34. Five different boxes can be stacked $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$ ways.

35. There are $5 \cdot 4 \cdot 3 = 60$ different three-letter codes that can be formed from the 5 letters *A, B, C, D,* and *E* if no letter can be used more than once.

This is the same as finding $P(5, 3) = 60$.

49. Since the 13th digit is determined by the other 12, there is no choice in picking it. The other 12 places are free to vary and repetitions are allowed. So there are 10^{12} possible ISBN numbers.

52. This is a permutation in which 5 different days are selected from a possible 365 days without a repetition. It is given by

$$P(365,\ 5) = \frac{365!}{(365-5)!} = \frac{365 \cdot 364 \cdot 363 \cdot 362 \cdot 361 \cdot 360!}{360!} = 365 \cdot 364 \cdot 363 \cdot 362 \cdot 361 = 6{,}302{,}555{,}019{,}000$$

So, 5 people can each have a different birthday in more than 6.3 trillion different ways.

53. (a) SUNDAY has 6 letters, and none of them are repeated. They can be arranged $P(6, 6) = 6! =$ 720 different ways.

(b) If the letter S must come first, then we are really only arranging 5 letters. This can be done $P(5, 5) = 5! = 120$ different ways.

(c) If the letter S must come first and the letter Y must come last, then only four letters are being arranged. It is the permutation of 4 objects which can be done $P(4, 4) = 4! = 24$ ways.

54. There are 5 French books and 5 Spanish books to be arranged.

(a) If books of the same language must be together with French on the left and Spanish on the right, we have two tasks. The first is to arrange the 5 French books. This can be done $P(5, 5)$ ways. The second task is to arrange the 5 Spanish books, which also can be done $P(5, 5)$ ways. By the Multiplication Principle the ten books can be placed on the shelf

$$P(5, 5) \cdot P(5, 5) = 5! \cdot 5! = (5!)^2 = 14{,}400 \text{ ways.}$$

(b) Alternating the French and Spanish books in the grouping, starting with a French book, still can be done in 14,400 ways, since there are 5 choices for the first French book, 5 choices for the first Spanish book, 4 choices for the second French book, 4 choices for the second Spanish book, and so on. Using the Multiplication Principle, we get

$$5 \cdot 5 \cdot 4 \cdot 4 \cdot 3 \cdot 3 \cdot 2 \cdot 2 \cdot 1 \cdot 1 = 5! \cdot 5! = 14{,}400 \text{ ways.}$$