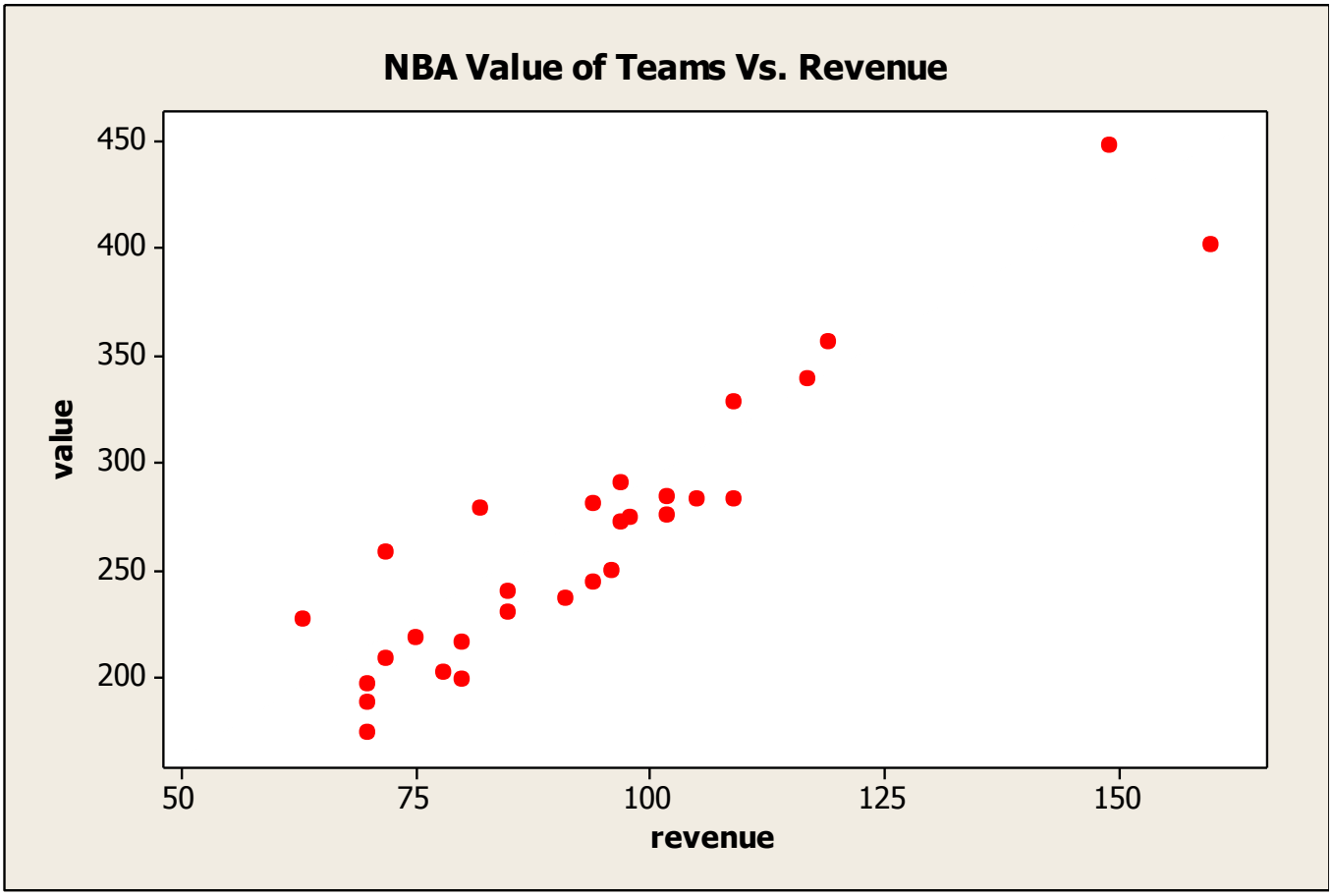
The NBA is trying to provide relevant information to potential team owners. Reaching purchase agreements requires being able to predict the value of a team. Data is provided showing the revenue produced by each franchise and the team's overall value. The NBA wants to be able to use this information to predict the value of any team based on its revenue. You are going to develop this model using statistical methods.

TEAM	VALUE	REVENUE
GRIZZLIES	227	63
SUPERSONICS	196	70
WARRIORS	188	70
BUCKS	174	70
CAVALIERS	258	72
CLIPPERS	208	72
NUGGETS	218	75
HAWKS	202	78
HORNETS	216	80
MAGIC	199	80
ROCKETS	278	82
JAZZ	239	85
TIMBERWOLVES	230	85
HEAT	236	91
PACERS	280	94
NETS	244	94
RAPTORS	249	96
CELTICS	290	97
TRAILBLAZERS	272	97
WIZARDS	274	98
PISTONS	284	102
KINGS	275	102
SPURS	283	105
76ERS	328	109
SUNS	282	109
MAVERICKS	338	117
BULLS	356	119
LAKERS	447	149
KNICKS	401	160
Data given in Millions of Dollars		


NBA Value of Teams Vs. Revenue
value
450
400
350
300
250
200
50
75
100
125
150
revenue

The NBA and the Median-Median Line: Student Activity Sheet

The NBA is trying to provide relevant information to potential team owners. Reaching purchase agreements requires being able to predict the value of a team. Data is provided showing the revenue produced by each franchise and the team's overall value. The NBA wants to be able to use this information to predict the value of any team based on its revenue. You are going to develop this model using statistical methods.

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1. Create a scatter plot relating the two columns of data. Which variable should be on the x-axis? Why?

2. Does this data appear to have a linear association? Describe the scatter plot you created.

3. Use your best estimate to draw a line that best represents the data in your scatter plot. Write the equation of your line.

The median-median line is a specific line that can be used to represent linearly associated data. In order to find the median-median line, you must divide the data into three groups and then find points that represent the medians of these three sections of data. Once the three median points are found, they form a triangle. The median-median line is parallel to one side of this triangle and passes through the centroid of the triangle.

4. Why is the use of three median points important to finding a line to represent the linear relationship? (Hint: What do you know about the behavior of medians of data sets?)

5. Divide your data into three groups with as close to the same number in each group as possible. If you cannot divide it evenly, make the leftmost and the rightmost groups have the same number of data points. Draw vertical lines on your scatter plot marking the divisions between the three groups.

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6. Find the point that is the median of the x-values and the median of the y-values for each group. Describe how you would do this both using the graph and using the list of data.

7. Label the three median points M1, M2 and M3, with M1 as the leftmost point and M3 as the rightmost point.

8. These three points form a triangle. The centroid of this triangle is the weighted center of the data. The median-median line will be parallel to the line containing M1 and M3 and will pass through the centroid of the triangle. Use your knowledge of algebra and geometry to write the equation for the median-median line for this data. Show your calculations along with a graph in the coordinate plane showing the triangle and the median-median line.

9. How does the median-median line compare to the line that you drew for #3?

10. What algebraic tools did you use in your process for writing the equation of the median-median line?

11. What geometric tools did you use in your process for writing the equation of the median-median line?

12. How would you calculate the equation of the median-median line if the three points (M1, M2, and M3) happen to be collinear?

13. How can the NBA use the median-median equation you found to provide information to potential owners?

Common Core State Standards:

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.