** Mathematics Assignment 8**

**Comparing Cell Phone Plans**

**Date:** Due

**Overview:**

You want to have your own cell phone. You are trying to decide which payment plan to choose. Some plans offer a free phone, if you sign a three-year contract. The details for each plan are shown in the chart below. Plan A costs $40 per month plus 5 per minute for daytime calls. In Plan B, you can buy a phone for $99 and use a “pay-as-you-go” card. Plan C costs $30 per month, with 100 free daytime minutes plus free evenings and weekends.

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| --- | --- | --- | --- | --- |
| **Phone Plan** | **Cost of Phone** | **Cost of Plan** | **Free Daytime Minutes** | **Evenings and Weekends** |
| **A**  36 month contract | Included | $40/month plus $0.05/min for all daytime minutes | 0 | Free |
| **B**  Pay-As-You-Go | $99 | $0.30/min for first 2 min, then $0.05/min | 0 |  |
| **C**  36 month contract | Included | $30/month plus $0.30/min after the first 100 minutes | 100 | Free |

**Preparation Work and Tasks:**

1. Create a table of values or spreadsheet for each cell phone plan. **(2)**

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| --- | --- | --- | --- |
|  | **Plan A** | **Plan B** | **Plan C** |
| **# of daytime minutes used in a month** | **Monthly Cost** | **Monthly Cost** | **Monthly Cost** |
| 10 | $40.50 |  |  |
| 20 | $41.00 |  |  |
| 30 |  |  |  |
| 40 |  |  |  |
| 50 |  |  |  |
| 60 |  |  |  |
| 100 |  |  |  |
| 150 |  |  |  |
| 200 |  |  |  |

1. Use your table of values or a spreadsheet to determine each total cost. **(3)**
2. Draw a graph for each cell phone plan. **(3)**
3. What is the monthly cost of buying a $99 phone, if it is spread over three years? Be sure to consider this when you make your final decision. **(1)**
4. These algebraic expressions both represent the total monthly cost of Plan A:

0.05*m* + 40 **or** 5*m* + 4000

Explain how each expression can be used to determine the cost, if *m* represents the total daytime minutes. **(2)**

1. What is the total monthly cost of Plan C for up to 100 minutes? Write an algebraic expression that represents the total monthly cost of Plan C for more than 100 minutes.Use your expression to determine the cost of 300 daytime minutes per month with Plan C. **(2)**
2. What is the cost of calls up to 2 minutes with Plan B, not including the phone? Write an algebraic expression that represents the cost of calls over 2 minutes with Plan B, not including the phone. Use your expression to determine the cost of 300 daytime minutes per month with Plan B. **(2)**
3. Solve each equation to determine the number of minutes that were billed to the account. **(4)**
   1. 5*m* + 4000 = 4400, where *m* is the number of daytime minutes used.
   2. 0.05*m* + 40 = $50, where *m* is the number of daytime minutes used.
   3. 30 + 0.30*c* = $60, where *c* is the number of daytime minutes over 100 minutes.
   4. 60 + 5*b* = 90, where *b* is the number of minutes over 2 minutes.
4. Your friend chose Plan A. He was shocked to get a bill of $115 for the month of April. **(3)**
   1. Use an equation to determine the number of daytime minutes used that month.
   2. Determine the average number of minutes he used the phone during each day.
   3. Use an equation to determine the total bill if your friend used the phone for 20 daytime minutes each day in April.
5. Create and solve an equation to determine the total cost with each plan if you make one 5-minute daytime phone call every day for 30 days and also talk for 15 minutes in the evening. Explain how you used your equation. **(3)**
6. Summarize your results, stating your final choice of cell phone plan. Outline the reasons for your decision. You may include other factors that have not been considered in this assignment, such as evening use, text messaging, and so on. **(5)**

**Evaluation:**

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| **Category** | **Level 4** | **Level 3** | **Level 2** | **Level 1** | **%** |
| Depth of Understanding | Demonstrates thorough understanding of concepts. | Demonstrates considerable understanding of concepts. |  |  | 20 |
| Problem Solving / Thinking | Use of procedure includes almost no errors or omissions. | Use of procedures is mostly correct, but there may be a few minor errors and / or omissions. |  |  | 20 |
| Application of Learning | Demonstrates sophisticated ability to make connections between mathematics learning and the real world. | Demonstrates considerable ability to make connections between mathematics learning and the real world. |  |  | 20 |
| Explanation and Justification of Concepts, Procedures, and Problem Solving | Provides thorough, clear and insightful explanations / justifications, using a range of words, pictures, symbols, and / or numbers. | Provides complete, clear and logical explanations / justifications, using appropriate words, pictures, symbols, and / or numbers. |  |  | 20 |
| Use of Mathematical Vocabulary | Uses a broad range of mathematical vocabulary to communicate clearly and precisely. | Uses mathematical vocabulary with considerable clarity and precision. |  |  | 20 |