Probability Exercises

In January in Maine it is cloudy on half of the days.

1. On a day in January I flip a coin. What is the probability that the coin comes up heads and the day is cloudy?

2. On a day in January I toss two dice.

   (a) What is the probability that the sum of the values of the dice is 11 or greater?
   (b) What is the probability that the sum of the values of the dice is 11 or greater or 3 or less?
   (c) What is the probability that the sum of the values of the dice is 11 or greater or 3 or less and the day is cloudy?

3. If it's cloudy I always eat oatmeal. If it's sunny, I eat oatmeal half the time. On any day in January, what is the probability that I'm eating oatmeal?

4. I roll three dice, what is the probability that I get:

   (a) Three, Four, Four, in that order?
   (b) Two fours and one three, in any order?

The theory of chance consists in reducing all the events of the same kind to a certain number of cases equally possible, that is to say, to such as we may be equally undecided about in regard to their existence, and in determining the number of cases favorable to the event whose probability is sought. The ratio of this number to that of all the cases possible is the measure of this probability, which is thus simply a fraction whose numerator is the number of favorable cases and whose denominator is the number of all the cases possible.

Pierre-Simon Laplace, A Philosophical Essay on Probabilities (1814)