Review Exercises

Chapter 11 - Sequences and Series

1. Write the first four terms of the recursively defined sequence:

   $a_1 = 4$; $a_{n+1} = 5a_n - 2$

2. Write the sum below using summation notation:

   $9 + 12 + 15 + 18$

3. Cartons are stacked in 40 rows with 5 on the top row, 9 in the second row, 13 in the third row, and so on.

   a. Write an expression for the number of cartons in the nth row.

   b. Find the number of cartons in the 40^{th} row.

   c. Find the total number of cartons in the stack.

4. If $a_7 = 31$ and $a_{20} = 96$ in an arithmetic sequence, find the **first term**, the **common difference**, and a **formula for the nth term** of the sequence.

5. Find the 17^{th} term of the sequence ¼, ½, 1, ...

6. Find S_{18} for the sequence 4, – 20 , 100 , -500, ...

7. In an old fable, a commoner who had saved a king's life was told that he could ask for a just reward. His request to the king was that he place one grain of wheat on the first square of a chessboard, two grains on the second, four grains on the third, eight grains of the fourth, continuing until he filled the board. (A chessboard consists of 64 squares).

    a. Find the number of grains on the last square.

    b. Compute the total number of grains needed to do this to see why the request, seemingly simple, could not be granted

8. Find the sum of 10 + 25 + 40 + . . . + 295.

9. Find the sum of the infinite series 1/5 + 1/7 + 5/49 + ...

10. Determine if the following sequences converge or diverge. If a sequence converges, state the value to which the sequence is converging.

a. $a_n = (-1)^n$

b. $\{ a_n \} = \frac{n+1}{2n^2}$