Center, Spread, Shape of Dist. Answer Key

1. **A**. The median value of a data set is the middle number when the values are listed in order from least to greatest. There are 28 data points on the dot plot, which is already organized in order from least to greatest. Thus, the median value will occur between the 14th and 15th data point. The median is the average of the 14th data point (0 ten) and the 15th data point (0 ten): $\frac{0+0}{2} tens$. The median number of coffee shops is 0 tens. Choice B is incorrect because it is the mean of the data. Choice C is incorrect because it is the largest value of the data. Choice D is incorrect and is half of the range.

2. **D**. To solve this problem, we set up the equation $\frac{130+51+32+75+106+x}{6}=62.$ Solving for x , we get:

$$394+x=72*6$$
$$394+x=432$$
$$x=38$$

Choice A is incorrect because it is the desired mean. Choices B and C are incorrect and potentially come from algebra errors.

3. **C**. The mean is the average of all the data points. We must add up all the values of each data point and then divide by the total number of data points.

$$mean=\frac{(0)(1)+(1)(5)+(2)(4)+(3)(3)+(4)(4)+(5)(2)+(6)(3)+(7)(0)+(8)(2)+(9)(1)}{1+5+4+3+4+2+3+0+2+1}$$
$$mean=\frac{0+5+8+9+16+10+18+0+16+9}{25}$$
$$mean=\frac{91}{25}=3.64$$

Choices A, B, and D are incorrect and potentially come from algebra errors.

4. **B**. We know that the mean number of cars sold each month is equal to:

$$\frac{total\ number\ of\ cars\ sold}{number\ of\ days}$$

In the first month, the mean is equal to 2. To calculate the mean from the second month, we plug in the values given. Since Harold sold 2 cars per day for 15 days, 1 car per day for 7 days, 3 cars per day for 8 days, and 5 cars on the last day, the mean is:

$$\frac{(2)(15)+(1)(7)+(3)(8)+(5)(1)}{15+7+8+1}=\frac{30+7+24+5}{31}=2.13\ .$$

The difference between the means is equal to $2.13-2=0.13$.

Choice A is incorrect and may come from forgetting to take the difference. Choices C and D are incorrect and may come from algebra errors.

5. **C**. The range is the difference between the highest and lowest value. $501.87-202.32=299.55.$ The range of Gabriel's monthly grocery expenditure is $299.55. Choices A, B, and D are incorrect and may come from reading errors or algebra errors.

6. **C**. The range is the difference between highest value and the lowest value. In this case, $range=38-25=13.$ Choice A is incorrect because it is the largest value of the data set. Choice B is incorrect because it is the mean of the data set. Choice D is incorrect because it subtracts the mean from the lowest value.

7. **C**. The median is the middle value of a data set. If the professor increases each score by 5 points, the median value must also increase. The mean is the average value of the data set, calculated by adding up each individual score and dividing the sum by the total number of students in the class. The original mean can be calculated with the expression:

$$mean = \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n}$$

With n being the number of students in the class. The new mean can be calculated with the expression:

$$\begin{aligned} mean &= \frac{(5 + x_1) + (5 + x_2) + (5 \times x_3) + \ldots + (5 \times x_n)}{n} \\ &= \frac{x_1 + x_2 + x_3 + \ldots + x_n + (5 \times n)}{n} \\ &= \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n} + \frac{5 \times n}{n} \\ &= \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n} + 5 \\ &= mean + 5 \end{aligned}$$

Therefore, both the mean and the median increases by 5 points. Choices A, B, and D all do not properly describe the change in the mean and the median.

8. **C**. The range is calculated by subtracting the smallest value from the largest value, or $largest\ value - smallest\ value = range$. To find the largest possible value of x, we set up the equation $x - 6 = 10$. Solving for x, we get $x = 16$. Choices A, B, and D all do not give the largest possible value of x to have a range of 10.

9. **D**. First, we order the list of numbers from least to greatest to get: 9, 17, 29, 67, 100. From here, we can see that the median is 29. To find x, we know that 25 must be the middle value. However, since we have an even number of data points, the median must the average of the two middle points. Thus, we can set up the equation: $\frac{(29 + x)}{2} = 25$. Solving for x we get $x = 21$. Choices A, B, and C are incorrect and potentially come from algebra errors.

10. **B**. First, we order the list of numbers from least to greatest to obtain: 9, 17, 29, 100. If we add in a number x to the list, we will have a list of 5 data points. Thus, the only way to obtain a median of x is for x = 25. Choices A, C, and D are incorrect and potentially come from algebra errors.