Problem #6160 Two roads, Broadway and State, connect the towns of East-land and Harping. Three roads, Park, Fairvew, and Main, connect the towns of Harping and Johnstown. Find the number of possible routs from East-land to Johnstown that pass through Harping. Then find the probability that State and Fairvew will be used if a rout is selected at random. State the probability as a fraction and percent and its likelihood.

Solution Due to combinatorial rule of product: " if we have a ways of doing something and b ways of doing another thing, then there are $a \cdot b$ ways of performing both actions" the number of possible routs from East-land to Johnstown is $2 \cdot 3 = 6$. Thus, the probability of choosing any route(under the assumption of selecting at random, that is with equal probabilities) is $1/6 \approx 0.166$. Hence, the probability that our route is State—Fairvew is $1/6$ as any other of the possible ways.

Note, that the probability that one will use State is $3/6 = 1/2$, and the probability that one will use Fairvew is $2/6 = 1/3$.

Answer $1/6$ or 0.166 or 16% or $1:6$.

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