

Weekly Practice 8 key

1. Notice that the second number of arrangements would need to be smaller than the first number of arrangements, since forcing the books to be in alphabetical order by author places a restriction on the arrangements; some arrangements allowed by the first situation would be disallowed in the second.

(a) In this first case, we don't care about the ordering, just the number of ways to arrange the books. This is $P(17, 10)$ which is by definition the number of ways to arrange 10 objects chosen from 17 distinct objects:

$$P(17, 10) = \frac{17!}{7!} = 70572902400$$

(b) Since this time we do care about the ordering, we need to divide off by the number of ways to permute the 10 choices. In other words this is a "combination", so the number is:

$$\binom{17}{10} = \frac{17!}{7!10!} = 19448$$

2. Nothing fancy here, we just want the binomial coefficient since all we are doing is counting the ways to choose 270 things from a set of 538. **Warning:** This is a very large number.

$$\binom{538}{270} \approx 3.08228857943 \times 10^{160}$$