**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per.\_\_\_\_\_\_\_ Score:\_\_\_\_\_**

**U8 HW #4** *Constructing and Comparing Linear Functions*

**Directions:** Determine whether the situations represented below are linear or nonlinear. **For the situations that are linear,** construct a function that models the relationship between the two quantities.Be sure to define your variables.

1. The graph below shows the amount of revenue a company will make selling t-shirts dependent on the price of each t-shirt. Consider the relationship between price of each shirt and revenue made.



Is the data linear? Why or why not?

If yes, construct a function to model the relationship between the two variables. Be sure to define your variables.

1. When Camilo opened his email this morning he had 140 unread emails. The table below shows the number of remaining unread emails Camilo has in his inbox. Assume that Camilo does not receive any new emails while he is reading his email. Consider the relationship between time and the number of unread emails.

Is the data linear? Why or why not?

If yes, construct a function to model the relationship between the two quantities. Be sure to define your variables.

|  |  |
| --- | --- |
| Time (hours) | # of Unread Emails |
| 0 | 180 |
| 0.5 | 160 |
| 1 | 140 |
| 2 | 100 |
| 2.5 | 80 |
| 4 | 20 |
| 4.5 | 0 |

1. Justine and her family are floating down a river. After 1 hour, they have floated 1.25 miles, after 4 hours they have floated 5 miles, and after 6 hours they have floated 7.5 miles. Is the relationship between time (in hours) and distance (in miles) linear? Why or why not? If it is linear, write a function that models the relationship between the two quantities.
2. Who will have $1,000 first, Becky or Olga?

|  |  |
| --- | --- |
| Becky has $100 and is saving $10 every wee k. | Olga’s information is shown on the graph below.  Time (weeks)  Money (dollars) |

1. Jack, George, Lucy, and Anna are playing games on their iPads. The representations below show the battery life remaining on each child’s iPad over time. (Note variables: *x* = time in hours, *y* = battery life remaining as a percent.) Use these representations to answer the questions that follow.

|  |  |
| --- | --- |
| Jack: | pad by asrafil - Anna: |
| George:  George’s iPad started with 92% battery life and is using 12.5% of the battery life every hour. |
| Lucy:   |  |  | | --- | --- | | Hours | Battery Life Remaining (%) | | 0 | 76 | | 2 | 60 | | 3 | 52 | |

* 1. Whose iPad had the most battery life when the kids started playing?
  2. Whose iPad is using the battery at the fastest rate? At the slowest rate?
  3. Who will run out of battery life first?
  4. Whose will be able to play their iPad for the longest amount of time?

1. Emily’s little brother painted on her math homework. She knows the data in each of the tables below represents a linear function. Help Emily determine what number is hidden behind the blob of paint.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | 10 | 20 | 30 | 40 |
| *y* | 8 | 13 |  | 23 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | –2 | 0 | 2 | 3 |
| *y* | –5 |  | 7 | 10 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | 0 | 1 |  | 6 |
| *y* | 0 | 3 | 9 | 18 |

**Directions:** For each problem, circle the representation with the greatest rate of change. *Put a star by the representation with the greatest y-intercept*.

**Assume all representations have a constant rate of change**.



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | | ***x*** | ***y*** | | 1 | 1.5 | | 2 | 2 | | 3 | 2.5 | |  |
| 8. | |  |  | | --- | --- | | ***x*** | ***y*** | | 0 | 0 | | 2 | -2 | | 5 | -5 | |  |