

Dinner Party

ID: 8960

Time required
30 minutes

Activity Overview

In this activity, students investigate the total cost of a private party at each of three restaurants. Each restaurant states its pricing information differently, but all charge a flat room fee (represented by the y -intercept) plus a per guest plate fee (represented by the slope). Students model the cost of a party at each restaurant with the graph of a linear function.

Topic: Linear Functions

- Graph an equation of the form $y=mx+b$ and display a table of values to find its y -intercept.
- Write the equation of a straight line given its slope and its y -intercept.
- Given the slope of a line and a point on it, use the point-slope form to write the equation of the line.

Teacher Preparation and Notes

This activity is appropriate for students in Algebra 1. It is assumed that students have recently been introduced to the notions of slope, y -intercept, $y = mx + b$ and point-slope form.

- This activity is designed to have students explore **individually and in pairs**. However, an alternate approach would be to use the activity in a whole-class format. By using the computer software and the questions found on the student worksheet, you can lead an interactive class discussion.
- Notes for using the TI-Nspire™ Navigator™ System are included throughout the activity. The use of the Navigator System is not necessary for completion of this activity.
- **To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter “8960” in the keyword search box.**

Associated Materials

- DinnerParty_Student.doc
- DinnerParty.tns
- DinnerParty_Soln.tns

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

- Theatre-Goers (TI-Nspire technology) — 9638
- Linear Equation Investigation (TI-Nspire technology) — 9592
- Any 2 Points Make a Line (TI-Nspire technology) — 9002

Problem 1 – Linear Bistro

Students are given a chart showing the cost of private parties with different numbers of guests.

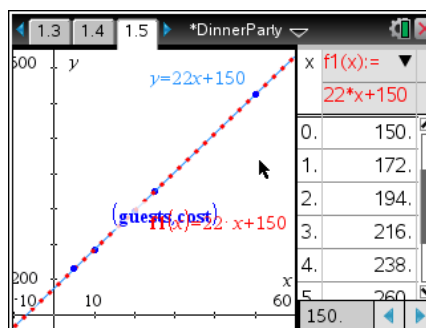
	A	B	C
	guests	cost	
1	5	260	
2	10	370	
3	20	590	
4	25	700	
5	50	1250	
6			
A7	5		

- They are prompted to make a scatter plot of this data (**MENU > Graph Entry/Edit > Scatter Plot**, then select the x and y variables) and draw a line through the points (**MENU > Geometry > Points & Lines > Line**) and click on two points to draw the line.
- Next students find the y-intercept of the line two ways: by estimating where the line crosses the y-axis and by viewing a function table. Find the equation of the line. After writing a row of the function table as a coordinate pair, students use the table to find the slope of the line.
- Finally, they are asked to draw some conclusions relating the slope and y-intercept of the line to its equation.

Note: When students graph the line in f1, student can select **Menu > Graph Entry/Edit > Equation > Line > $y = mx+b$** and enter the slope in the first empty box and the y-intercept in the second empty box.

Student .tns file Solutions

1. The guests are the x-values and the costs are the y-values.
2. The points form a line. (varying answers)
3. All the points lie on the line, so the data is perfectly linear.
4. The slope of the line represents the fee per plate.
5. About 150
6. Look for the y-value when $x = 0$.
7. \$150
8. Sample answer: (1, 172)
9. \$22
10. The slope is the coefficient of x in the equation, and the y-intercept is added to the x term.



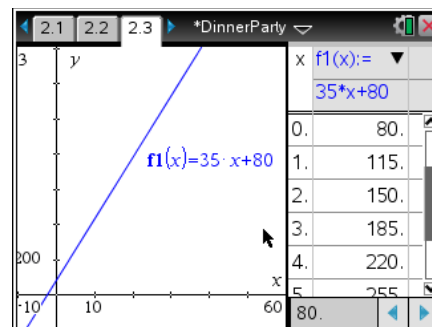
TI-Nspire Navigator Opportunity: Quick Poll
See Note 1 at the end of this lesson.

Problem 2 – Straight Eight’s Restaurant

In this problem, students are given the room and per plate fees and asked to calculate the cost of a party of 10 guests. They then write and graph an equation to model the cost at this restaurant. By adding a function table, they can check their equation against the cost they calculated for a party of 10.

Student .tns file Solutions

11. \$430
12. $y = 35x + 80$
13. see graph/table to the right

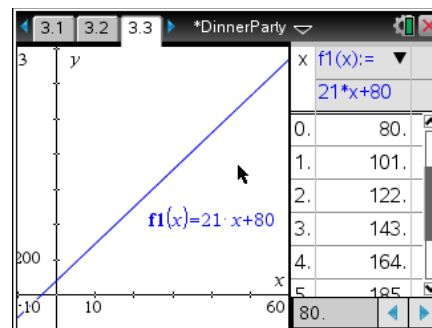


Problem 3 – First Degree Café

Students are given one point on the line, in the form of the cost for a party of 5 guests, and the slope of the line, in the form of the per plate fee, and asked to write an equation in point-slope form. They simplify and graph this equation. Finally, they explore methods to check the equation using a function table and the handheld’s slope tool (**MENU > Geometry > Measurement > Slope**).

Student .tns file Solutions

14. $y - 185 = 21(x - 5)$
15. See table to the right. Look for the value of the function when $x = 5$. It should be 185.
16. The slope of the line should be 21.



TI-Nspire Navigator Opportunities

Note 1

Problems 1–3: Quick Poll

You may want to use Quick Poll to verify students understand the concepts of domain and range. The questions provided on the student worksheet may be used for this purpose.