

Conditions

if the papers of 4 students can be checked by any of the 7 teachers, then show that the probability that all the 4 papers are checked by exactly 2 teachers is $\frac{6}{49}$

Solution

The probability of this event is the ratio for all favorable outcomes (the amount of ways in which we can take fixed 2 teachers from 7) to all possible outcomes (the amount of ways in which we can take any of 7 teachers four times).

For 1st paper we can take a teacher in 7 different ways.

For 2nd – in 6 ways (excluding the 1st chosen teacher)

For 3rd – in 2 ways (first or second teacher)

For 4th – in 2 ways (first or second teacher)

That's why the probability is:

$$P = \frac{7 \cdot 6 \cdot 2 \cdot 2}{7 \cdot 7 \cdot 7 \cdot 7} = \frac{4}{49}$$

Answer: 4/49, not 6/49