Quantitative Revolution Geography:

The application of statistical and mathematical techniques, theorems and proofs in understanding geographical systems is known as the 'quantitative revolution' in geography. Statistical methods were first introduced into geography in the early 1950s (Burton, 1963). Consisting mainly of descriptive statistics, there was also some attempt at hypotheses testing using, for example, chi-square. Bivariate Regression Analysis followed shortly but it was not until the 1960s that the General Linear Model was fully explored. It was I. Burton who published a research paper, 'The Quantitative Revolution and Theoretical Geography' in the Canadian Geographer (7: pp.151-62) in 1963.

The statistical methods are employed in geography for the generating and testing hypotheses using empirical data, whereas the mathematical techniques and theorems are used for deriving models from a set of initial abstract assumptions. In other words, statistical methods are used to estimate, and test the significance of, various parameters associated with a given mathematical model such as the distance decay and gravity models.

There has been confusion among the geographers and the public mind about the nature and social relevance of geography, especially after the Second World War. The status of geography as a university discipline was under discussion. It was also a topic of debate that what should be taught as geography at various stages of the educational processes. In 1948, James Conant, President of the Harvard University, had reportedly come to the conclusion that “geography is not a university subject”.

The Department of Geography of Harvard University was closed soon after and the discipline of geography was gradually eased out in many of the private universities of U.S.A. The continual threat of departmental closure or staff reduction also lead to frantic search in American universities for new ideas and research programmes. This resulted into the development of the ‘spatial sciences school’, also called ‘quantitative revolution’ in geography.

The last three decades have been characterized by an almost continuous debate among human geographers concerning the philosophy, nature and methodology of geography. Moreover, the geographers of the post-Second World War suffered from a complex that they did not have standard theories, models and laws like that of other social and biological sciences.
Consequently, their efforts and researches were not considered of much social relevance. In order to overcome these complexes and to put the subject on a sound theoretical footing, geographers started using quantitative techniques to interpret the organization of space, to generalize and to formulate their own theories and models about the man and environment relationship.

The main objectives of the quantitative revolution in geography were as under:

1. To change the descriptive character of the subject (geo + graphy) and to make it a scientific discipline;

2. To explain and interpret the spatial patterns of geographical phenomena in a rational, objective and cogent manner;
3. To use mathematical language instead of the language of literature, like 'After in the Koppen's classification of climate which stands for the 'tropical rainforests';
4. To make precise statements (generalizations) about locational order;
5. To test hypotheses and formulate models, theories and laws for estimations and predictions;

6. To identify the ideal locations for the various economic activities so that the profit may be maximized by the resource users; and
7. To provide geography a sound philosophical and theoretical base, and to make its methodology objective and scientific.

In order to achieve these objectives, the preachers of quantitative techniques stressed on field surveys for the collection of data and empirical observations.

In the formulation of models and theories they assumed:

1. Man is a rational (economic) person who always tries to optimize his profits.
2. Man has infinite knowledge of his space (environment and resources).
3. They assumed ‘space’ as an isotropic surface.
4. There is no place for the normative questions (questions about social values) in scientific research and objective interpretation of the geographical reality.
5. They assumed that normative questions, like cultural values, beliefs, attitudes, customs, traditions, likes and dislikes, prejudice, and aesthetic values have no place in geographical research and scientific explanation of geographical patterns