TASK 1.1.7: PATTERN APPLICATION

Solutions

Juanita was going to get a cell phone. The Call-A-Lot phone company had a special plan for high school students. The plan charges a flat fee of $15 dollars a month and a charge of $0.05 per minute for each phone call.
Fill in the table below.

Number of minutes talking	Process column	Total cell phone cost per month
0	15 + .05(0)	$15
1	15 + .05(1)	$15.05
2	15 + .05(2)	$15.10
3	15 + .05(3)	$15.15
4	15 + .05(4)	$15.20
15	15 + .05(15)	$15.75
100	15 + .05(100)	$20
n	15 + .05n	T = 15 + .05n

1. If she spends $35 per month on her phone bill, how many minutes will she be able to talk? Explain how you determined this.

400 minutes. Students may use 35 as output value and solve the equation 35=15+.05n to derive the number of minutes. Students may also use the trace function or table function on the graphing calculator to find the corresponding x-value associated with the y-value 35.

2. When Juanita signs her contract, even before she talks on the phone, how much money does she owe the Call-A-Lot phone company? What is the ordered pair that represents this situation?

Juanita owes the $15 flat fee for 0 minutes. (0, 15)

3. Use your graphing calculator to create a scatter plot of this data and situation. What is a good viewing window for this situation? Justify your answer.

A good viewing window for this problem situation is Xmin=-10 and Xmax=450; Ymin=-1 and Ymax=40. This window clearly shows the point where x=400 and y=35 and also includes the y-intercept of (0, 15).

4. If Juanita talks for 1 hour, what will she owe the Call-A-Lot phone company? What is the ordered pair that represents this situation?

If Juanita talks for 1 hour, she will owe the Call-A-Lot phone company $45. The ordered pair that represents this situation is (60, 45) if the domain is reported in minutes.

5. If Juanita can only spend $35 on her phone bill every month, how many additional minutes could she talk if the Call-A-Lot phone company decides to lower the cost per minute to 4 cents? Justify your answer. What would be a reasonable range and domain for this scenario?

If the phone company changes the charge from $0.05 to $0.04 per minute, Juanita would be able to talk for 500 minutes for $35 dollars. That is an additional 100 minutes. A reasonable domain for this situation is 0 to 500. A reasonable range is 15 to 35. The domain (#minutes) changed for this situation, but the range (cost) did not.

6. The Call-A-Lot phone company decides to raise the flat fee from $15 to $25 and keep the cost per minute at $0.05. If Juanita wants to keep her monthly bill at $35, how many minutes can she talk? Justify your answer. How would the range and domain for this situation compare to the other situations? Explain.

If the Call-A-Lot phone company raises the flat fee from $15 to $25, Juanita will only be able to use 200 minutes for a monthly bill of $35. Take the flat fee of $15 off the total cost of $35 and Juanita has $20 to spend at $0.05 per minute. Take the flat fee of $25 off the total of $35 and Juanita has only $10 to spend on minutes. That is half the original amount and will allow her only half the minutes.

Math notes

This problem represents an application of the pattern process. Through this part of foundations of functions we have covered:

- Concrete pattern – table – scatter plot – expression – range and domain
- Scatter plot – concrete – table – expression – range and domain
- Expression – concrete pattern – table – range and domain
- Problem situation – table – expression – equation – range and domain

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n		

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