

PROLOGUE

Arnold E. Ross (1906 - 2002).

In an effective program of mathematical studies, students are propelled by eager curiosity to observe and experiment, thus creating new opportunities for observation. In hopes of unearthing deep relationships, students search for patterns among those observations, formulate adventurous conjectures, prune the many conjectures with the sharp ax of possible counterexamples, and then attempt to endow the surviving conjectures with the security of a proof.

Once convinced of the validity of a mathematical relationship, students should communicate it to others and record it for future reference. Accurate communication of mathematical ideas often requires use of specialized language crafted for that purpose. That language enables students to express increasingly subtle observations, which can stimulate a new round of mathematical conjectures.

A word of warning is in order at this point. Every discipline progresses from initial discoveries to the esoteric heights of pure research. However, personal discovery is a vital ingredient of learning. Effective learning requires an environment in which students are encouraged to have telling flashes of insight. Such an environment must entail searching questions which, through the hazardous path of trial and error, lead to the desired understanding.

A neat formulation of results is the end product of understanding and not its starting point. All too often we disregard the vital underpinning of experience, presenting to the novice the end result of someone else's successful struggle for understanding in the forlorn hope that this may provide an easy way out.

The gold in "them there hills" is not always buried deep. Much of it is within easy reach. Some of it is right on the surface to be picked up by any searcher with a keen eye for detail and an eagerness to explore. As in any treasure hunt, the involvement grows as the hunt proceeds and each success whether small or great adds the fuel of excitement to the exploration.