1. **Appendix 2A: Least-Squares Regression Computations** (Slide #1 is a title slide)

*Learning Objective 8: Analyze a mixed cost using a scattergraph plot and the least-squares regression method.*

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* 1. The data set
     1. Assume that you have the following data set and that you wish to use Microsoft Excel to estimate the variable and fixed cost components of your total meals cost.

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* + 1. The first step is to prepare a scattergraph plot to see if a linear relationship exists between the number of meals served and the total cost.
       1. To prepare the plot, highlight the data in cells C4 through D19. From the Charts group within the Insert tab, select the “Scatter” subgroup and then click on the choice that has no lines connecting the data points.

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* + - 1. To insert labels for the X-axis and Y-axis, go to the Layout tab in Excel. Then, within the Labels group, select Axis titles.

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* + - 1. Your scattergraph plot should appear as shown on this slide.

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* + 1. The second step is to determine the intercept *a*, the slope *b*, and the *R2*. The intercept represents the estimated fixed costs. The slope represents the estimated variable cost per unit. The *R2* tells what percentage of the variation in the dependent variable (cost) is explained by variation in the independent variable (activity).

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* + - 1. Begin by right clicking on any data point in the scattergraph plot. This should produce the screen shown on this slide. Notice that under “Trend/Regression Type” you should select “linear.” Similarly, under “Trendline Name” you should select “Automatic.”
      2. Next to the word “Backward” you should input the lowest value for the independent variable, which in this example is 1,260 meals. Taking this particular step instructs Excel to extend your fitted line until it intersects the Y-axis.

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* + - 1. Finally, you should check the two boxes at the bottom of the screen that say “Display Equation on chart” and “Display R-squared value on chart.” Then click “Close.”
      2. This will automatically insert a line within the scattergraph plot that minimizes the sum of the squared errors. It will also automatically insert the estimated least-squares-regression equation and *R2* (which is approximately 93% in this example) into the scattergraph plot.

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* + 1. Notice that Excel depicts its least-squares regression equation as *Y* = *bX* + *a*, or in this example Y = $2.768X + $2,618.72. This can easily be translated to the format of *Y*= *a* + *bX* that is used in the textbook as follows: *Y* = $2,618.72 + $2.768*X*.

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