

Sample responses to descriptive questions on Exam #1

The following are student responses to a few problems on Exam #1. Each of these is an example of a reasonable response.

- 2(b) Which of the stems plots from (a) is most informative. Briefly explain why.

The stemplot with split stems is most informative. The pattern of the data is much clearer on the split stem. While the data is not symmetrical, you can see that it does curve up to a peak which we could not see in the first plot. It also enables you to pick out a possible outlier. It also shows a dip in the middle of the data, so that it could be considered having two peaks.

- 3(b) For this distribution, the median is 3.67. Is the mean for this distribution less than 3.67, equal to 3.67, or greater than 3.67? Explain how you reach your conclusion.

The mean for this distribution is less than 3.67 because the mean is not resistant and therefore is affected by data that is further off, which in this case is the smaller GPAs.

- 4(b) A larger study gathers hand spans for 100 students. The mean of the new distribution is 19.1 cm and the standard deviation is 1.2 cm. The researcher measures one more hand span and it turns out to be 19.1 cm. Is the mean of the new distribution (with 101 values) less than, equal to, or greater than 19.1 cm? Is the standard deviation of the new distribution (with 101 values) less than, equal to, or greater than 1.2 cm? Explain the reasoning you use to reach each conclusion.

The mean will be equal to 19.1 cm and the standard deviation will be less than 1.2 cm because adding another number equal to the mean does not "pull" the mean right or left but keeps it the same. If the mean is the same, the standard deviation will still be less because the mean is being subtracted each time and including the value of the mean minus the mean, $19.1 - 19.1$ in this case, equals zero but you are dividing by one more number since one more value is included.

- 6 Heights of humans are approximately normally distributed with a mean of 65 inches and a standard deviation of 4 inches. Aliens from a faraway planet also have heights that are approximately normally distributed. The aliens measure lengths in a unit called a *blarg*. The distribution of alien heights has a mean of 4.6 blargs and a standard deviation of 1.4 blargs. Who would stand out more in a crowd of their own kind between a human of height 72 inches and an alien of height 6.2 blargs?

(Referring to sketches of the two relevant normal curves and calculated z -scores of 1.75 and 1.14): *The human would stand out more in a crowd because his height is further away from the mean than the height of the alien.*