

Answer Key - Investigating the Effects of Outliers on the Regression Line

1. Hopefully the answers will be yes. The slope is the constant coefficient of x in the equation of the line in the top left box of the applet.
2. The line will rotate towards or move towards the new point. Other patterns may be seen that reflect particular cases of this. Also, the line will no longer reflect the general trend of the majority of points so well.
3. Locations above or below one end of the line will cause drastic changes in the slope. If the 8 points are reasonably spread out, then locations above or below the central part of the line tend to move the line without much change in slope. If the 8 points were drawn in a cluster, you would need to put the outlier above or below the central part of the cluster if you don't want to change the slope by much.

Reflection Questions

4. Answers will depend on the particular choice of real-world example, and should be accompanied by a reasonable explanation as to what could have gone wrong in the experiment to produce the outlier.
5. Outliers move the regression line, rotating it and shifting it towards the outlier and away from the general trend of the data. The farther away the outlier, the larger the effect will be on the line, so that the line is no longer an indication of the general trend of the data.
6. Answers will vary depending on the imagination of the students. Perhaps a particularly short person suffers from an eating problem that results in a weight much larger than the general trend. Perhaps one person is a fashion model and everyone else is a weightlifter. Perhaps someone was accidentally weighed with heavy boots on. To justify leaving out the outlier one would have to be sure that the outlier is an anomaly and not representative of a type of person you want to include in your study. Usually one omits an outlier if it is likely to be due, say, to errors of measurement or errors in recording the data.