**Colorado Technical University**

 **Course:** MATH207 – Integral Calculus

**Unit 6 Part 12 Readings: Series**

A **sequence** is an ordered collection of numbers

Arithmetic Sequences - each term in the sequence (after the first) differs from the preceding by

a constant amount (positive or negative)

Geometric Sequences - each term in the sequence (after the first) is a common multiple

(positive or negative) of the previous term

**Series**

A **series** is the sum of the terms of a sequence

Summation Notation Σ

Infinite series vs partial sum

 Given a sequence of numbers {an}, the sum of the terms of this sequence:

a1 + a2 + a3 + ... + an + ... is called an **infinite series**

 The sequence Sn defined by:

S1 = a1

S2 = a1 + a2

Sn = a1 + a2 + a3 + ... + an

 n

 = ∑ ak

 k=1

is the **sequence of partial sums** of the series

 The number Sn is the **nth partial sum**

**Arithmetic series**: a + (a+d) + (a+d+d) + (a+d+d+d) + …

 ∞

 Σ (a1+(k-1)d)

k=1

form of the series:

****an arithmetic series never converges:

as n tends to infinity, the series will

always tend to positive or negative

infinity

the sum of the first n terms will be:

Sn = (n/2) (2a1+(n – 1) d)

**Geometric series**: a + r×a + r×r×a + r×r×r×a + …

 ∞

 Σ a1rk

k=1

form of the series:

Some geometric series converge

(have a limit) and some diverge (as

n tends to infinity, the series does not

tend to any limit or it tends to infinity)

if |x|<1 then the geometric series will

converge to S = $\frac{a}{1-r}$

the sum of the first n terms of the geometric

series will be:

Sn = $\frac{a\left(1-r^{n+1}\right)}{1-r}$