AP STAT DEBRIEF – Question 5

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INTENT OF THE QUESTION:

The goals of the question were to assess a student's ability to analyze with a scatterplot, interpret information given by lines on a scatterplot and use a regression equation to estimate a predicted value of y.

2015 QUESTION 5: Height, Arm Span, and Type of Rectangle Question
Please view the questions here:
http://media.collegeboard.com/digitalServices/pdf/ap/ap15_frq_statistics.pdf

a. The first part of the question required students to describe the relationship between arm span and height. To receive full credit, the student had to discuss strength, form and direction in <u>context.</u>

b. Students had to choose the line from graph 2 as helping to classify students. Points above line represent people with arm span greater than height. Points below the line represent people with arm span less than height. Points on the line represent people with arm span equal to height.

c. Complete a frequency table of classifications of the 12 seniors.
   Students had to count the points above graph (arm span greater), points on the line(arm span = height) and points below the line (arm span less). Students had to identify how many of each type and complete the table. Proportions were acceptable for identifying each type but counts were needed in the table.

d. What is the predicted arm span for a senior with height 61 inches?
   This was a simple calculation –students substituted 61 for the explanatory variable and gave the predicted response of arm span.

   NOTES:

1. To get an (E) for part (a), students had to include a correct description of form, direction, and strength. Also, the response had to be given in context. Remind students to answer questions in context.
2. Just giving a correlation value was not sufficient for receiving credit for the form. Indicating a linear correlation was necessary. Students had to also use a term to describe the strength of the relationship such as strong or moderately strong. Again, only listing the correlation value does not define strength. Students had to interpret the value to give the strength.
3. Some students used relative frequencies, instead of frequencies when filling in the table. If students put both frequencies and relative frequencies, this was counted as parallel solutions with the same lowering of their score. Remind students that two

factually correct solutions can be counted wrong even if one of the solutions answers the question correctly. Students should answer the question asked and then stop.

4. Choosing Graph 1 for part b did not satisfy any of the components needed for part b.

5. To get an (E) for part (c), students had to include a formula for predicting arm span with 61 inserted for x, the correct value for the predicted arm span, and the correct unit attached to the prediction. They had to substitute 61 into the formula for credit, though they did not have to write the formula without the 61.

6. Students could have a perfect answer throughout this question, but if they left the unit off the prediction in part (c), they could not earn a 4.

7. Some students had trouble using anything but the least-squares regression line for identifying which line is better at identifying body classification. In this case, thinking about what part of the graph would show arm span greater than height, equal to height, and less than height is helpful. The least squares regression line does not do a good job of classifying body type this way, while y=x does. In y=x, all points above the line would have arm span greater than height, all points on the line would have an arm span equal to the height, and all points below the line would have arm span less than height. Perhaps encouraging students to look at the graph holistically to decide what it portrays could have helped with students who only wanted to use the LSRL. While LSRL may be better for predicting arm span from height, it was not useful for this part of the question.

8. Though in this case, there was not penalty, students should use correct terminology. Y = x was not a least squares regression line or a regression line.

9. Students occasionally were not careful when answering part (b). For example, if a student said that tall rectangles were represented by points above the line y=x, and then later accidentally said that short rectangles were (also) represented by points above the line y=x, they could be dinged. You could tell that the student understood the question and knew how to respond, but this mistake usually resulted in a downgrade to a lower score.

10. Part c required students to choose the best equation for predicting arm span --- which would be the least squares regression line. Students had to choose the correct prediction line, get an arm-span value between 61.5 and 62.5 and give units. This part was completely separate from "b". Students could not use the y – x equation for predicting.