and B.



Based on the boxplots, which of the following statistics is the same for both leagues?

(A) The range

(B) The interquartile range ✓

(C) The median

(D) The minimum

(E) The maximum

Answer B

Correct. The interquartile range is equal to the length of the box in a boxplot. Both boxes appear to have the same length.

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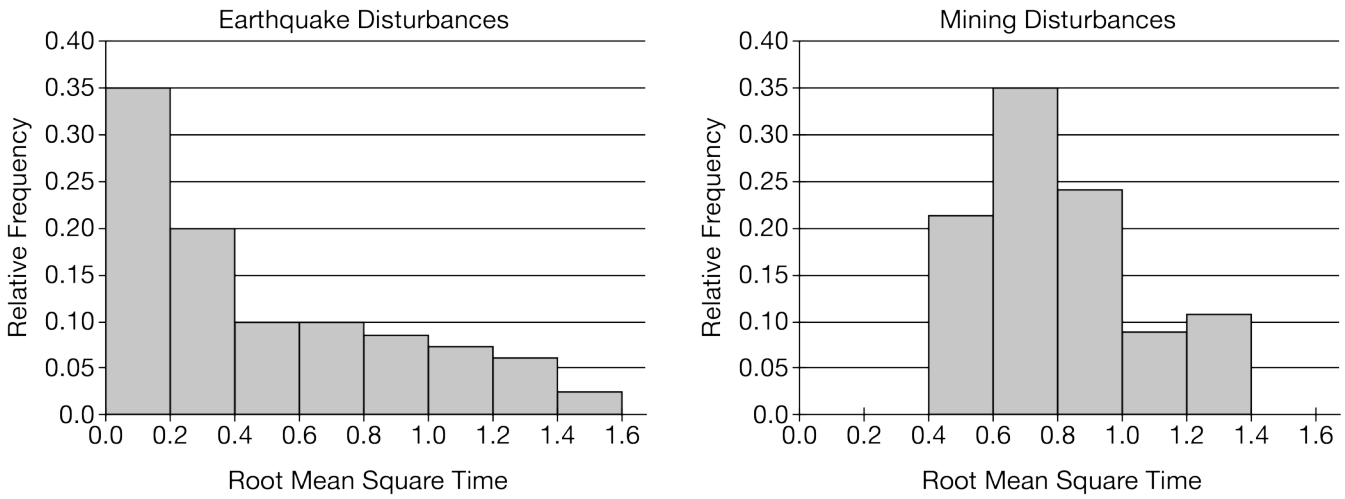
2. One way to measure the duration of subterranean disturbances such as earthquakes and mining is to calculate the root-mean-square time. The following histograms summarize the distributions of the root-mean-square times for two sources of disturbances.



Based on the histograms, which of the following correctly compares the two distributions?

(A) The median of the earthquake disturbances is equal to the median of the mining disturbances.

(B) The median of the earthquake disturbances is less than the median of the mining disturbances. ✓

(C) The range of the earthquake disturbances is equal to the range of the mining disturbances.

(D) The range of the earthquake disturbances is less than the range of the mining disturbances.

(E) The mode of the earthquake disturbances is equal to the mode of the mining disturbances.

Answer B

Correct. The median is located at the fiftieth percentile of a distribution. To determine the bar in which the median is located, the relative frequencies of the bars are added until the sum first exceeds 0.5. The median for earthquake disturbances is located in the interval between 0.2 and 0.4, and the median for mining disturbances is located in the interval between 0.6 and 0.8, so the median of the earthquake disturbances must be less than the median of the mining disturbances.

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3. The following table shows summary statistics for the number of hours a group of students spent playing video games last Monday and last Saturday.

Day	Minimum	Q1	Median	Q3	Maximum
Monday	0	1	2	4	12
Saturday	1	4	6	8	18

Based on the summary statistics, which of the following gives the best comparison of the range and the interquartile range (IQR) of the two days?

(A) The range and IQR of hours played on Monday are both greater than the range and IQR of hours played on Saturday.

(B) The range and IQR of hours played on Monday are both less than the range and IQR of hours played on Saturday. ✓

(C) The range and IQR of hours played on Monday are both equal to the range and IQR of hours played on Saturday.

(D) The range of hours played on Monday is greater than the range of hours played on Saturday, and the IQR of hours played on Monday is less than the IQR of hours played on Saturday.

(E) The range of hours played on Monday is less than the range of hours played on Saturday, and the IQR of hours played on Monday is greater than the IQR of hours played on Saturday.

Answer B

Correct. The range (maximum minus minimum) is 12 hours played on Monday and 17 hours played on Saturday. The IQR (Q3 minus Q1) is 3 hours played on Monday and 4 hours played on Saturday.