Chapter 3 Activity: Shopping for the Best Cell Phone Plan

Your Name: _____

Answer the following questions on a separate sheet of paper. Make sure your work is neat and easy to follow. Show as much work as possible. Feel free to work with your teammate if you like. In that case, you can turn in one paper but both teammates must do their share.

In purchasing cell phone service, you must shop around to determine the best rates and services that apply to your situation. You can look up basic cell phone plan info on the Internet. For example, try these cell phone websites and look for a link to display *individual* plans:

http://www.cingular.com/indexc http://www.verizonwireless.com/b2c/index.jsp http://www.sprint.com/personal/wireless/

1. Each team member is required to gather information about a cell phone plan. Fill in the following table with that information from two cell phone plans with different rates.

	Plan 1	Plan 2
Name		
Basic Monthly Fee		
Number of Peak Minutes Included in Monthly Plan		
Cost per minute for Additional Peak Minutes		

- 2. Notice that each monthly charge includes a specific number of peak (anytime) time minutes included in the monthly fee. Write a piece-wise defined function for <u>each</u> plan, where C is the monthly cost and x is the number of peak time minutes used. Be sure to clearly label your functions.
- 3. Graph the functions corresponding to each plan. Draw two separate graphs on the same set of coordinate axes and be sure to label each graph clearly. Using two different colors can help you distinguish between the two graphs.
- 4. Which plan gives the best deal for the following amounts of monthly minutes? Explain.

a.	260 minutes	с.	1000 minutes
b.	450 minutes	d.	2500 minutes

- 5. Using your graph, when does plan 1 become the best deal? Why?
- 6. Using algebra, solve for exactly when plan 2 becomes the best deal.

Sample Answers for Lab Comparing Cell Phone Plans

(2) Examples of piece-wise functions:

C(x): cost in dollars x: total number of minutes

Cell Phone Plan 1 (\$29.99 a month & 40¢ for ea. minute over 300):

$$C_1(x) = \begin{cases} 29.99 & \text{if } 0 \le x \le 300 \\ .4x - 90.01 & \text{if } 300 < x < 43200 \end{cases}$$

Cell Phone Plan 2 (\$39.99 a month & 20¢ for ea. minute over 400):

$$C_2(x) = \begin{cases} 39.99 & \text{if } 0 \le x \le 400 \\ .2x - 40.01 & \text{if } 400 < x < 43200 \end{cases}$$

Note: all formulas in the above example have been simplified (i.e., combined like-terms, cleared parentheses, etc.) BTW: 43200 = total number of minutes in a 30-day month.

(4) Sample answers could read like this:

For 1000 minutes a month, plan 1 costs \$309.99 (i.e., $C_1(1000) = 309.99$); plan 2 costs \$159.99 (i.e., $C_2(1000) = 159.99$). Thus, plan 2 is a better deal for 1000 minutes a month.

(6) Sample algebra to determine when one plan is cheaper than the other:

Based on your graph, determine which two pieces of each function intersect if any. Set those two pieces equal to each other and solve.

39.99 = .4x - 90.0139.99 + 90.01 = .4 - 90.01 + 90.01x = 325

Thus, we conclude that plan 2 is cheaper when the total number of monthly minutes is greater than 325.