

Rent a Video Game

ID: 13642

Time required

45 minutes

Activity Overview

In this activity, students will identify what a variable is, construct a table of values, graph the ordered pairs from the table, and use the TI-73 to graph the equation.

Topic: Algebraic Thinking

- *Writing number sentences*
- *Using variables to represent changing quantities*
- *Creating ordered pairs, tables, and graphs*

Teacher Preparation and Notes

- *Students should be familiar with ordered pairs and graphing ordered pairs.*
- *For more connection to the scenario used in this activity, students can set the calculator to always display two decimal places by pressing **MODE**, use the arrow keys to highlight the number 2 to the right of the word Float and press **ENTER**.*
- *Before beginning the activity, students should turn off all plots and functions.*
- *TI-Navigator is not required for this activity, but an extension is given for those teachers that would like to use it.*
- ***To download the student worksheet and TI-Navigator files, go to education.ti.com/exchange and enter “13642” in the quick search box.***

Associated Materials

- *MGAct22_Video_worksheet_TI73.doc*
- *MGAct22_Video_Nav_TI73.act*

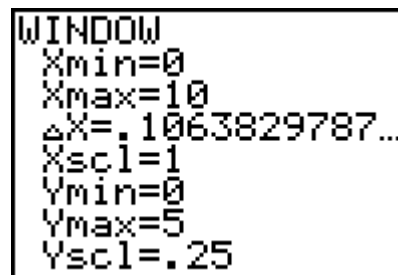
Suggested Related Activities

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

- *Linear Equations: Using Graphs and Tables (TI-73 Explorer) — 4415*
- *Making Cents of Density (TI-73 Explorer) — 8525*
- *Going for the Gold (TI-73 Explorer & TI-Navigator) — 12599*
- *The Best Cell Phone Plan (TI-30XS MultiView) — 8605*

To view the graph, you will need to set an appropriate viewing window as well. Work with students to identify what will be best for viewing the data. This is a good experience to have them look at the data to determine minimum and maximum values and an appropriate scale.

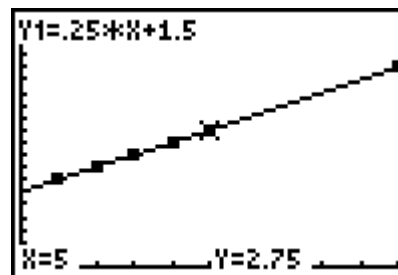
After the plot is drawn, students can use a straight edge to draw a line of fit that goes through all the points.



Problem 3 – Graphing the Equation

Question 10

For students to graph the equation, they can press $\boxed{Y=}$ and then clear any equations that may be present. Then, press $\boxed{0} \boxed{.} \boxed{2} \boxed{5} \boxed{\times} \boxed{x} \boxed{+} \boxed{1} \boxed{.} \boxed{5} \boxed{0} \boxed{ENTER}$. To view the graph, they will then press \boxed{GRAPH} . The function along with the scatter plot will appear.



Questions 11–12

Finally, students look at the table of values to compare to the ordered pairs from earlier in the activity. Students can see how each value they had is mirrored here.

| X | Y1 |
|------|------|
| 0.00 | 1.50 |
| 1.00 | 1.75 |
| 2.00 | 2.00 |
| 3.00 | 2.25 |
| 4.00 | 2.50 |
| 5.00 | 2.75 |
| 6.00 | 3.00 |

X=0

Extension – TI-Navigator™

1. You can use *MGAct22_Video_Nav_TI73.act* to allow students to each give one data point for analysis in either the main problem or any of the extension problems. To reuse the file between problems, make sure to clear the data before starting the activity again.
2. Use **Screen Capture** throughout to monitor student progress.
3. Use **QuickPoll** to have students determine the y-value given a specific x-value. Call out an x-value and have students submit what the y-value should be.

Extensions

Here are additional problems that you can assign to small groups and then have them share what they discover with the rest of the class.

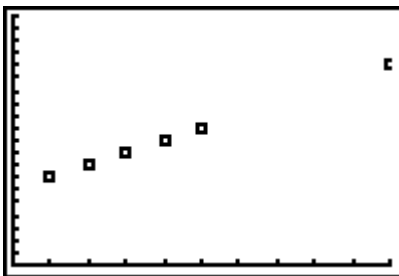
1. You are going to take a taxi to the mall. The going rate is \$2.00 for the first mile and 90¢ for each additional mile. How much will it cost to travel the 15 miles to the mall? Write a number sentence. How much would it cost to go to a friend's house 21 miles away?
2. You can buy a family season golf package for \$350. This entitles all members of your immediate family to unlimited golf privileges from March 15 through October 15. The standard golf fees are \$6.50 for juniors (through age 16) and \$8.50 for adults. How often would a family of four have to golf to justify buying a season pass?

