2019 AIME I #2

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Jenn randomly chooses a number J from $1, 2, 3, \ldots, 19, 20$. Bela then randomly chooses a number B from $1, 2, 3, \ldots, 19, 20$ distinct from J. The value of $B - J$ is at least 2 with a probability that can be expressed in the form $\frac{m}{n}$, where m and n are relatively prime positive integers. Find $m + n$.

The total number of ways for them to choose numbers is $20 \cdot 19$. The total number of ways such that $B - J \geq 2$ is

$$\sum_{J=1}^{18} \sum_{B=J+2}^{20} 1 = \sum_{J=1}^{18} 19 - J = \frac{18 \cdot 19}{2}.$$

So the probability that $B - J \geq 2$ is $\frac{9}{20}$ yielding the answer of $\boxed{029}$. ■