HL 1 TEST REVIEW Chapter 1 **NO CALCULATORS** on this section

[1] The sum of an infinite geometric series of is $\frac{80}{3}$ and the first term is 40. Find the common ratio of the series.

[2] How many terms are in this arithmetic sequence? $45, 39, 33, 27, ..., -255$

[3] How many terms are in this geometric sequence? $256, 64, 16, 4, ..., \frac{1}{256}$

[4] In an arithmetic series, $u_4 = 3p + 7q$ and $u_7 = 15p + q$. Find the first term.

[5] [a] Find the sum: $x^3 - x^7 + x^{11} - x^{15} \cdots$

[b] State the restriction on *x* for the sum found in [a] to be valid:

[c] Evaluate the expression $\left(\frac{1}{2}\right)^3 - \left(\frac{1}{2}\right)^7 + \left(\frac{1}{2}\right)^{11} - \left(\frac{1}{2}\right)^{15} \cdots$ (HINT: Use the result in 5[a].)

[6] Find the sum of the <u>first 100 terms</u> of this arithmetic series: $4 + 7 + 10 + 13 + \cdots$

[7] Choose the correct expression for the sum of the <u>first 100 terms</u> of this geometric series: $12 + 3 + \frac{3}{4} + \frac{3}{16} + \cdots$

[a] $\dfrac{12}{1 - \frac{1}{4}}$ [b] $\dfrac{12}{1 + \frac{1}{4}}$ [c] $\dfrac{12\left(1 - \left(\frac{1}{4}\right)^{100}\right)}{1 - \frac{1}{4}}$ [d] $\dfrac{12\left(1 - \left(\frac{1}{4}\right)^{99}\right)}{1 - \frac{1}{4}}$ [e] $\dfrac{12\left(1 - \left(\frac{1}{4}\right)\right)^{100}}{1 - \frac{1}{4}}$ [f] $\dfrac{12\left(1 - \left(\frac{1}{4}\right)\right)^{99}}{1 - \frac{1}{4}}$

[8] Find the sum of this infinite geometric sequence: $125 + 25 + 5 + 1 + \cdots$

[9] Evaluate: [a] $\sum_{r=1}^{100} (2r + 3)$ **[b]** $\sum_{r=0}^{100} 2\left(\frac{3}{4}\right)^r$ [c] $\binom{9}{3}$ [d] P_2^7

<u>Calculator section</u>

[1] How many ways are there to fill the offices of president, vice president, and secretary from a club of 12 people?

[2] A bag contains 20 marbles, each one a different color. You select two dice at random. How many different pairs are possible?

[3] Simplify $\dfrac{n!(n-2)!}{(n+1)!(n-3)!}$

[4] How many arrangements are possible for the word **STATISTICS**?

[5] Show your use of the binomial theorem to expand $\left(x^2 + \frac{1}{x}\right)^5$

[6] Find the term of $(3x - 5y)^6$ containing x^3.

[7] Prove using mathematical induction: [a] $5 \mid 6^n + 4$ [b] $1^3 + 2^3 + 3^3 + ... + n^3 = \dfrac{n^2(n+1)^2}{4}$