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

**U8 CW #4** *Constructing and Comparing Functions*

**Directions:** Identify the dependent and independent variable in the following situations. Determine whether the situations 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. An object is dropped from a bridge into the water below. The graph below shows the height of the object (in feet) with respect to time (in seconds). Consider the relationship between the height of the object and time.

Independent Variable:

Dependent Variable:

Is the data linear? Justify your answer.

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



1. Owen is earning pennies each day that he makes his bed in the morning. On the first day, Owen’s mom gives him 2 pennies. On the second day, Owen’s mom gives him 4 pennies, on the third day 6 pennies, on the fourth day 8 pennies, and so on. Owen makes his bed every day and this pattern continues. The model below shows how many pennies Owen earns each day (each box represents 1 penny). Consider the relationship between **the number of pennies received** **on a given day** and the **day number**.

Independent Variable:

Dependent Variable:

Is the data linear? Justify your thinking.

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

Day 1

Day 2

Day 3

Day 4

1. Refer back to #2 and Owen earning pennies. Consider the relationship between the **total number of pennies** Owen has earned and the **day number**.

Independent Variable:

Dependent Variable:

Is the data linear? Justify your choice.

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

|  |  |  |
| --- | --- | --- |
| Day | # of Pennies Added That Day | Sum of Pennies |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Carbon-14 has a half-life of 5,730 years. The table below shows the amount of carbon-14 that will remain after a given number of years. Consider the relationship between number of years and amount of carbon-14 remaining.

Independent Variable:

Dependent Variable:

Is the data linear? Justify your answer.

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

|  |  |
| --- | --- |
| **# of Years** | **Milligrams of Carbon-14** |
| 0 | 8 |
| 5,730 | 4 |
| 11,460 | 2 |
| 17,190 | 1 |
| 22,920 | $$\frac{1}{2}$$ |

1. Steve is a lifeguard at a local community pool. Each day at noon, he records the temperature and the number of people in the pool. Do you think the relationship between temperature and number of people in the pool is linear? Explain.
2. Put the cyclists in order from slowest to fastest. (Note variables: *x* = time in seconds, *y* = meters traveled)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cyclist A:

|  |  |
| --- | --- |
| Time (*x*) | Distance (*y*) |
| 2 | 1 |
| 4 | 2 |
| 6 | 3 |

 | Cyclist D: Time (seconds)Distance (meters) |
| Cyclist B: Bob has cycled 12 meters in the past 6 seconds. |
| Blue bike by Anonymous - Blue bicycle (originally named "vtt_02") by Franck Doucet. From old OCAL website.Cyclist C: $$y=\frac{1}{3}x$$ |

|  |  |
| --- | --- |
| Family A:$$y=95-55x$$ | Family D:  |
| Family B:Family B lives 120 miles from Disneyland and drives 60 mph. |
| Family C:

|  |  |
| --- | --- |
| Hours | Distance from Disneyland |
| 0 | 80 |
| 1.5 | 5 |

 |

1. Four families are meeting up in Disneyland. Each family starts driving from home. The representations below show the distance each family is from Disneyland over time. (Note variables: *x* = time in hours, *y* = distance from Disneyland.) Assume the families drive to Disneyland at a constant rate.
	1. Which family lives the closest to Disneyland?
	2. Which family lives the farthest from Disneyland?
	3. Which family is traveling at the fastest speed?
	4. Which family is traveling at the slowest speed?
	5. Who will get to Disneyland first?
	6. Who will get to Disneyland last?
2. Based on the information below, which bathtub will be empty first? Why?

|  |  |
| --- | --- |
| Bathtub A: Starts with 25 gallons and is draining 1.5 gallons a minute. | Bathtub C: Time (minutes) Water (gallons) |
| Bathtub B:

|  |  |
| --- | --- |
| Minutes | Gallons |
| 0 | 25 |
| 3 | 20 |
| 6 | 15 |

Bathtub 1 by monicams - simple bathtub with water |

**Directions:** For each set of 3 representations (#9 and #10), 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.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$y=2+3.5x$$ |

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| 1 | 8 |
| 5 | 20 |
| 7 | 26 |

 |  |
| 1.
 |

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| 0 | 4 |
| 2 | -2 |
| 5 | -11 |

 | $$(0, 3)(2, -5)$$ |