**Exploring Growth Patterns: A Comparison**

The following pictures show walls being built section by section. They are called ‘growth patterns’ because the heights of the walls grow with each section.

|  |  |
| --- | --- |
| **Pattern A**. Complete the table below based on pattern A shown to the right. | **Pattern A** |
|

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section # (*x*) |  |  |  |  |  |
| # of Bricks NA(*x*) |  |  |  |  |  |

 |
| Write a recursive rule for pattern A.   |

|  |  |
| --- | --- |
| **Pattern B**. Complete the table below based on pattern B shown to the right.  | **Pattern B** |
|

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section # (*x*) |  |  |  |  |  |
| # of Bricks NB(*x*) |  |  |  |  |  |

 |
| Write a recursive rule for pattern B.  |
|   |

|  |  |
| --- | --- |
| **Pattern C**. Complete the table below based on pattern C shown to the right. | **Pattern C** |
|

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section # (*x*) |  |  |  |  |  |
| # of Bricks NC(*x*) |  |  |  |  |  |

 |
| Write a recursive rule for pattern C.  |
|  |

|  |  |
| --- | --- |
| **Pattern D**. Complete the table below based on pattern D shown to the right. | **Pattern D** |
|

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section # (*x*) |  |  |  |  |  |
| # of Bricks ND(*x*) |  |  |  |  |  |

 |
| Write a recursive rule for pattern D.  |
|    |

1. Describe how the patterns are similar.
2. Describe how the patterns are different from each other.
3. Decide whether each pattern shows linear growth or exponential growth *and explain why.*

Pattern A:

Pattern B:

Pattern C:

Pattern D:

1. Find the initial value for each pattern.

Pattern A:

Pattern B:

Pattern C:

Pattern D:

1. For each linear growth pattern find the rate of change.

Pattern \_\_\_\_\_\_\_ Rate of change \_\_\_\_\_\_\_\_\_\_\_

Pattern \_\_\_\_\_\_\_ Rate of change \_\_\_\_\_\_\_\_\_\_\_

1. For each exponential growth pattern find the growth factor.

Pattern \_\_\_\_\_\_\_ Growth factor \_\_\_\_\_\_\_\_\_\_\_

Pattern \_\_\_\_\_\_\_ Growth factor \_\_\_\_\_\_\_\_\_\_\_

1. Write an explicit rule (function) for each pattern.

Pattern A:

Pattern B:

Pattern C:

Pattern D:

1. If you had trouble writing an explicit rule for any of the patterns, write down which ones and why.
2. For a linear function $f\left(x\right)= mx+b$
3. Which parameter (*m* or *b*) represents the initial value?
4. Which parameter (*m* or *b*) represents the rate of change?
5. For an exponential function $f\left(x\right)=ab^{x}$
6. Which parameter (*a* or *b*) represents the initial value?
7. Which parameter (*a* or *b*) represents the growth factor?