1. If a student scored 89 points on a test where the mean score was 80.2 and the standard deviation was 6.7. The student's z score is _____.

$$z-score=\frac{x-\bar{x}}{s}=\frac{89-80.2}{6.7}=1.31$$

2. If a student scored 77 points on a test where the mean score was 84.5 and the standard deviation was 5.1. The student's z score is _____.

$$z-score=\frac{x-\bar{x}}{s}=\frac{77-84.5}{5.1}=-1.47$$

3. Indicate which student has the higher z score.
   Art Major $X=46 \quad \bar{X}=50.5 \quad s=5.2$
   Theater Major $X=70 \quad \bar{X}=75.1 \quad s=7.3$
   A) The theater major has a higher score than the art major.
   B) Neither student received a positive score; therefore, the higher score cannot be determined.
   C) The art major has a higher score than the theater major.
   D) Both students have the same score.

   Art Mayor: $z-score=\frac{x-\bar{x}}{s}=\frac{46-50.5}{5.2}=-0.87$

   Theater Major: $z-score=\frac{x-\bar{x}}{s}=\frac{70-75.1}{7.3}=-0.70$

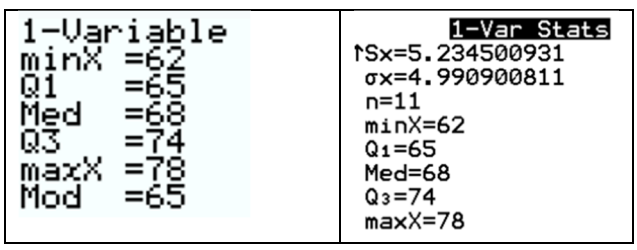
   The z-score of the mean value is zero. The theater's major $z=-70$ is closer than the mean than the art mayor's score, -0.87 which is farther away from the mean, below of the mean. Notice that when a test value is above the mean, the farther away the score is, the better.
   The answer is A.

4. For the data set below, find the first quartile: 62,65,75,72,68,63,65,67,78,70,74

   Sort the data: 62, 63, **65**, 65, 67, **68**, 70, 72, **74**, 75, 78

   Min Q1 Q2 Q3 Max
   Median

   For graphing calculators' instructions, **see notes** for practice4:
   Mean, median, variance: calculations.



5. The number of incidents in which police were needed for a sample of 9 schools in Allegheny County is 8, 39, 6, 12, 45, 16, 3, 0, 15. Find the first and third quartiles for the data.

   Q2, median
   Sort the data: 0, 3, 6, 8, **12**, 15, 16, 39, 45

   $Q1 = \frac{3+6}{2} = 4.5$ $Q3 = \frac{16+39}{2} = 27.5$

6. The average resident of Metro City produces 630 pounds of solid waste each year, and the standard deviation is approximately 70 pounds. Use Chebyshev's theorem to find the weight range that contains at least 75% of all residents' annual garbage weights.

   Note:
   Chebyshev's theorem: at least $1 - \frac{1}{k^2}$ of the data lie within k standard deviations of the mean, that is, in the interval with endpoints $\bar{x} \pm ks$ for samples and with endpoints $\mu \pm k\sigma$ for populations, where k is any positive whole number that is greater than 1.

   75% corresponds to 2 standard deviations from the mean since $1 - \frac{1}{2^2} = \frac{3}{4} = 0.75$ or 75%

   Two standard deviations from the mean: $\mu \pm k\sigma$ = $630 \pm 2(70) = 630 \pm 140$
   $630 - 140 = 490$
   $630 + 140 = 770$

7. The following population parameters were obtained from a graphing calculator, mean, $\mu = 77$; $\sigma = 8$. Assuming the population is bell-shaped, between what two values will approximately 68% of the population be?

   Note:
   The empirical rule predicts that in normal distributions, 68% of observations fall within the first standard deviation $(\mu \pm \sigma)$, 95% within the first two standard deviations $(\mu \pm 2\sigma)$, and 99.7% within the first three standard deviations $(\mu \pm 3\sigma)$ of the mean.

   Therefore, since 68% of observations fall within the first standard deviation $(\mu \pm \sigma)$, according to information given in question 7, we have one standard deviation from the mean:

   77 ± 8
   $77 - 8$ and $77 + 8$
   69 to 85