

Learning Outcomes – MATH 10041 – Chapter 4

Ch.	Sec.	Big idea	Learning outcomes – Conceptual	Learning Outcomes - Observable
4	1	Exploring association between 2 variables; Scatterplots as a tool to visualize variability	Understand and recognize different trends in scatterplots, strengths of associations, and shapes	Given two scatterplots, compare them in context, concerning trend, strength of the association, and shape; Given a scatterplot, classify the trend as being increasing, decreasing, or non-existent; Determine if the association is strong or weak, and indicate its shape; Interpret a given scatterplot in context, interpreting trend, strength of the association, and shape; Write a clear description of the above, also noting possible outliers.
	2	The correlation coefficient as a measure of strength of an association	Students understand that the correlation coefficient is a number that measures strength of a linear association between two numerical variables; It is used for LINEAR TRENDS between two NUMERICAL VARIABLES; They understand that it does NOT tell us whether an association is linear, but gives the strength of an association known to be linear; Students understand that correlation does NOT imply causation; Students understand that r has no units.	Students understand that a perfect correlation is given by -1 or 1 . Given a scatterplot, students can recognize if r is positive or negative and give an approximate value for r . Students use technology to find r for a given set of data; Interpret the meaning of the correlation coefficient in context.
	3	Linear regression	Understand the line of best fit as a tool for summarizing a linear relationship and predicting future observed values; Understand why the regression line is called the “line of best fit” or “least squares regression” and include a description of how the line is calculated; Understand that, when the trend is linear, the regression line connects points that represent the mean value for y for each value of x .	Given a regression equation, identify the independent variable (predictor) and the (response) dependent variable; Use a given linear regression equation to predict a value of the output variable, given an input value; Given a regression equation, interpret the slope and vertical intercept in context; Given the output from several different statistical technologies, report the regression equation and its slope and vertical intercept. Given a real world scenario, identify the two variables and determine which should be the predictor (x) and which should be the response (y).
	4	Some interpretation pitfalls and analyzing goodness of fit	Linear regression models are appropriate for linear associations only; Understand what an influential point is; Correlation is not causation;	Explain the procedure for dealing with influential points; Recognize a faulty conclusion dealing with correlation; Recognize when an interpretation of the vertical intercept is appropriate and when it is not.

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Regression on aggregate data needs to be interpreted with caution;
Extrapolation may lead to false predictions;
Understand the coefficient of determination as measure of how well the data fit the model.

Interpret the coefficient of determination for a given regression line.