Analytic and synthetic methods: These two methods have to be discussed separately in order to arrive at the conclusion that their combination is the logical way out.

Analytic method:

It proceed from unknown to known. Analysis means breaking up of the problem in hand so that it ultimately gets connected with something already known. It is the process of opening up or unfolding of the problem to know hidden interior.

Procedure:

Algebraic identities and geometrical propositions provides suitable examples for the illustration of this method. In these cases, the problem consist of two parts. One of the part is proved. We make the unknown as our starting point, analyses the statement of the problem, work out step by step requirements, connect the unknown with something known and conclude that the unknown stands proved.

Synthetic method:

It is the opposite of analytic method, here we also proceed from unknown to known. In practice it is the complement of analysis. To synthesizes means to place together things that are apart. It states with something already known and connect that with the known part of the statement.

Procedure:

We shall illustrate the procedure with the same example used for analysis.

Example :

If $a^2+b^2=7ab$ prove that $2\log(a+b) = 2\log 3+\log a+\log b$

Proof:

To prove this using synthetic method, begin from the known.

The known is $a^2+b^2= 7ab$

Adding 2ab on both sides

$a^2+b^2+2ab=7ab + 2ab$

$(a+b)^2 = 9ab$

Taking log on both sides

$\log(a+b)^2 = \log 9ab$

$2\log(a+b) = \log 9 + \log ab$

$2\log(a+b) = \log 3^2 + \log a + \log b$

$2\log(a+b) = 2\log 3+ \log a+ \log b$

Thus if $a^2+b^2=11ab$ prove that $2\log(a-b) = 2\log 3+\log a+\log b$