

Semester Exam Review HLi NO CALCULATORS

[1] The sum of an infinite geometric series is 64 and the common ratio is  $\frac{3}{4}$ . Find the first term of the series.

[2] How many terms are in this arithmetic sequence? 14, 22, 30, ..., 230

[3] How many terms are in this geometric sequence? 9, 3, 1, ...,  $\frac{1}{243}$

[4] In an arithmetic series,  $u_5 = 3y - 12$  and  $u_8 = 9y$ . Find the first term.

[5] Find the sum of the first 100 terms of this arithmetic series:  $100 + 94 + 88 + \dots$

[6] Find the sum of this infinite geometric sequence:  $\frac{2}{3} - \frac{4}{9} + \frac{8}{27} - \frac{16}{81} \dots$

[7] Evaluate  $\binom{12}{9}$

Calculator section

[1] There are 4 appointment times available during 8B to see the career specialist: 2:15, 2:30, 2:45, and 3:00. If there are 21 students in 8B, how many ways are there to fill up the four appointment times?

[2] There are 18 students in 1A. Five students are needed to help move textbooks. How many groups of 5 are possible?

[3] Show your use of the binomial theorem to expand  $\left(2x + \frac{1}{x^2}\right)^4$

[5] Find the term of  $\left(4x^2 - \frac{3}{x}\right)^6$  that is constant (i.e., it has no  $x$ ).

[6] Factor and find all roots.

[a]  $x^4 - 9x^3 + 46x^2 - 124x + 120 = 0$

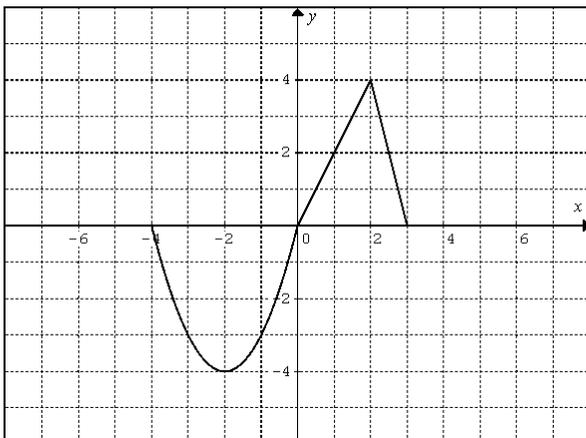
[b]  $x^3 - 125 = 0$

[7] Evaluate the following:

[a]  $i^{216}$

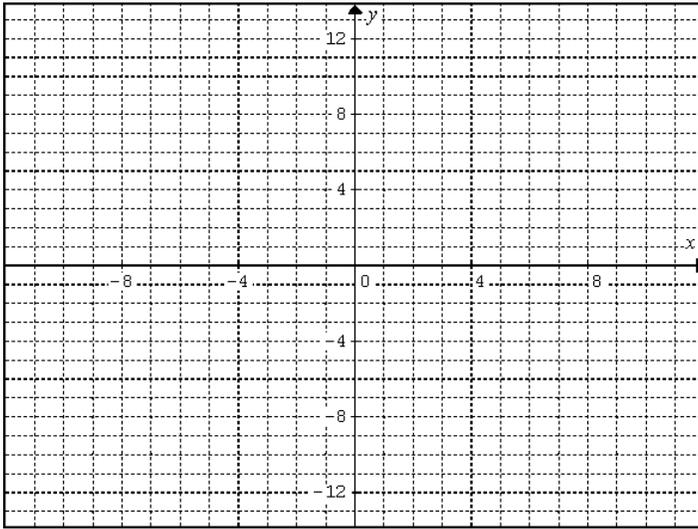
[b]  $(3 - 2i)^5$

[c]  $|12 - 5i|$



[8] The graph of  $y = f(x)$  is shown here. Graph the following, each on its own grid.

[a]  $y = 1 - f(x - 1)$



**[9]** Consider the polynomial  $P(x) = 4x^4 - 8x^3 + 4x^2 - 12x + 1$  with roots  $r_1, r_2, r_3,$  and  $r_4$ . Find the following:  
(Put this on page 3 of your notebook paper.)

[a]  $r_1 \cdot r_2 \cdot r_3 \cdot r_4$       [b]  $r_1 + r_2 + r_3 + r_4$       [c]  $\frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + \frac{1}{r_4}$