

IB Math SL 1 - Sequences and Series IB Packet

Name _____

Note: No Calc: #1, 2, 4, 6 Calc: #3, 5, 7, 8

1. In an arithmetic sequence, the first term is 5 and the fourth term is 40. Find the second term. (Total 4 marks)

2. Find the sum of the infinite geometric series

$$\frac{2}{3} - \frac{4}{9} + \frac{8}{27} - \frac{16}{81} + \dots$$

(Total 4 marks)

3. Find the sum of the arithmetic series

$$17 + 27 + 37 + \dots + 417.$$

(Total 4 marks)

4. The n th term, u_n , of a geometric sequence is given by $u_n = 3(4)^{n+1}$, $n \in \mathbb{Z}^+$.

- (a) Find the common ratio r .
(b) Hence, or otherwise, find S_n , the sum of the first n terms of this sequence.

(Total 3 marks)

5. The *Acme* insurance company sells two savings plans, Plan A and Plan B.

For Plan A, an investor starts with an initial deposit of \$1000 and increases this by \$80 each month, so that in the second month, the deposit is \$1080, the next month it is \$1160 and so on.

For Plan B, the investor again starts with \$1000 and each month deposits 6% more than the previous month.

- (a) Write down the amount of money invested under Plan B in the second and third months. (2)

Give your answers to parts (b) and (c) correct to the nearest dollar.

- (b) Find the amount of the 12th deposit for each Plan. (4)

- (c) Find the total amount of money invested during the first 12 months

- (i) under Plan A; (2)

- (ii) under Plan B. (2)

(Total 10 marks)

6. The following table shows four series of numbers. One of these series is geometric, one of the series is arithmetic and the other two are neither geometric nor arithmetic.

(a) Complete the table by stating the type of series that is shown.

Series		Type of series
(i)	$1 + 11 + 111 + 1111 + 11111 \dots$	
(ii)	$1 + \frac{3}{4} + \frac{9}{16} + \frac{27}{64} \dots$	
(iii)	$0.9 + 0.875 + 0.85 + 0.825 + 0.8 \dots$	
(iv)	$\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} \dots$	

(b) The geometric series can be summed to infinity. Find this sum.

(Total 6 marks)

7. 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.

(Total 6 marks)

8. Find

a) $\sum_{n=7}^{20} 5 - 4n$

b) $\sum_{n=6}^{25} \frac{1}{6561} \left(\frac{3}{2}\right)^{2n-1}$

(Total 8 marks)

Answers

1. $16\frac{2}{3}$ or $\frac{50}{3}$ 2. $\frac{2}{5}$ 3. 8897 4. a) $r = 4$ b) $S_n = 16(4^n - 1)$

5. a) 2nd month: \$ 1060, 3rd month: \$ 1123.60 b) For Plan A = \$1880, Plan B = \$1898

c) Plan A = \$17280, Plan B = \$ 16870

6. (a) (i) Neither (ii) Geometric series (iii) Arithmetic series (iv) Neither b) 4

7. 54, 10.8

8.a) -686 b) ≈ 116620