$\qquad$ Date: $\qquad$ Period: $\qquad$ Score: $\qquad$

Sec 1H Unit 3 Day 2 Linear vs Exponential Assignment

1. Jenna is planning to swim in a charity swim-a-thon. Several relatives said they would sponsor her. Each of their donations is explained. Complete a table for each donation plan.

Taking risks is how we grow.
Grandmother: I will give you \$1 if you swim 1 lap, \$3 if you swim 2 laps, \$5 if you swim 3 laps, \$7 if you swim 4 laps, and so on.

| Laps | 1 | 2 | 3 | 4 | 5 | $\ldots 20$ laps | $n$ laps (explicit equation) |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Donation |  |  |  |  |  |  |  |

Mother: I will give you $\$ 1$ if you swim 1 lap, $\$ 3$ if you swim 2 laps, $\$ 9$ if you swim 3 laps, $\$ 27$ if you swim 4 laps, and so on.

| Laps | 1 | 2 | 3 | 4 | 5 | $\ldots 20$ laps | $n$ laps (explicit equation) |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Donation |  |  |  |  |  |  |  |

Aunt Lori: I will give you $\$ 2$ if you swim 1 lap, $\$ 3.50$ if you swim 2 laps, $\$ 5$ if you swim 3 laps, $\$ 6.50$ for 4 laps, and so on.

| Laps | 1 | 2 | 3 | 4 | 5 | $\ldots 20$ laps | $n$ laps (explicit equation) |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Donation |  |  |  |  |  |  |  |

Uncle Jack: I will give you \$1 if you swim 1 lap, $\$ 2$ if you swim 2 laps, $\$ 4$ if you swim 3 laps, $\$ 8$ if you swim 4 laps, and so on.

| Laps | 1 | 2 | 3 | 4 | 5 | $\ldots 20$ laps | $n$ laps (explicit equation) |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Donation |  |  |  |  |  |  |  |

2. Decide whether each donation pattern is exponential, linear, or neither.

## Grandmother:

## Mother:

## Aunt Lori:

## Uncle Jack:

Evaluate the following equations, when $x=\{1,2,3,4,5\}$. Organize your inputs and outputs into a table of values for each equation. Let $x$ be the input and $g(x)$ be the output.
3. $g(x)=4^{x}$
4. $g(x)=(-3)^{x}$
5. $g(x)=-3^{x}$
6. $g(x)=10^{x}$

7. The graphs at right represent $y=2^{x}$ and $y=2 x+1$.
a. Which graph shows linear growth?

How do you know when a graph is linear?
b. Which graph shows exponential growth?

How do you know?



Study the pattern in each table and answer questions $a$ and $b$.
8.

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $Y$ | 10 | 12.5 | 15 | 17.5 | 20 | 22.5 |

a. linear, exponential, or neither. Explain your reasoning.
b. If the relationship is linear or exponential, give its explicit equation.
c. Write at least three more explicit equations for this pattern.
9.

| $x$ | 0 | 1 | 2 | 3 | 4 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $y$ | 1 | 6 | 36 | 216 | 1296 |

a. linear, exponential, or neither. Explain your reasoning.
b. If the relationship is linear or exponential, give its explicit equation.
10. $f(x)=x^{2}$
a. linear, exponential, or neither. Explain your reasoning.
b. List the first 5 terms.
11. $f(x)=2(2)^{x}$
a. linear, exponential, or neither. Explain your reasoning.
b. List the first 5 terms.


