Sequence & Series

Name: _____   Date: _____   Period: _____

Slide 1 - Multiple Choice	Your Response
What formula you have to use to find the rate of change?	Available Choices: • Point Slope Formula • Slope Formula • Quadratic Formula • Slope Intercept Formula

Slide 2 - Draggable	Your Response
Which of the following is the slope formula? $\frac{y_2-y_1}{x_2-x_1}$ $\frac{y_1-y_2}{x_2-x_1}$ $\frac{y_2-x_2}{y_1-x_1}$ $\frac{x_2-x_1}{y_2-y_1}$	

Slide 3 - Draggable	Your Response
The slope is positive indicate the rate of change is decreasing? True | False	

Slide 4 - Text Response	Your Response
Average Rate of Change • What is the rate of change for the cost of four movie tickets is $30 and the cost of seven tickets is $52.50?	

Slide 5 - Multiple Choice	Your Response
How do you determine if this data is an arithmetic sequence? **Cars Washed** <table><tr><td>Hours</td><td>Cars</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>8</td></tr><tr><td>3</td><td>12</td></tr><tr><td>4</td><td>16</td></tr></table>	Available Choices: • Use the slope formula to calculate the rate of change at different intervals. If the rate of change is the same, then it is an arithmetic sequence. • Use the slope formula to calculate the rate of change at two intervals. If the rate of change is the same, then it is an arithmetic sequence. • Use the slope formula to calculate the rate of change at one interval because that is enough information to determine arithmetic sequence.

Slide 6
Arithmetic Sequence • A **sequence** such as 1, 5, 9, 13, 17 or 12, 7, 2, −3, −8, −13, −18 which has a constant difference between terms. The first term is a_1, the common difference is d, and the number of terms is n.

Slide 7

Arithmetic Sequence

- The explicit formula for an arithmetic sequence is $a_n = a_1 + (n - 1)d$.
    - a_1 is the first term of the sequence.
    - d is the common difference of the sequence.
    - n is the position number in the sequence.

    2, 6, 10, 14, 18

- What are the values of a_1 and d?

Slide 8 - Text Response

Arithmetic Sequence

- The explicit formula for an arithmetic sequence is $a_n = a_1 + (n - 1)d$.
    - a_1 is the first term of the sequence.
    - d is the common difference of the sequence.
    - n is the position number in the sequence.

    3, 6, 12, 15, 18

- What are the values of a_1 and d?

Your Response

Slide 9

Arithmetic Sequence

- Is this sequence an arithmetic sequence? Explain using "common difference."

    1, 4, 7, 10, 12, 15

Slide 10 - Text Response	Your Response
Arithmetic Sequence • Is this sequence an arithmetic sequence? Explain using "common difference." 　　-5, -3, -2, 0, 2, 4	

Slide 11 - Text Response	Your Response
Arithmetic Sequence • Is this sequence an arithmetic sequence? Explain using "common difference." 　　-1, 3, -1, 3, -1	

Slide 12

Arithmetic Sequence: Explicit Formula

• The explicit formula for an arithmetic sequence is $a_n = a_1 + (n - 1)d$.

a_1 is the first term of the sequence.
d is the common difference of the sequence.
n is the position number in the sequence.

　　2, 6, 10, 14, 18

• The explicit formula for this arithmetic sequence is

$a_n = 2 + (n - 1)4$
$a_n = 2 + 4n - 4$
$a_n = 4n - 2$

Arithmetic Sequence: Explicit Formula

• The explicit formula for an arithmetic sequence is $a_n = a_1 + (n-1)d$.

• What is the explicit formula for this sequence?
  -21, -15, - 9, - 3…

Arithmetic Sequence: Explicit Formula & nth Term

• The explicit formula for an arithmetic sequence is $a_n = a_1 + (n-1)d$.

  1, 6, 11, 17, 23…

• What is the explicit formula for the above sequence?
• What is the value of a_{15}?

Arithmetic Sequence: Recursive Formula

• A **recursive formula** designates the starting term, a_1, and the nth term of the sequence, a_n , as an expression containing the previous term (the term before it), a_{n-1}.

