# 京大過去問　２００５年　第１問

次の文章を読んで、下の問いに答えなさい。

The famous British physicist Lord Kelvin(1824-1907), after whom the degrees in the absolute temperature scale are named, once said in a lecture: “When you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.” He was referring, of course, to the knowledge required for the advancement of science. But numbers and mathematics have the curious tendency of contributing even to the understanding of things that are, or at least appear to be, extremely remote from science. In a famous story by Edger Allan Poe, Detective Dupin says: “We make chance a matter of absolute calculation. We subject the unlooked for and unimagined to the mathematical formulae of the schools.” At an even simpler level, consider the following problem you may have encountered when preparing for a party: You have a chocolate bar composed of twelve pieces; how many snaps will be required to separate all the pieces? The answer is actually much simpler than you might have thought. Every time you make a snap, you have one more piece than you had before. Therefore, if you need to end up with twelve pieces, you will have to snap eleven times. More generally, irrespective of the number of pieces the chocolate bar is composed of, the number of snaps is always one less than the number of pieces you need.

Even if you are not a chocolate lover yourself, you realize that this example demonstrates a simple mathematical rule that can be applied to many other circumstances. But in addition to mathematical properties, formulae, and rules (many of which we forget anyhow), there also exist a few special numbers that are so ubiquitous that they never cease to amaze us. The most famous of these is the number of pi(π), which is the ratio of the circumference of any circle to its diameter. The value of pi, 3.14159…., has fascinated many generations of mathematicians. Even though it was defined originally in geometry, pi appears very frequently and unexpectedly in the calculation of probabilities. A famous example is known as Buffon’s Needle, after the French mathematician Comte de Buffon (1707-1788), who posed and solved this probability problem in 1777. He asked: Suppose you have a large sheet of paper on the floor, ruled with parallel straight lines spaced by a fixed distance. A needle of length equal precisely to the spacing between the lines is thrown completely at random onto the paper. What is

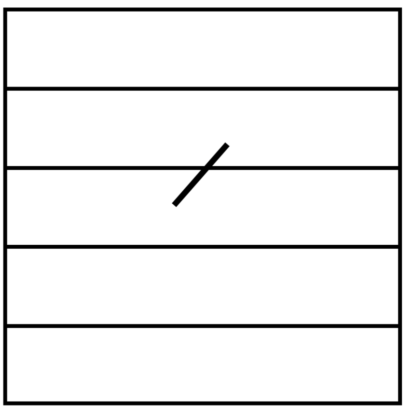

Figure 1

the probability that the needle will land in such a way that it will intersect one of the lines, as in Figure 1? Surprisingly, the answer turns out to be the number 2/π. Therefore, in principle, you could even evaluate π by repeating this experiment many times and observing in what fraction of the total number of throws you obtain an intersection. Pi has by now become such household word that film director Darren Aronofsky was even inspired to make a 1998 intellectual thriller with that title.

From *The Golden Ratio*: *The Story of PHI, the World's Most Astonishing Number* by Mario Livio, Broadway Books

(1) 物理学者Kelvinの講演から引用したセンテンスが１つある。それを和訳しなさい。

(2) 探偵Dupinの言葉を引用したセンテンスが２つある。それらを和訳しなさい。

(3) You have a chocolate bar composed of twelve pieces: how many snaps will be required to separate all the pieces?という問いに対して、「より一般的」な答えとなっているセンテンスが１つある。それを和訳しなさい。

(4) Buffon's Needleの問いを構成しているセンテンスが３つある。それらを和訳しなさい。

(5) Buffon's Needleの問いに対する答えとなっているセンテンスが１つある。それを和訳しなさい。