

# CCC 2010 (A) - Question 1

Question 1: Consider a random walk on the vertices of a regular dodecahedron. Let  $X_0$  be the starting vertex. Let  $X_n$  be the vertex reached after  $n$  steps. Let  $Y_n = \mathbb{1}_{\{X_n = X_0\}}$ . Compute the expected value of  $Y_n$ .

Let  $\mathbb{E}_x$  denote the expected value starting at vertex  $x$ . Let  $\mathbb{E}_x Y_n$  be the expected value of  $Y_n$  starting at vertex  $x$ . Let  $\mathbb{E}_x Y_0$  be the expected value of  $Y_0$  starting at vertex  $x$ . Let  $\mathbb{E}_x Y_1$  be the expected value of  $Y_1$  starting at vertex  $x$ . Let  $\mathbb{E}_x Y_2$  be the expected value of  $Y_2$  starting at vertex  $x$ .

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