1.
   a)
      i.) 50
      ii.) Yes
      iii.) No
      iv.) Yes
   b.) \(500\)
   c.) \(\frac{1}{2}\) the number of flips
   d.)
      i.) The number of ways to get heads
      ii.) The total number of outcomes on a coin
      iii.) \(\frac{1}{2}\)
2.)
   a.) HH TH HT TT
   b.) \(\frac{1}{4}\)
   c.) \(100\)
   d.) \(\frac{1}{4}\) of \(400\)
3.)
   a.) HHH HHT HTH HTT
       THH THT TTH TTT
   b.) \(\frac{1}{8}\)
   c.) \(\frac{3}{8}\)
   d.) \(\frac{3}{8}\)
   e.) \(\frac{1}{8}\)
   f.) \(\frac{4}{8}\)
   g.) \(\frac{4}{8}\)
   h.) Equivalent
4.)
   a.) \(1, 2, 3, 4, 5, 6\)
   b.) \(\frac{1}{6}\)
   c.) \(\frac{3}{6}\)
   d.) \(\frac{3}{6}\)
   e.) Equivalent
   f.) \(\frac{4}{6}\)
   g.) \(\frac{2}{6}\)
   h.) Answer g is \(\frac{1}{2}\) answer h
   i.) They sum to \(1\)
5.)
   a.) No
   b.) \(\frac{4}{6}\) and \(\frac{2}{6}\) for red and blue respectively
6.)
   Answers may vary
7.)
   1,1 1,2 1,3 1,4 1,5 1,6
   2,1 2,2 2,3 2,4 2,5 2,6
   3,1 3,2 3,3 3,4 3,5 3,6
b.) \( \frac{1}{36} \)

c.) \( \frac{1}{36} \)

d.) \( \frac{6}{36} \)

e.) \( \frac{(5+4+3+2+1)}{36} \) or \( \frac{15}{36} \)

f.) \( \frac{3}{6} \)

g.) \( \frac{1}{2} \times \frac{1}{2} \) or \( \frac{1}{4} \)

8.) Yes, you are twice as likely to win the car if you switch.

Explanation: The likelihood of the car being behind any specific door is \( \frac{1}{3} \) at the start. Let us group the doors now into two distinct groups—the door we chose and the doors we did not choose. There is a \( \frac{1}{3} \) chance it is behind our door; there is a \( \frac{2}{3} \) chance it is behind the other door (*This never changes). When the host opens one of the other doors we still know that the sum of the probability of the two doors is \( \frac{2}{3} \), but we also know that the probability of one of the doors is exactly \( \frac{0}{3} \) now. Therefore the probability of the door we did not choose is \( \frac{2}{3} \) and is the best choice.