

Name: .....

A student has to sell two books from a collection of 6 math, 7 science, and 4 economics books. Using a counting argument (i.e., count to get numerator and denominator), what is the probability that selling two randomly selected books will result in selling two books in the same subject?

**Solution:**

- The number of ways we could choose two math books is  $\binom{6}{2} = \frac{6*5}{2} = 15$ . The number of ways we could choose two science books is  $\binom{7}{2} = \frac{7*6}{2} = 21$ . The number of ways we could choose two econ books is  $\binom{4}{2} = \frac{4*3}{2} = 6$ . The total number of ways to choose two books of the same kind is 42.
- The number of ways we could choose any two books is  $\binom{17}{2} = \frac{17*16}{2} = 136$ .
- The probability of selling two books in the same subject is  $\frac{42}{136} = 0.309$ .