

COMPARING COSTS

Performance Standard (8A/8B).F

Compare the costs of two cellular phone plans and determine the best rate.

- *Mathematical knowledge:* Use a table and a graph of points plotted on a Cartesian plane to display the findings, write an equation containing variables that could be used to find the cost of any given number of minutes on either plan;
- *Strategic knowledge:* Use graph of points to draw conclusions;
- *Explanation:* Explain observations and any conclusions drawn from the data.

Procedures

1. *In order to describe numerical relationships using variables and patterns (8A) interpret and describe numerical relationships using tables, graphs, and symbols(8B)*, students should experience sufficient learning opportunities to develop the following:
2. Investigate, extend, and describe arithmetic and geometric sequences of numbers whether presented in numeric or pictorial form.
 - Create a table of values that satisfy a simple linear equation and plot the points on the Cartesian plane.
 - Describe, verbally, symbolically, and graphically, a simple relationship presented by a set of ordered numbers.
3. Each student is given a copy of the problem “Comparing Costs”.
4. Have the students read through the directions and the problem.
5. The teacher may want to suggest to the student that s/he use numbers of minutes that are multiples of ten.
6. The student will work the problem by using the information given, making a table of values, plotting the ordered pairs on the Cartesian plane, and writing equations to determine costs.
7. The student will write an explanation of how s/he solved the problem, his/her observations about the data collected, and any conclusions drawn from the data.
8. The teacher will be assessing whether the student can take the information given in the problem and use it to fill in the table with appropriate values. If the student uses minutes in multiples of 10, the table should look something like this:

Number of Minutes	0	10	20	30	40	50	60	70	80
Keep-in-Touch	\$20.00	\$21.00	\$22.00	\$23.00	\$24.00	\$25.00	\$26.00	\$27.00	\$28.00
ChitChat	\$0.00	\$4.50	\$9.00	\$13.50	\$18.00	\$22.50	\$27.00	\$31.50	\$36.00

8. The equation that should be used for ChitChat is: $C = n \cdot \$0.45$
9. The equation that should be used for Keep-in-Touch is: $C = \$20.00 + \$0.10 \cdot n$
10. To determine whether the student can interpret and extend the patterns, the teacher will want to ask something like, “How much would each company charge for 25 minutes? For 100 minutes?”
11. On the graph, one line will begin at zero because ChitChat charges nothing when no minutes are used. The other line will begin at \$20.00 because Keep-in-Touch charges \$20 whether minutes are use or not. This should be included in the student’s written explanation of the pattern and the graph.
12. Also included in the student’s writing should be something about the lines represented on the graph being straight because the companies charge a constant rate. For each minute used, the customer is charged \$0.10 or \$0.45.
13. The student should mention in their writing that people who talk on their cell phone 50 minutes or less a month will most likely want the ChitChat offer because it will be cheaper. People who talk more than 50 minutes a month will probably opt for the Keep-in-Touch offer to save money.

Examples of Student Work not available

Time Requirements

- One class period

Resources

- Copies of the “Comparing Costs” task sheet
- Pencil
- Calculator-regular and/or graphing
- Mathematics Rubric

NAME _____ DATE _____

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Student Task Sheet

1. Read the problem below.
2. Make a table of values.
3. Using the values in the table as ordered pairs (minutes, cost) and graph paper, plot the points of each line on a Cartesian plane to show the comparison of rates. Use different colors.
4. Write an equation for each set of values that will determine the cost of n (number of minutes).
5. Explain in writing your observations of, and conclusions drawn from, the data display. Your observations and conclusions should include identifying groups of people for which each plan might meet their needs. Use the back of the paper for your writing and equations.

Problem:

Doug saw advertisements for two cellular telephone companies. Keep-in-Touch offers phone service for a basic fee of \$20.00 a month plus \$0.10 for each minutes used. ChitChat has no monthly basic fee but charges \$0.45 a minute. Both companies use technology that allows them to charge for the exact amount of time used; they do not “round up” the time to the nearest minute as many competitors do. Compare these two companies’ charges for the time used each month.

Number of Minutes									
Keep-in-Touch									
ChitChat									

