Answer on question #55304 – Math – Statistics and Probability

Question

A lawsuit has been brought by female managers of a company. Recently the company decided to promote three of eight mid-level managers to top vice-president positions. Of the eight mid-level managers, five were women and three were men, yet all of the promotions went to the men. The lawyer for the women believes that they have a case if the probability of only men getting these three promotions by chance alone is less than 5%. Do the female employees have a case?

Solution

From the question we know that the probability of getting the promotion for every employee is the same. Thus, the probability of a man getting the first promotion is $\frac{3}{8}$, because we have 3 desired variants of 8 possible ones. Then the probability of a second man getting a promotion will be $\frac{2}{7}$, as the number of all possible variants will now be less – one man is gone from the pool (so we will have one variant less in both desired and possible pools) . Finally, the probability of a third man getting a promotion is now $\frac{1}{6}$ (exactly as before – minus one variant from both desired and possible pools). To get the total chance, we must now multiply all the probabilities, and we will get

$$P_f = \frac{3}{8} \cdot \frac{2}{7} \cdot \frac{1}{6} = \frac{6}{336} = \frac{1}{56} \approx 1.8\% < 5\%$$

Answer: chance is less than five percent, so female employees have a case.