Dinner Party

Your boss asks you to plan a retirement party for one of your co-workers. You are comparing the cost of a dinner party at different restaurants. Each restaurant charges a flat room fee (no matter how many guests attend) and a per plate fee.

Problem 1 – Linear Bistro

The chart shows the costs of a party at Linear Bistro for different numbers of guests. What is the room fee at Linear Bistro? What is the per plate fee?

Guests	Cost
5	260
10	370
20	590
25	700
50	1250

To find out, enter the data into **L1** and **L2** in your calculator.

Adjust your window settings as shown.

Press [2nd] [STAT PLOT] and select **Plot1** to make a scatter plot of the data from the chart.

1. Which variable represents the *x*-values, the number of guests or the costs? Which variable represents the *y*-values?

2. Look at the points. What do you notice?

The points form a line, so this data is linear. Use the
LinReg command to draw a line through these points.
(Adding **Y1** to the end of the command stores the
equation of the line in **Y1**.)

```
LinReg(ax+b) L₁,
L₂,Y₁
```

Press GRAPH to view the graph.

3. Describe the line. Do all the points lie on the line?

The *y*-intercept of the line represents the flat room fee at Linear Bistro.

4. What does the slope of the line represent?

5. Use the scale on the *y*-axis to estimate the *y*-intercept.

We can use a function table to find the exact value of the *y*-intercept.

6. How can you find the *y*-intercept in a function table?

Press 2nd [TABLE] to view the function table.

7. What is the room fee at Linear Bistro?

You can write a row from the function table as a coordinate pair. For example, the first row
can be written as (0, 150).

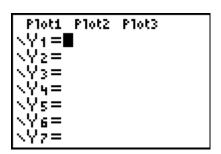**8.** Write another row from the function table as a coordinate pair.

9. Use these two points to find the slope of the line. What is the per plate fee at the Linear Bistro?

10. Press $\boxed{Y=}$ to view the equation of the line. What do you notice about the slope, the *y*-intercept, and the equation?

Problem 2 – Straight Eight's Restaurant

Straight Eight's Restaurant charges an $80 room fee and $35 per plate.

11. How much would a dinner party for 10 people cost at Straight Eight's?

12. Write an equation in the form $y = mx + b$ that models the cost of a dinner party at Straight Eight's for *x* guests. Enter it as **Y1** and view its graph. (Remember to turn your scatter plot from Problem 1 off!)

```
Plot1  Plot2  Plot3
\Y1=■
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
```

View the function table and use it to check your equation. Is the *y*-intercept correct? Does the value at *x* = 10 match your answer to Question 11?

Problem 3 – First Degree Café

The First Degree Café charges $185 for a party of 5 people. The cost per plate is $21.

13. Write an equation in point-slope form, $(y - y_1) = m(x - x_1)$, that models the cost of a dinner party at the First Degree Café.

Simplify the equation and graph it as **Y1**.

14. View the function table. Explain how to use it to check your equation.