3. You get a job as a car salesman at the new Ford dealership in town. Your boss tells you that you can work by commission or salary. If you work on commission basis, you would make 1% of your sales. If you chose to work on salary, you would make \$500 per week. (The average Ford sells for \$21,000.) Write an equation that shows how much you would make if you worked on a commission basis and sold 1 car, 2 cars, 3 cars, n cars. At what point do you start making more money by commission?
4. Question 3 extended: A third option is offered whereby you would make 0.5% commission and \$200 salary. Explain which of the three options you would choose and why. Support your opinion with a graph.
5. You have been invited to go biking in the backcountry. Claude's Classy Wheels rents mountain bikes for \$4.00 an hour, but Claude insists you also rent a lock for a \$1.35 flat fee for each bike rented. Write a number sentence to show how much it would cost to rent a bike for 7 hours. If you had \$13.50, for how many hours could you rent the bike? What if you had \$16.00? Tell how you would find this answer.

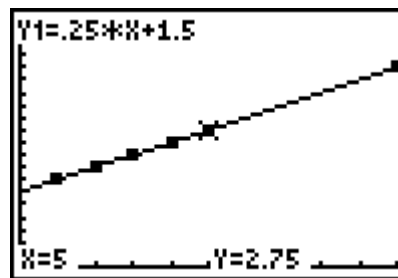
Solutions – student worksheet

1. $0.25 * 4 + 1.50$
2. $0.25 * 6 + 1.50, 0.25 * 8 + 1.50$
3. the part after 0.25, and it represents the number of hours
4. $0.25x + 1.50$
5. the total cost changes as well
6. $y = 0.25x + 1.50$
7. (1, 1.75), (2, 2.00), (3, 2.25), (4, 2.50), (5, 2.75), (10, 4.00)

8.



9.



This line represents all values of hours, not just the individual ones calculated.

10. See the graph in Question 9 above.
11. The values found in the table will be the same as the ordered pairs. There will, however, be more values in the table than just the 6 ordered pairs.
12. The scatter plot is a discrete function while the equation is a continuous function. The scatter plot is discrete because you can only trace the specific values that were input in the lists, not all values along the line.

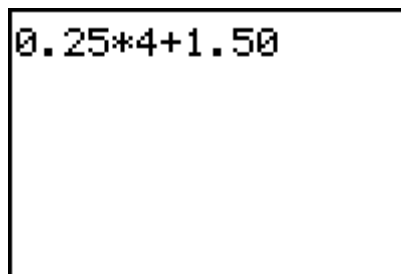


In this lesson you will look at a scenario of renting a video game system. You are going to rent a video system for \$0.25 per hour plus \$1.50 as a surcharge.

Problem 1 –Number Sentences

1. If you rent the system above for 4 hours, how much will you pay? Show the number sentence you used.

You can enter the number sentence on the TI-73 to perform the calculation. For 4 hours, you would press $0 \ . \ 25 \ * \ 4 \ + \ 1 \ . \ 50 \ \text{ENTER}$.



2. What if you rented the system for 6 hours? For 8 hours? Write the number sentence for each case.

3. Which part of your number sentence keeps changing? What does it represent?

4. How could you write a math sentence about this problem using the letter x to hold the place for the number of hours? _____
5. Is the number of hours the only thing that changes? If not, what else changes?

6. Now, write a math sentence using y to hold the place of the total cost.

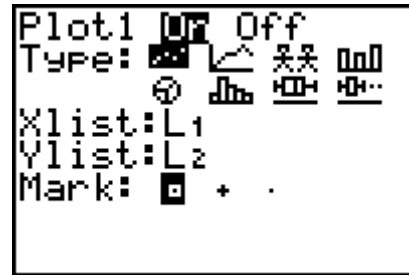
Problem 2 – Creating a Graph

Now, let's enter several x - and y -values into lists to create a scatter plot.

7. Enter values in L1 (x) and L2 (y) for x -values of 1, 2, 3, 4, 5, and 10. List the ordered pairs.

| L1 | L2 | L3 | Z |
|---------|------|-------|---|
| 1.00 | 1.75 | ----- | |
| 2.00 | 2.00 | | |
| ----- | | | |
| L2(3) = | | | |

8. Set up a scatter plot as shown at the right. Then draw the scatter plot you create of all the ordered pairs.
9. Draw a line to connect all the ordered pairs. What does this line represent? _____



Problem 3 – Graphing the Equation

Finally, look at the equation that can model our rental scenario.

10. Enter the math sentence you wrote in Question 6 into Y1 (press $\boxed{Y=}$), and then graph (press $\boxed{\text{GRAPH}}$). How does the graph of the equation compare to the line drawn in Question 9?

11. Look at a table of the function values. Press $\boxed{2\text{nd}}$ $\boxed{\text{WINDOW}}$ and set up the table as shown at the right. Press $\boxed{2\text{nd}}$ $\boxed{\text{GRAPH}}$ to see the actual table of function values. How do these values compare to the list of ordered pairs from Question 7?



12. Use the Trace feature to trace both the scatter plot and the function. Use the words continuous and discrete to describe the differences between the two.
