Writing Samples

A. “It is not hard to say what is meant by a random point in the cube, or a random direction, but less clear how to choose a speed randomly, since speed can take any value from 0 to infinity. To avoid this difficulty, let us make the physically implausible assumption that all the molecules are moving at the same speed, and that it is only the initial positions and directions that are chosen randomly. A two-dimensional version of the resulting model is illustrated in Figure 3.”

B. “Cardano had thus given credit where credit was due, which satisfied everyone except Tartaglia. He, on the contrary, raged furiously about Cardano’s deceit and treachery. In Tartaglia’s eyes, Cardano had violated a sacred oath, pledged on his faith as a “true Christian,” and was nothing more nor less than a vile scoundrel. Accusations poured from Tartaglia’s pen and were answered not by Cardano, who managed to stay above the fray, but by the tenacious and loyal Ferrari. The latter was known for his hot temper (he had lost a few fingers in an especially vicious fight) and lashed back vehemently.”

C. “Mathematical questions tend to spring from two main sources: the real world, and the abstract world of mathematics. The real world, with its city street, provided much of the motivation for studying taxicab geometry in the first place. Questions of optimum locations for apartments, factories, phone booths, etc., produced a host of host of geometrical problems. The real world also suggested modifying our model from the taxicab geometry to the mass-transit geometry. This generated another whole array of mathematical questions which we only began to investigate. (Quite a few problems will arise if you try to do for mass-transit geometry everything that we did for taxicab geometry. For example, study of the midset of two lines, the incenter of a triangle, the circumcenter of a triangle, etc.) Posing new “real” problems will lead to more geometrical questions about both taxicab and mass-transit geometry.”

D. “This section touches on a rather large subject, the theory of random graphs. We shall hardly do more than define some of the terms, prove a consequence of the Kruskal-Katona theorem and note another result about random sets. When talking about random graphs, we shall assume that the reader had encountered the basic concepts of graph theory like connectedness, complete graph, cycle, path, and diameter. The reader unfamiliar with these concepts should just skip the remarks about graphs and pass on to random sets. As we wish to keep our convention that the ground set X has *n* elements, our notation concerning random graphs will be unconventional. For an extensive account of the theory of random graphs the reader should consult Bollobas (1985).”

E. “8. OTHER SOLUTION CONCEPTS. Many different models and solution concepts have been proposed for the multiperson cooperative games in addition to the von Neumann-Morganstern model for games “with side payments” and the solutions, core and values discussed in this book. The various bargaining sets introduced by R. J. Aumann and M. Maschler are of particular interest, as well as the kernel and nucleolus which are always nonempty subsets of one particular bargaining set which has been studied extensively. These notions will not be covered in this volume.”

F. “This is a classical, famous, and important result by Leonhard Euler from 1734. One of its key interpretations is that it yields the first non-trivial value of Riemann’s zeta function (see the appendix on page 41). This value is irrational as we have seen in Chapter 6.

G. But not only the result has a prominent place in mathematics history, there are also a number of extremely elegant and clever proofs that have their history: For some of these the joy of discovery and rediscovery has been shared by many. In this chapter, we present three such proofs.”