COLLEGE ALGEBRA

NAME: _____

GPS # 6 1.6 FITTING LINES TO DATA POINTS: MODELING LINEAR FUNCTIONS Class Time: _____ Date: _____

Useful Definitions:

* Linear Model: A linear model is an equation of the form $f(x) = a + bx$,
* Linear Regression (the least-square method): A procedure which defines the best-fit line as the line for which the sum of the squares of vertical distances from the data points to the line is a minimum.
* Constant first differences: If the first differences of data outputs are constant (for equally spaced inputs), a linear model can be found that fits the data exactly. If the first differences are "nearly constant," a linear model can be found by an approximate fit for the data.
* Discrete: It is used to describe the data or a function that is presented in the form of a table or in a scatterplot.
* Continuous: It is used to describe a function or graph when the inputs can be any real number.

1. Construct a scatter plot of the data in the table. Can the scatter plot be fit exactly or only approximately by a linear function? How do you know? Find the linear function that is the best fit for the data.

x	2	6	10	14	18
y	2	4	6	8	10

2. a) Find the least-squares regression line in the form $f(x) = a + bx$.
   b) Use the regression line to estimate y when $x = 150$ (interpolation) and $x = 200$ (extrapolation).

x	100	120	140	160	180
y	477	483	489	495	504

3. If \$400 is invested at 4% simple interest, the future value S in t years is given in the table below.
a) Is the rate of change of the future value constant for uniform inputs?
b) Can the future value be modeled by a linear function?
c) Write the equation that gives the future value as a function of the time in years in slope-intercept form.

Year(t)	0	1	2	3	4
Future Value (S)	400	425	450	475	500