- The mean, median, unique mode, and range of a collection of eight integers are all equal to 8. The largest integer that can be an element of this collection is

(A) 11 **(B)** 12 **(C)** 13 **(D)** 14 **(E)** 15

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- **Solution (D)** The values 6, 6, 6, 8, 8, 8, 8, 14 satisfy the requirements of the problem, so the answer is at least 14. If the largest number were 15, the collection would have the ordered form 7, __, __, 8, 8, __, __, 15. But $7+8+8+15=38$, and a mean of 8 implies that the sum of all values is 64. In this case, the four missing values would sum to $64-38=26$, and their average value would be 6.5. This implies that at least one would be less than 7, which is a contradiction. Therefore, the largest integer that can be in the set is 14.

Difficulty: Hard

NCTM Standard: Data Analysis and Probability Standard for Grades 9–12: For univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics.

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Probability and Statistics > Descriptive Statistics > Unimodal