WARM-UP

Find the sum for the series: 65 + 59 + 53 +....-85

① Find n first

$t_n = a + (n-1)d$

$-85 = 65 + (n-1)(-6)$

$-85 = 65 - 6n + 6$

$26 = n$

② Use formula

$S_n = \frac{n}{2}[2a + (n-1)d]$

$S_{26} = \frac{26}{2}[2(65) + (25)(-6)]$

$S_{26} = -260$

Find the indicated sum for the series:

S_{25} for -20 -18 -16....

$a = -20$

$d = 2$

$n = 25$

$S_{25} = \frac{25}{2}[2(-20) + (25-1)(2)]$

$S_{25} = 100$

UNIT #7: Sequences and Series

Geometric Series

Learning Goal:

I will learn how to find the sum of an geometric series by applying the formula.

Lesson: Geometric Series

A geometric series is the sum of the terms of a geometric sequence.

The formula is:

$$S_n = \frac{a(r^n - 1)}{r - 1} \quad r \neq 1$$

Sum of a Geometric Series

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

Find S_9 for $1 + \overset{\wedge 2}{2} + \overset{\wedge 2}{4} + \ldots$

$a = 1$

$r = 2$

$n = 9$

$S_n = \frac{a(r^n - 1)}{r - 1}$

$S_9 = \frac{1(2^9 - 1)}{2 - 1}$

$S_9 = 511$

Find S_9 for $1 \overset{\wedge -2}{-} 2 \overset{\wedge -2}{+} 4 - \ldots$

$a = 1$

$r = -2$

$n = 9$

$S_9 = \frac{1((-2)^9 - 1)}{-2 - 1}$

$S_9 = 171$

UNIT 7: Sequences and Series

Geometric Series

Learning Goal:

I will learn how to find the sum of a geometric series by applying the formula.

Success Criteria:

To be successful, I must be able to...

- describe the difference between a geometric sequence and series
- find the sum of a geometric series using the formula:

$$S_n = \frac{a(r^n - 1)}{r - 1}\ r \neq 1$$

Bring canned goods!!!

Practice Work

p. 476 #1a - f, 3a - e, 10, 16

Sum of a Geometric Series Given First and Last Terms

Find the sum of $1 + 2 + 4 + \ldots + 512$

First we have to find how many terms the series has:

$t_n = ar^{n-1}$ $\quad t_n =$ $\quad a =$ $\quad r =$

Then we use the equation to find the sum. $S_n = \frac{a(r^n - 1)}{r - 1}$

$t_n = 512$, $a = 1$, $r = 2$, $n = ?$

$t_n = ar^{n-1}$

$512 = (1)(2)^{n-1}$

$2^9 = 2^{n-1}$

$9 = n - 1$

$10 = n$

$S_{10} = \frac{1(2^{10} - 1)}{2 - 1}$

$S_{10} = 1023.$

Test Review Questions
p. 486 #2 - 12, 14, 15

More Practice:
p. 480 #2-4, 7-11, 15-19, 21, 23, 24, 27-29, 33-36, 38

Outline:

- Sequences
- Difference between arithmetic and geometric sequences
- Arithmetic Sequences
- Geometric Sequences
- Recursion Formulas
- Arithmetic Series
- Geometric Series
- Be sure to know <u>all 4 formulas</u>: arithmetic sequence, geometric sequence, arithmetic series (2nd formula), and geometric series