









1.4 TRENDS USING TECHNOLOGY

Describe the different types and strengths of correlation.

r	Description	r	Description
1	perfect positive correlation 	-1	perfect negative correlation 
0.75 to 1	strong positive correlation 	-1 to -0.75	strong negative correlation 
0.50 to 0.75	moderate positive correlation 	-0.75 to -0.50	moderate negative correlation 
0.25 to 0.50	weak positive correlation 	-0.50 to -0.25	weak negative correlation 

In statistics, the correlation coefficient, r , measures the strength and direction of a linear relationship between two variables on a scatterplot.

The value of r is always between +1 and -1.

The coefficient of determination, r^2 , does not give the direction of correlation, but does make the scale constant. It gives the relative strength of the relationship between two variables.

A value of $r^2 = 0.4$ indicates that 40% of the variation in y is due to the variation in x .

Name	Minutes Played	Points Scored
Fred	151	50
Tony	19	11
Samir	164	38
Jared	87	28
Anuj	135	39
Matt	111	39
Steve	54	8
Ali	163	61
Darcy	192	52
Ryan	98	33
Travis	71	26

Example: For each player, the basketball coach keeps track of the amount of time played (in minutes) and the number of points scored. The results are shown.

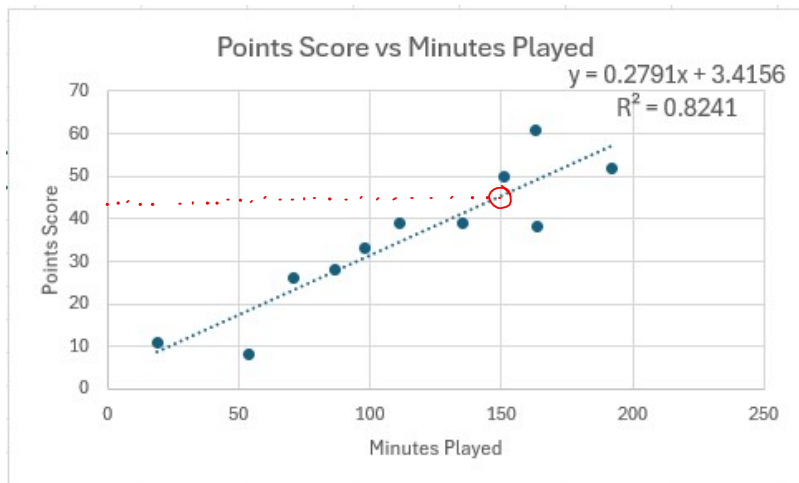
- (a) Create a scatter plot and find a line of best fit using Excel.
- (b) If Jude scored 45 points, how many minutes did he play?

The vertical distance between a data point and the line of best fit is called the residual value (or residual). It may be calculated for a single point (x_1, y_1) by subtracting the calculated value from the actual value

$$R_1 = y_1 - [a(x_1) + b]$$

where a and b are the slope and intercept of the line of best fit, respectively.

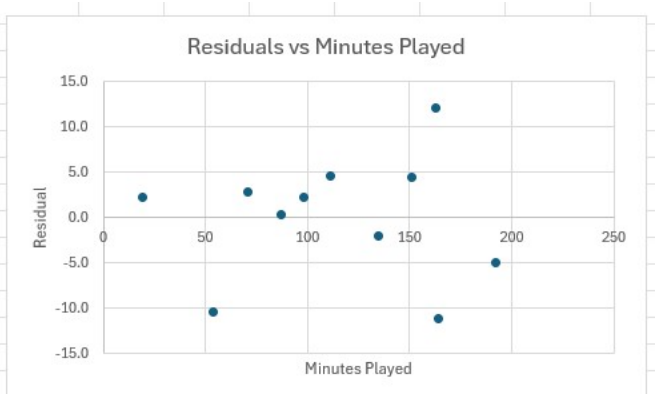
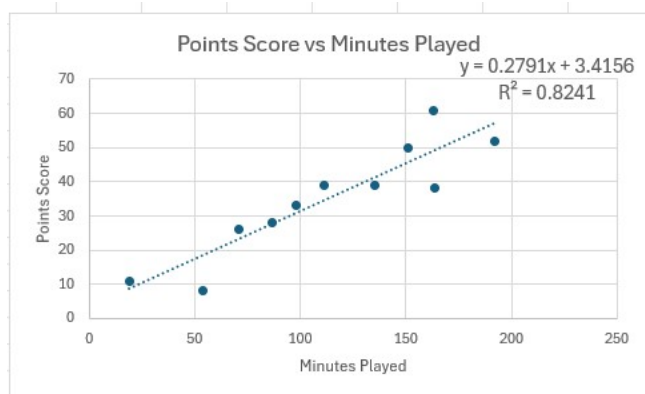
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"1.4 Data File"



b) ~ 150 mi

The residuals should be graphed. If the model is a good fit, the residuals should be fairly small, and there should be no noticeable pattern. Large residuals or a noticeable pattern are indicators that another model may be more appropriate. If only a few pieces of data cause large residuals, you may wish to disregard them.

Use Excel to make a graph of residuals for the basketball data.



Practice: #1-6, 10