Bellwork:

Write a paragraph describing what you did over your spring break

Lesson 9.1 Objectives

I understand and can apply sigma notation

I can evaluate series with and without technology

A **sequence**, $\{a_1, a_2, a_3, a_4, \ldots a_n, \ldots\}$, is a list of terms in a specified order where a_1 is the first term and a_n is the ***n*th term** or the **general term**.

A **finite sequence** has a first term and a last term while an **infinite sequence** has a first term, but continues without end.

A **series**, $S = a_1 + a_2 + a_3 + a_4 + \ldots a_n + \ldots$, is the sum of the terms of a sequence. A **finite series** sums the terms of a finite sequence while an **infinite series** sums the terms of an infinite sequence.

A **geometric** series is the sum of the terms of a geometric sequence, $S = a + ar + ar^2 + ar^3 + \ldots + ar^n + \ldots$, where a is the first term and r is the common ratio.

Sigma Notation

$$\sum_{k=1}^{n} 2k+1$$

Upper Limit: n

Explicit Formula: $2k+1$

Lower Limit: $k=1$

$3+5+7+9+11+13$

For example, $\sum_{k=3}^{7} k^3 = 3^3+4^3+5^3+6^3+7^3 = 784$.

For an infinite series the upper limit is ∞.

Write out and evaluate the sum

$$\sum_{k=1}^{5} k^2 = 1^2+2^2+3^2+4^2+5^2$$

$1+4+9+16+25 = 55$

Write out and evaluate the sum

$$\sum_{k=3}^{8} 2k = 6 + 8 + 10 + 12 + 14 + 16$$

$$= 66$$

3. $$\sum_{k=1}^{4} \frac{k}{k+1} = \frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5}$$

$$= \frac{163}{60}$$

Use technology to find the sum of $\sum_{k=5}^{20} k^2 + 2k$.

∅ : summation

$= 3240$

Write in Sigma Notation

a. $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} \ldots + \frac{1}{10}$

a_1 +1 +1

$\sum_{k=1}^{8} \frac{1}{k+2}$

Write the series using sigma notation

$12+18+24+\ldots+54$

+6 +6

$= 6k+6$

$-6 \quad -6$

$48 = 6k$

$\frac{48}{6} = \frac{6k}{6}$

$k = 8$

$$\sum_{k=1}^{8} 6k+6$$

Write the series using sigma notation

$50+48+46+\ldots+30$

−2 −2

$= -2k+52$

$-2 \quad -2$

$$\sum_{k=1}^{11} -2k+52$$

$-22 = -2k$

$\frac{-22}{-2} = \frac{-2k}{-2}$

$k = 11$

March 21, 2018