

Homework OST

- (b)* Let $(S_n; n \geq 0)$ be simple random walk started at the origin: $S_0 = 0$. Let T be the number of steps until the walk hits a or b , where $b < 0 < a$ are integers. Let A and B be the events that $S_T = a$ or $S_T = b$, respectively. Use the martingales in Exercise (a), together with the optional stopping theorem, to find $P(A)$, $P(B)$, and ET . Find $\text{var } T$ when $a = \infty$ and $p < q$. How would you choose to find $\text{var } T$ when $a < \infty$?