**1.** An arithmetic sequence has 5 and 13 as its first two terms respectively.

1. Write down, in terms of *n*, an expression for the *n*th term, *an*.

(b) Find the sum of all the terms of the sequence which are less than 400.

**2.** The common ratio of the terms in a geometric series is 2*x*.

(a) If the first term of the series is 35, find the value of *x* for which the sum to infinity is 40.

1. Find the 4th term in the series.

(c) Find the sum of the first 5 terms.

**3.** (a) The sum of the first six terms of an arithmetic series is 81. The sum of its first eleven terms is 231. Find the first term and the common difference.

(b) The sum of the first two terms of a geometric series is 1 and the sum of its first four terms is 5. If all of its terms are positive, find the first term and the common ratio.

**4.** Solve the following equations.

a.)  b.) 

**5.** Given the expression **;**

1. Find the coefficient of the term containing.
2. Find the constant term.

**6.** A van has eight seats, two at the front, a row of three in the middle, and a row of three at the back. If only 5 out of a group of 8 people can drive, in how many different ways can they be arranged in the car?

**7.** A committee of five people is to be selected from a class of 12 boys and 9 girls. How many such committees include at least 1 girl?

**8.** How many four-digit numbers are there which contain at least one 3?

**9.** In the arithmetic series with *n*th term *un*, it is given that *u*4 = 7 and *u*9 = 22.  
Find the minimum value of *n* so that *u*1 + *u*2 + *u*3 + ... + *un* > 10 000.

Topic List

* Arithmetic Sequences and Series
  + Common difference and sum of first *n* terms
  + Listing terms such as 
* Geometric Sequences and Series
  + Finding the common ratio
  + Finding the sum of the first *n* terms
  + Finding the sum of an infinite series if it converges ()
* Factorials
  + Manipulating factorials algebraically such as 
* Permutations
  + Arrangements of *n* items with no repeats ()
  + Arrangements with repeat values ()
  + Permutations of *r* objects chosen from *n - nPr*
  + Permutations with restrictions using dashes, such as listing 4 digit even numbers
* Combinations
  + Combinations of *r* objects chosen from *n* objects – *nCr*
  + Combinations as values in Pascal’s triangle
  + Binomial Theorem expansion using combinations (See formula below)
* Mathematical Induction
  + Focus on divisibility problems!

**Formulas and Equations**

|  |  |
| --- | --- |
| General Term of an Arithmetic Sequence    Sum of Arithmetic Series    General Term of a Geometric Sequence    Sum of a Finite Geometric Series    Sum of an Infinite Converging Geometric Series | Permutations    Combinations    Binomial Theorem    http://gofiguremath.org/wp-content/uploads/2013/12/Rows-0-10-and-beyond-cropped.png |