

## SPS Solution of the Week 9/26/2020-10/3/2020

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**Problem 1.** *Hedge your bets*

Suppose you play a game where there are two envelopes with \$  $X$  and \$  $2X$ . You are allowed to see the amount of money inside one of them without knowing which one it is. You can either keep that envelope or switch and take the other one. Come up with a scheme where your probability of picking the envelope with \$  $2X$  is greater than 50%

*Solution:* This will appear somewhat mind boggling at first, but pick any arbitrary positive real number  $C$ . Keep the money if the money in your envelope is  $> \$C$ . Since it is equally likely that  $X, 2X \leq C$  or  $X, 2X \geq C$ . But in case  $X < C < 2X$ , our decision to keep is the better one.  $\square$