  $a_n = a_{n-1} + d$

  1, 6, 11, 17, 23…

• The recursive formula for the above sequence is $a_n = a_{n-1} + 5$.
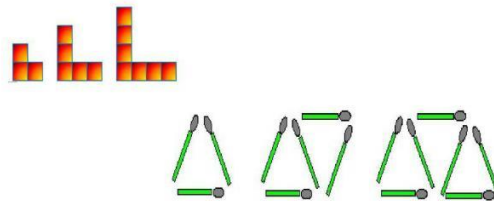
Arithmetic Sequence: Recursive Formula

- Given: $a_n = 3a_{n-1} + 5$, $a_1 = 11$

- Find the first five terms.

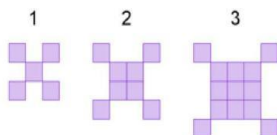| n	$a_n = 3a_{n-1} + 5$	a_n
1	Given	$a_1 = 11$
2	$a_2 = 3a_1 + 5 \rightarrow 3a_1 + 5 = 3*11 + 5$	$a_2 = 41$
3	$a_3 = 3a_2 + 5 \rightarrow 3a_2 + 5 = 3*41 + 5$	$a_3 = 128$
4	$a_4 = 3a_3 + 5 \rightarrow 3a_3 + 5 = 3*\_\_\_ + 5$	$a_4 =$
5	$a_5 = 3a_4 + 5 \rightarrow 3a_4 + 5 = 3*\_\_\_ + 5$	$a_5 =$

What is the explicit formula for this pattern?

Slide 18 - Text Response	Your Response

What is the explicit formula for this pattern?

Slide 19 - Text Response	Your Response
Find the next two patterns.	

Slide 20

Summation

- Summation is the process of adding things together. The summation symbol is Σ.

- Find the sum of this series: 1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71

- Adding: 1+6 +11+ 16+21+26+31+36+41+ 46+ 51+56+61+ 66+ 71 = 540

Slide 21

Summation: Arithmetic Series

- The formula for the summation for an arithmetic series is

$$\sum_{i=1}^{n} a_i = \left(\frac{n}{2}\right)(a_1 + a_n)$$

- 1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71

- $n = 15$
- $a_1 = 1$
- $a_n = a_{15} = 71$

$\left(\frac{15}{2}\right)(1 + 71) = 540$

Slide 22

Summation: Partial Sum

- Find the 35th partial sum for 1, 6, 11, 16, 21, 26, 31, 36...
- Use the Explicit Formula
  $a_n = a_1 + (n-1)d$
  $a_n = 1 + (n-1)5$
  $a_n = 1 + 5n - 5$
  $a_n = 5n - 4$

- Find the value for a_{35}.
  $a_{35} = 5(35) - 4 = 171$

- Apply summation formula.
  $\left(\frac{35}{2}\right)(1 + 171) = 3010$

Slide 23 - Draggable | Your Response

Sequence

- Is there a common difference in this sequence?
  1, 2, 4, 8, 16, 32...

Slide 24

Geometric Sequence

- a **sequence** of numbers where each term after the first is found by multiplying the previous one by a fixed, non-zero number called the common ratio.

- The Explicit Formula for Geometric Sequence: $a_n = a_1(r)^{n-1}$

  - 1, 2, 4, 8, 16, 32...

- Multiple of 2, this is call common ratio.

- The explicit formula for this geometric sequence is
  $a_n = 1(2)^{n-1}$

Geometric Sequence: Explicit Formula

- Explicit Formula for Geometric Sequence: $a_n = a_1(r)^{n-1}$
  4, 2, 1, 0.5, 0.25

- What is a_1?
- What is r?
- What is the explicit formula?

| Your Response

Geometric Sequence: Explicit Formula

- Explicit Formula for Geometric Sequence: $a_n = a_1(r)^{n-1}$

- Find the explicit formula for -1, 3, -9, 27, -81...
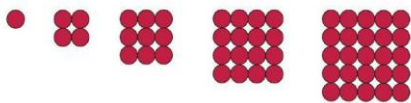

Geometric Sequence: Recursive Formula

- Recursive Formula for Geometric Sequence: $a_n = r*a_{n-1}$

Slide 28

Summation: Geometric Series

$$\sum_{i=1}^{n} a_i = a_1 \left(\frac{1 - r^n}{1 - r}\right)$$

Slide 29 - Drawing	Your Response
Find the explicit formula for this pattern? Explicit Formula	

Any question you want to ask the teacher about this topic?