|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **First Names** | | | | | **Favorite Candy** | | | | | | **Costume** | | | | | |
|  |  | Amari | Francisca | Jamirea | Micaiah | Senad | M&Ms | Starbursts | Twix | Air Heads | Mounds | Chef | | Banana | Ghost | Lumberjack | Pirate |
| **Time** | 5:45 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| 6:00 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| 6:30 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| 6:45 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| 7:00 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Costume** | Chef |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Banana |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Ghost |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Lumberjack |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Pirate |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| **Favorite Candy** | M&Ms |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Starbursts |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Twix |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Air Heads |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Mounds |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |

Who’s Who on Halloween?

Amari, Francisca, Jamirea, Micaiah, and Senad live in the same neighborhood. On Halloween, they each go out trick-or-treating, but they each start at slightly different times, wear a different costume, and have different favorite candies they like to collect. For each derivative problem you solve, you’ll receive a clue from one of the neighbors about what they saw that night. Can you figure out who’s who on Halloween, including what time each person started trick-or-treating, what their favorite candy is, and what costume they were in?

1. The person whose favorite candy is Air Heads started trick-or-treating before Senad.
2. The 5 people are the person whose favorite candy is Air Heads, the pirate, Micaiah, the person who started trick-or-treating at 7 PM and the person whose favorite candy is Twix.
3. Of the chef and Senad, one started trick-or-treating at 5:45 PM and the other has Twix as their favorite candy.
4. Francisca started trick-or-treating at 5:45 PM.
5. Jamirea is either the ghost or the lumberjack.
6. The ghost started trick-or-treating after the banana.
7. The person whose favorite candy is M&Ms is neither the ghost nor the banana.
8. The person who started trick-or-treating at 6:30 has Starbursts as their favorite candy.
9. The person who started trick-or-treating at 6:45 was not the banana.
10. The banana started trick-or-treating after Senad.
11. Chart, line chart

    Description automatically generatedThe graph of is shown.

Evaluate

1. Find the derivative of each function.
2. Chart, line chart

   Description automatically generatedThe graph of is shown below for . For which value(s) of x is continuous but not differentiable?
3. Selected values of and their derivatives are given in the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| -3 | 10 | 1 | -1 | 3 |
| -1 | 4 | -2 | -3 | 0 |
| 2 | 1 | -5 | 0 | -2 |
| 5 | -2 | -3 | 2 | 8 |
| 8 | -5 | 11 | 7 | -3.5 |
| 11 | 5 | 8 | 13 | 1 |

Let . Find .

1. Let for some constants *k* and *m*. If and , find the values of *k* and *m*.
2. The graph of is shown below. Order the following from least=1 to greatest=4.

Chart, line chart

Description automatically generated

\_\_\_\_\_\_

\_\_\_\_\_\_\_ The average rate of change of on the interval [3,6]

\_\_\_\_\_\_\_

\_\_\_\_\_\_\_

1. Selected values of and their derivatives are given in the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| -3 | 10 | 1 | -1 | 3 |
| -1 | 4 | -2 | -3 | 0 |
| 2 | 1 | -5 | 0 | -2 |
| 5 | -2 | -3 | 2 | 8 |
| 8 | -5 | 11 | 7 | -3.5 |
| 11 | 5 | 8 | 13 | 1 |

Let . Find .

1. If , find
2. Selected values of and their derivatives are given in the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| -3 | 10 | 1 | -1 | 3 |
| -1 | 4 | -2 | -3 | 0 |
| 2 | 1 | -5 | 0 | -2 |
| 5 | -2 | -3 | 2 | 8 |
| 8 | -5 | 11 | 7 | -3.5 |
| 11 | 5 | 8 | 13 | 1 |

Let . Find .

1. Let and let be a function so that for all *x*.

If and , write an equation for .