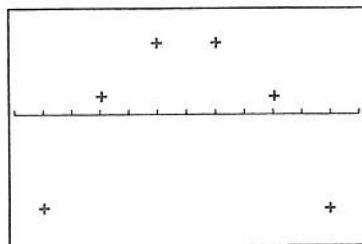


➤ Rapid Review

1. The correlation between two variables x and y is 0.85. Interpret this statement.

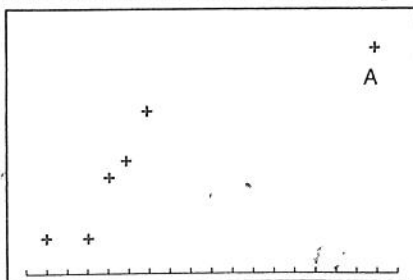
Answer: There is a strong, positive, linear association between x and y . That is, as one of the variables increases, the other variable increases as well.

2. The following is a residual plot of a least-squares regression. Does it appear that a line is a good model for the data? Explain.



Answer: The residual plot shows a definite pattern. If a line was a good model, we would expect to see a more or less random pattern of points about 0. A line is unlikely to be a good model for this data.

3. Consider the following scatterplot. Is the point A an outlier, an influential observation, or both? What effect would its removal have on the slope of the regression line?



Answer: A is an *outlier* because it is removed from the general pattern of the rest of the points. It is an *influential observation* since its removal would have an effect on a calculation, specifically the slope of the regression line. Removing A would increase the slope of the LSRL.

4. A researcher finds that the LSRL for predicting GPA based on average hours studied per week is $GPA = 1.75 + 0.11 (\text{hours studied})$. Interpret the slope of the regression line in the context of the problem.

Answer: For each additional hour studied, the GPA is predicted to increase by 0.11. Alternatively, you could say that the GPA will increase 0.11 on average for each additional hour studied.

5. One of the variables that is related to college success (as measured by GPA) is socioeconomic status. In one study of the relationship, $r^2 = 0.45$. Explain what this means in the context of the problem.

Answer: $r^2 = 0.45$ means that 45% of the variability in college GPA is explained by the regression of GPA on socioeconomic status.

6. Each year of Governor Jones's tenure, the crime rate has decreased in a linear fashion. In fact, $r = -0.8$. It appears that the governor has been effective in reducing the crime rate. Comment.

Answer: Correlation is not causation. The crime rate could have gone down for a number of reasons besides Governor Jones's efforts.

7. What is the regression equation for predicting weight from height in the following computer printout and what is the correlation between height and weight?

The regression equation is weight = _____ + _____ height				
Predictor	Coef	St Dev	t-ratio	P
Constant	-104.64	39.19	-2.67	.037
Height	3.4715	0.5990	5.80	.001
$s = 7.936$		R-sq = 84.8%		R-sq(adj) = 82.3%

Answer: $weight = -104.64 + 3.4715(height)$; $r = \sqrt{0.848} = 0.921$. r is positive since the slope of the regression line is positive and both must have the same sign.

8. In the computer output for Exercise #7 above, identify the standard error of the slope of the regression line and the standard error of the residuals. Briefly explain the meaning of each.

Answer: The standard error of the slope of the regression line is 0.5990. It is an estimate of the change in the mean response \bar{y} as the independent variable x changes. The standard error of the residuals is $s = 7.936$ and is an estimate of the variability of the response variable about the LSRL.