

Assignment : Sequences and Series

Date _____

1. The first term of an infinite geometric sequence is 18, while the third term is 8. There are two possible sequences. Find the sum of each sequence.
2. In an arithmetic sequence $u_1 = 7$, $u_{20} = 64$ and $u_n = 3709$.
 - (a) Find the value of the common difference.
 - (b) Find the value of n .
3. In an arithmetic sequence, $S_{40} = 1900$ and $u_{40} = 106$. Find the value of u_1 and of d .
4. The first three terms of an infinite geometric sequence are 32, 16 and 8.
 - (a) Write down the value of r .
 - (b) Find u_6 .
 - (c) Find the sum to infinity of this sequence.
5. In an arithmetic series, the first term is -7 and the sum of the first 20 terms is 620.
 - (a) Find the common difference.
 - (b) Find the value of the 78th term.
6. Let S_n be the sum of the first n terms of an arithmetic sequence, whose first three terms are u_1 , u_2 and u_3 . It is known that $S_1 = 7$, and $S_2 = 18$.
 - (a) Write down u_1 .
 - (b) Calculate the common difference of the sequence.
 - (c) Calculate u_4 .
7. Consider the infinite geometric sequence 25, 5, 1, 0.2, ...
 - (a) Find the common ratio.
 - (b) Find
 - (i) the 10th term;
 - (ii) an expression for the n^{th} term.
 - (c) Find the sum of the infinite sequence.
8. In an arithmetic sequence $u_{21} = -37$ and $u_4 = -3$.
 - (a) Find
 - (i) the common difference;
 - (ii) the first term.
 - (b) Find S_{10} .

Answer to Assignment Sequence and Series

1. $S_{\infty} = 54, \frac{54}{5} (=10.8)$

2. (a) $d = 3$

(b) 1235

3. $u_1 = -11 \quad d = 3$

4. (a) $r = \frac{16}{32} \left(= \frac{1}{2} \right)$

(b) $u_6 = 1$

(c) $S_{\infty} = 64$

5. (a) 620

(b) 301

6. (a) $u_1 = S_1 = 7$

(b) $d = 4$

(c) $u_4 = 19$

7. (a) $\frac{1}{5}$ (0.2)

(b) (i) $u_{10} = 25 \left(\frac{1}{5} \right)^9$
 $= 0.0000128$

(ii) $u_n = 25 \left(\frac{1}{5} \right)^{n-1}$

(c) For attempting to use infinite sum formula for a GP $\left(\frac{25}{1 - \left(\frac{1}{5} \right)} \right)$

$$S = \frac{125}{4} = 31.25 \quad (=31.3 \text{ to } 3 \text{ s.f.})$$

8. (a) (i) $d = -2$

(ii) $u_1 = 3$

(b) $u_{10} = 3 + 9 \times -2 = -15$

$$S_{10} = \frac{10}{2} (3 + (-15))$$
$$= -60$$