Date Completed: _____
Mentor Initials: _____

Statistical Measures (Advanced)

1. Machine A produces 400 springs a day. The number of defective springs produced by this machine each day is recorded for 50 days. Based on the distribution given below, what is the expected value of the number of defective springs produced by Machine A in any single day?

Number, n, of defective springs produced	Probability that n defective springs are produced in any single day
0	0.65
1	0.15
2	0.10
3	0.10

A. 0.00
B. 0.35
C. 0.65
D. 1.00
E. 1.25

2. A data set of 31 different numbers has a mean of 25 and a median of 25. A new data set is created by adding 11 to each number in the original data set that is greater than the median and subtracting 11 from each number in the original data set that is less than the median. Which of the following measures does NOT have the same value in both the original and the new data set?

I. Median
II. Mean
III. Standard Deviation

A. I only
B. II only
C. III only
D. I and II
E. I and III

3. James has an average score of exactly x points on 5 equally weighted tests. How many points higher than x must James score on the 6th equally weighted test to raise his average score after the 6th test to $x + 3$ points?

A. 3
B. 5
C. 6
D. 12
E. 18

4. The mean of 5 integers is 55. The median of these 5 integers is 87. Three of the integers are 0, 14, and 87. Which of the following could be one of the other integers?

A. 54
B. 70
C. 87
D. 91
E. 107

5. The table below gives some statistics based on the points Jenna earned on each of her first 3 math exams.

Statistic	Points
Median	82
Range	15
Maximum	94

If it can be determined, what is the mean number of points Jenna earned on her first 3 math exams?

A. 79
B. 81
C. 82
D. 85
E. Cannot be determined from the given information.

6. The list of numbers 43, 37, 32, X, Y, 18 has a median of 28. The mode of the list of numbers is 18. To the nearest whole number, what is the mean of the list?

A. 25
B. 26
C. 27
D. 28
E. 29

7. At the school carnival, Karen will play a game in which she will toss a penny, a nickel, and a dime at the same time. She will be awarded 4 points for each coin that lands with heads faceup. Let the random variable x represent the total number of points awarded on any toss of the coins. What is the expected value of x?

A. $\frac{1}{2}$

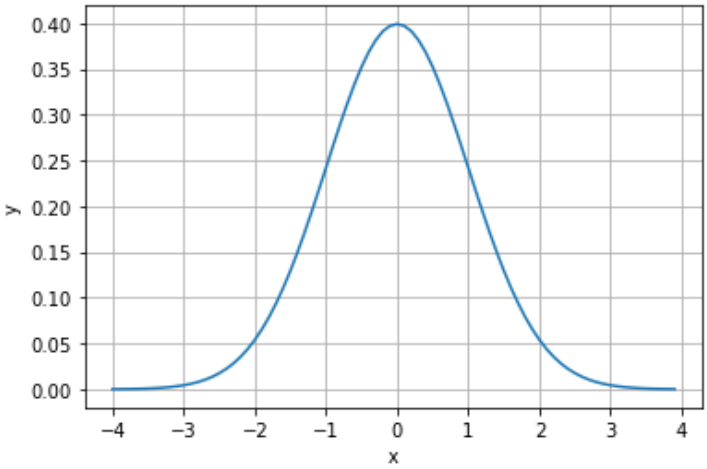
B. 1

C. 2

D. 6

E. 8

8. The standard normal probability distribution function ($\mu = 0$ and $\sigma = 1$) is graphed in the standard (x, y) coordinate plane below. Which of the following percentages is closest to the percent of the data points that are within 3 standard deviations of the mean in any normal distribution?



A. 50%
B. 68%
C. 90%
D. 95%
E. 99%

9. The average of 9 test scores is x. When the highest and lowest scores are removed from the 9 scores, the average is y. Which of the following is an expression for the average of the highest score and lowest score?

A. $9x - 7y$

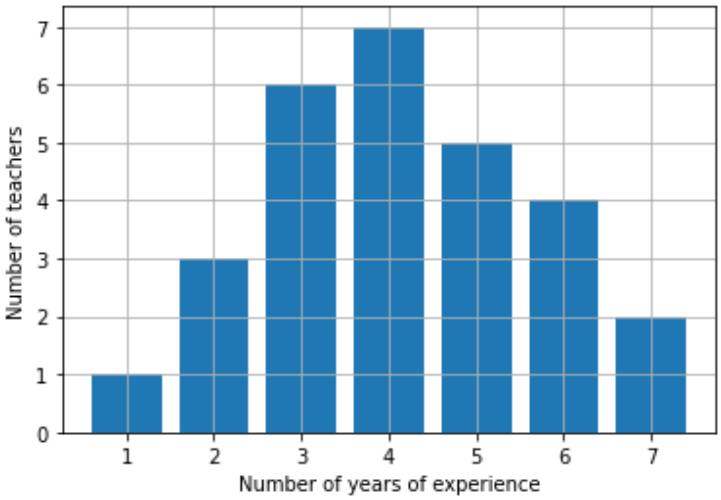
B. $\frac{9x-7y}{2}$

C. $\frac{9x+7y}{2}$

D. $\frac{9x+7y}{16}$

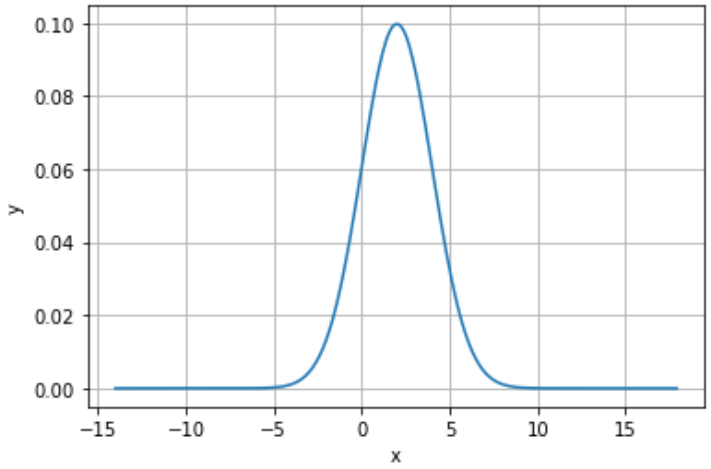
E. $\frac{x+y}{2}$

10. The graph below shows the distribution of the number of years of experience for 28 teachers enrolled in an advanced-degree program at a particular university. If a 29th teacher with 3 years of experience is added to the program and to the data set, what will be the effect on the mean and median of the data set?



A. The mean and median will both decrease.
B. The mean and median will remain the same.
C. The mean will decrease, and the median will remain the same
D. The mean will remain the same, and the median will increase.
E. Cannot be determined from the given information.

11. A normal distribution is graphed in the standard (x, y) coordinate plane below. If the distribution has $\mu = 2$ and $\sigma = 4$, what range of x values would most closely capture 95% of the area underneath the curve?



A. $(-6, 10)$
B. $(-2, 6)$
C. $(-4, 4)$
D. $(0, 4)$
E. $(2, 10)$

12. A finite arithmetic sequence has 9 terms, and the first term is $\frac{5}{7}$. What is the difference between the mean and the median of the 9 terms?

A. 0
B. $\frac{5}{7}$
C. $\frac{7}{5}$
D. 5
E. 7