Answer on Question #55193 – Math – Statistics and Probability

A lawsuit has been brought by female managers of a company. Recently the company decided to promote three of 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? Justify your answer.

Solution

We will find the probability of only men getting three promotions by chance alone. We have that probability is equal to $P = \dfrac{m}{n}$, where the numerator refers to the selection of three from three men (without regard to the order) and the denominator refers to the selection of three from eight mid-level managers.

Compute

$$m = \binom{3}{3} = 1, \qquad n = \binom{3}{8} = \frac{8!}{3!\,(8-3)!} = 56$$

and finally

$$P = \frac{m}{n} = \frac{1}{56} \approx 2\% < 5\%$$

It means that the female employees have a case.

Answer: yes.