Unit 5: Sequences and Series

Unit Objectives

- Determine *n*th terms of sequences
- Determine *i*th partial sums of series
- Use the binomial theorem

Unit 5 Lesson 1: Determine Terms of Sequences

Lesson Objectives

- Determine initial terms of a sequence
- Determine the *n*th term of a sequence

Sequence

- A list of values given by continuing a ______
- 1. Write the first four terms of the sequence given by $a_n = 3n 2$

2. Write the first four terms of the sequence given by $a_n = 3 + (-1)^n$

3. Determine the apparent nth term of the sequence 3, 6, 9, 12, 15,..., a_n

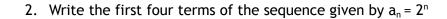
5. Determine
$$a_n$$
 1, 3, 5, 7, 9,..., a_n

6. Determine
$$a_n$$

1, -2, 3, -4, 5, -6,..., a_n

~~~U5L1 Classwork~~~

1. Write the first four terms of the sequence given by
$$a_n = \frac{(-1)^n}{2n-1}$$



3. Write the first four terms of the sequence given by
$$a_n = \frac{(-1)^n}{n^2}$$

4. Determine the apparent
$$n$$
th term of the sequence 4, 1, -2, -5, -8,..., a_n

5. Determine the apparent
$$n$$
th term of the sequence 3, 9, 27, 81, 243,..., a_n

6. Determine the apparent
$$n$$
th term of the sequence

$$-\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}, -\frac{1}{32, \dots, a_n}$$

Unit 5 Lesson 2: Calculate Series

Lesson Objectives

• Determine the *i*th partial sum of a sequence

$$\sum_{i=1}^{5} 3i$$

$$\sum_{k=3}^{6} (1+k^2)$$

$$\sum_{j=2}^{4} \frac{1}{j}$$

$$\sum_{j=0}^{10} \cos(\pi x)$$

~~~U5L2 Classwork~~~

$$\sum_{k=1}^{4} k^2$$

$$\sum_{j=0}^{3} (j+1)(j-2)$$

$$\sum_{i=1}^{10} \sin(\pi i)$$

$$\sum_{i=1}^{10} \cos(2\pi i)$$

$$\sum_{i=0}^{10} \sin(\frac{\pi}{2}i)$$

$$\sum_{i=0}^{12}\cos\bigl(\frac{\pi}{6}i\bigr)$$

7.
$$\sum_{i=1}^{11} (-1)^n n$$

$$\sum_{i=1}^{30} 10$$

9.
$$\sum_{i=1}^{30} (-1)^n 10$$

$$\sum_{10.\ i=1}^{10}(\frac{1}{n}-\frac{1}{n+1})$$

11. Extra Credit: Solve for x

$$300 = \sum_{i=1}^{x} 20$$

Unit 5 Lesson 3: Expand Using the Binomial Theorem

Lesson Objectives

Use the binomial theorem to expand binomials more quickly

Pascal's Triangle

1. Expand $(x + 3)^4$

2. Expand $(x + 2)^5$

3. Expand $(x - 4)^4$

4. Expand $(x - 2)^6$

5. Expand
$$(x + 2y)^3$$

6. Expand
$$(x^2 - \frac{1}{y})^4$$

7. Expand
$$(-2q + 3a^3)^5$$

~~~U5L3 Classwork~~~

1. Expand
$$(x + 3)^5$$

2. Expand
$$(2x - 4)^4$$

3. Expand
$$(x + 2)^7$$

4. Expand
$$(\frac{b}{2} - 4a^2)^3$$

5. Expand
$$(\frac{3}{\pi n^2} + \pi q)^6$$

6. Expand
$$(\sin(x) - 2\cos(x))^4$$

Unit 5 Lesson 4: Review for Quiz on Sequences and Series

Lesson Objectives

- Get a grade that'll make Mama proud
- 1. Write the first four terms of the sequence given by $a_n = n^2 n$
- 2. Write the first four terms of the sequence given by $a_n = n + (-1)^n$

3. Determine a_n given the following list of terms -8, -4, 0, 4, 8,..., a_n

$$\sum_{j=11}^{40} 100$$

$$\sum_{n=0}^{3} n(n+1)$$

$$\sum_{n=1}^{8} \sin(\pi x - \frac{\pi}{2})$$

7. Extra Credit: Solve for x

$$60 = \sum_{n=1}^{x} (-1)^n n$$

8. Expand $(x + 2)^6$

9. Expand
$$(\frac{3}{2a}+4b^2)^4$$