



1. Rectangle $ABCD$ has side lengths $AB = 10$ and $BC = 12$. Let the midpoint of CD be point M . Compute the area of the overlap between $\triangle AMB$ and $\triangle ADC$.
2. In day 0 of a Fairytale themed video game, three magical beanstalks are planted, each initially a seed. Starting on day 1, each beanstalk that has not sprouted will sprout (and reach for the sky) with $\frac{1}{3}$ probability. Find the probability that the beanstalks sprout on different days.
3. The numbers $1, 2, \dots, 9$ are put in a 3×3 grid. Below each column, Alice writes the product of the three numbers in that column, and she adds up her three results to get A . Besides each row, Bob writes the product of the three numbers in the row, and adds his three results to get B . Given that A is as small as possible, what's the maximum possible value of B ?