

Notes Section 10.1 - Sequences, series, and  
sigma notation

1. find the next four terms of the sequence  
3, -1, -5, -9

$$\boxed{-13, -17, -21, -25}$$

2. find the next four terms of the sequence  
18, 15, 10, 3

$$\boxed{-6, -17, -30, -45}$$

3. find the first four terms of the sequence  
given by  $a_n = n^3 + 1$

$$n=1 \rightarrow 2$$

$$n=2 \rightarrow 9$$

$$n=3 \rightarrow 28$$

$$n=4 \rightarrow 65$$

$$\boxed{2, 9, 28, 65}$$

4. find the fourth term of the recursively  
defined sequence

$$a_1 = 3 \quad a_n = 3a_{n-1} - n + 2 \quad n \geq 2$$

$$a_2 = 3a_{2-1} - 2 + 2$$

$$a_2 = 3(3) - 2 + 2 = 9$$

$$a_3 = 3a_{3-1} - n + 2$$

$$a_3 = 3(9) - 3 + 2$$

$$a_3 = 26$$

$$a_4 = 3a_{4-1} - 4 + 2$$

$$a_4 = 3(26) - 4 + 2$$

$$a_4 = \boxed{76}$$

5. find the fifth partial sum of  
 $a_n = n^2 - 3$

$$a_1 = -2$$

$$a_2 = 1$$

$$a_3 = 6$$

$$a_4 = 13$$

$$a_5 = 22$$

add together

$$\boxed{40}$$

6. find  $S_4$  of  $a_n = \frac{6}{2^n}$

$$a_1 = 3$$

$$a_2 = \frac{6}{4} = \frac{3}{2}$$

$$a_3 = \frac{6}{8} = \frac{3}{4}$$

$$a_4 = \frac{6}{16} = \frac{3}{8}$$

$$3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8}$$

$$\frac{24}{8} + \frac{12}{8} + \frac{6}{8} + \frac{3}{8} = \boxed{\frac{45}{8}}$$

7. find the sum

$$a) \sum_{n=1}^4 (n^2 - n) = 0 + 2 + 6 + 12 = \boxed{20}$$

$$b) \sum_{n=2}^5 \frac{3n+3}{n} = \frac{9}{2} + 4 + \frac{15}{4} + \frac{18}{5} = \boxed{15.85}$$

$$c) \sum_{n=1}^{\infty} 3 \left( \frac{1}{10^n} \right) = \frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \dots = \boxed{\frac{1}{3}}$$

8. Write each series in sigma notation. the lower bound is given

$$\frac{1}{20} + \frac{1}{25} + \frac{1}{30} + \frac{1}{35} + \frac{1}{40}, \quad n=4$$

$$\boxed{\sum_{n=4}^8 \frac{1}{5n}}$$