

# Show Me the Money

5607

## Introduction

In this activity, students will investigate equations that represent a company's income, expense, and profit functions and use those equations to identify the break even points and the point of maximum profit.

## Grades 9-12

### NCTM Algebra Standards

- Understand patterns, relations, and functions
- Interpret representations of functions of two variables

### Files/Materials Needed

*Money Intro.act, Money Points.act, Money Equations.act, Money.edc*

1

- Launch TI-Navigator™ on the computer and start the session.
- Have each student log into NavNet on their calculator.

2

**Introduce the scenario:** A toy company has a monthly income function of  $y = 9x$  and a monthly expense function of  $y = x^2 + 8$ , where  $x$  is in millions of units and  $y$  is in millions of dollars. We would like to find the break even points and the point of maximum profit.

3

- Load the activity settings file *Money Intro.act*.
- Divide the class into two groups (e.g., odd birth months vs. even birth months). Assign one group the income function and the other the expense. Tell each group member to enter their equation and send it to Activity Center. [Note: Each group's equation will lie on top of each other, so you will instantly know if any students are off task.]
- Stop the activity and discuss the graphs. There are two break even points (income = expense) and the interval between them represents profitability (income > expense).

4

- Load the activity settings file *Money Points.act*.
- Start the activity. Select **Individualize Student Cursors** from the View menu, and instruct the students to move their cursors to an intersection point (where income equals expense) and mark it. Have one group mark the lower left intersection point and have the other group mark the upper right.
- Select the **List-Graph** tab to see the coordinates of the plotted points. The marked points should all be close to the actual points (1, 9) and (8, 72).
- Stop the activity and select the **Equation** tab.
- Select the income function from the pull-down menu for the first column and the expense function for the second.
- Confirm that for 1 million units, both the income and expenses are \$9 million, and for 8 million units, the income and expenses are both \$72 million.

# Show Me the Money

5

---

- a. Continuing with the **Equation** tab, add the profit function  $y = 9x - (x^2 + 8)$ .
- b. Note that the profit is \$12 million when  $x = 4$  and 5. There must be a maximum profit somewhere between 4 and 5 million units. Enter various values for  $x$  in the section at the bottom of the screen until you find a maximum profit of \$12.25 million at 4.5 million units. [Point out also that the profit is 0 when  $x = 1$  and 8, the break even points.]

6

---

- a. Load the activity settings file **Money Equations.act**.
- b. Start the activity to send the three equations to the students.
- c. Have students log out of NavNet and use their calculators to find the intersection points of the income and expense functions and the maximum point of the profit function. Point out that the profit function crosses the  $x$ -axis at the break even points.

7

---

- a. Have students log back into NavNet and *force send* the LearningCheck™ file **Money.edc**.
- b. Have students complete the assignment. Analyze the results with Class Analysis and discuss the results.