SESSION 1 EXERCISES:

Operations on Integers:

A. Add the following integers
   1. -3 + 7
   2. 15 - (-9)
   3. -8 + (-12)
   4. - 25 - (-15)
   5. 0 + 10

B. Multiply the following integers
   1. -5 * 2
   2. 10 * 3
   3. -4 * 8
   4. 6 * (-9)
   5. -7 * (-3)

Sequence or Series:

A. Identify whether the given is a sequence or a series
   1. 2, 4, 6, 8, 10
   2. 1 + 3 + 5 + 7
   3. 5, 10, 15, 20, 25
   4. 1 + 4 + 9 + 16
   5. 100, 90, 80, 70, 60

B. Identify whether the given is an infinite or finite sequence.
   1. 1, 2, 3, 4, 5, ...
   2. 4, 8, 12, 16, 20
   3. 2, 4, 8, 16, 32, ...
   4. ..., 7, 14, 21, 28, 35
   5. -1, -2, -3, -4, -5, ...

C. Identify whether the given infinite geometric series is converging or non-converging.
   1. 2 + 1 + 1/2 + 1/4 + 1/8 ...
   2. 4 + 2 + 1 + 1/2 + ¼ ...
   3. 2 + 4 + 8 + 16 + 32 ...
   4. 1 + 1/2 + 1/4 + 1/8 + 1/16 ...
   5. 5 + 10 + 20 + 40 + 80...

Arithmetic Sequence:

A. Identify whether the sequence is arithmetic.
   1. 2, 4, 6, 8, 10
   2. 3, 6, 12, 24, 48
   3. -5, -2, 1, 4, 7
   4. 1, 3, 9, 27, 81
   5. -10, -7, -4, -1, 2

B. Identify the common difference for the following arithmetic sequences.
   1. 2, 5, 8, 11, 14
   2. -4, -1, 2, 5, 8
   3. 10, 7, 4, 1, -2
   4. 7, 7, 7, 7, 7, 7
   5. 1, -2, -5, -8, -11
   6. 1/2, 3/2, 5/2, 7/2, 9/2
   7. 1/3, 1/2, 2/3, 5/6
   8. 1/4, 1/2, 3/4, 1, 5/4

C. Identify the first 4 terms of the sequence defined by the equation:
   1. $a_n = 2n + 1$
   2. $a_n = 3n - 1$
   3. $a_n = 4n$

D. Solve for the following:
   1. Find the 9^{th} term of the sequence [29, 25, 21,17, ...]
   2. Given $a_1 = 15$ and $a_4 = 36$, identify the 2^{nd} term.
   3. If $a_6 = 201$ and $d = -3$, what is the first term?

E. Get the arithmetic mean of the following:
   1. 10 and -2
   2. 11 and 5
   3. –11 and 1

Geometric Sequence:

A. Identify whether the sequence is geometric.
   1. 4, 8, 16, 32, ...
   2. 2, 6, 18, 54, 162, ...
   3. 3, 12, 48, 192, 768, ...
   4. 1, 3, 9, 27, 81, ...
   5. -10, -7, -4, -1, 2, ...

B. Identify the common ratio for the following geometric sequences.
   1. 2, 4, 8, 16, 32
   2. 1, -3, 9, -27, 81
   3. 5, 10, 20, 40, 80
   4. -6, 12, -24, 48, -96

C. Identify the first 4 terms of the sequence defined by the equation:
   1. $a_n = 3 * 2^n$
   2. $a_n = 4 * (-1/2)^n$
   3. $a_n = 2 * (1/3)^n$

D. Solve for the following:
   1. Find the 9^{th} term of the sequence [100, 50, 25, 12.5, 6.25,...]
   2. Given $a_2 = 25$ and $a_5 = 0.2$, identify the 2^{nd} term.
   3. If $a_6 = 243$ and $r = 3$, what is the first term?

F. Get the geometric mean of the following:
   1. 4 and 16
   2. 81 and 1
   3. 80 and 5

Arithmetic Series:

A. Solve for the following.

1. What is the sum of the first 150 natural numbers.
2. What is the sum of all even numbers from 8 to 70, inclusive.
3. What is the sum of all odd numbers from 91 to 183, inclusive.
4. How many terms in the sequence [1, 14, 27, 40, 53, 66, 79, ...] must be added to obtain a sum of 1027, stating from 1.

Geometric Series:

A. Solve for the following.

1. What is the sum of the first 7 terms in the sequence [4, 16, 64, 256]?
2. What is the sum of the first 9 terms in the sequence [2, 8, 32, 128]?
3. How many terms in the sequence [1, 3, 9, 27, 81, ...] must be added to obtain a sum of 364, starting from 1?
4. Given $a_2 = 40$ and $a_5 = 5000$. What is the common ratio?