

Problem of the Week
Problem A and Solution
A Week of Weather

Problem

Aiyana records the average daily temperature, in degrees Celsius, for one week.
The temperatures are:

$$8, 12, 5, 5, 7, 15, 4$$

(a) Determine the mode and the mean for the temperatures. The mode is the value that occurs most often in a data set. The mean is calculated by adding all the values in the data set and dividing by the number of values in the set.

(b) After recording the temperatures for two more days, Aiyana noticed that the mean of all nine temperatures was unchanged, but the mode was now a different single value. What was the temperature on each of the next two days?

Solution

(a) The mode of the data set is 5 since it is the only value that appears more than once. The sum of the data is $8 + 12 + 5 + 5 + 7 + 15 + 4 = 56$. Since there are 7 temperatures, the mean is $56 \div 7 = 8$.

(b) For the mean to be the same after recording the temperature for two more days, the average temperature over those two days must be 8 degrees Celsius. This means the sum of the temperatures on the next two days must be 16 degrees Celsius.

There are many pairs of temperatures whose sum is 16. However, for the mode to change, one temperature must occur more often than any other. Since the original mode, 5, appears twice, the two new temperatures must be the same so that one value appears three times.

The only way this can happen is if the temperature on each of the next two days is 8 degrees Celsius. The new data set then contains three 8s, so the unique mode changes from 5 to 8. So the temperature must have been 8 degrees Celsius on each of the next two days.