

Assignment 1

AI1110: Probability and Random Variables

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PROBLEM 10.13.3.42 : At a fete, cards bearing numbers 1 to 1000, one number on one card, are put in a box. Each player selects one card at random and that card is not replaced. If the selected card has a perfect square greater than 500, the player wins a prize. What is the probability that

- 1) the first player wins a prize?
- 2) the second player wins a prize, if the first has won?

Solution: There are only 9 cards having perfect squares greater than 500 on them, namely, 529, 576, 625, 676, 729, 784, 841, 900 and 943.

A: Event when First player wins a prize

B: Event when Second player wins a prize

- 1) If the first player selects one of these 9 cards, he wins a prize, hence

$$\Pr(A) = \frac{9}{1000} \quad (1)$$

- 2) Now, if first player has already won a prize without replacing the card, number of favourable cards decrease by one, and second player has to select one of the 8 remaining cards to win a prize, hence,

$$\Pr(B|A) = \frac{8}{100} \quad (2)$$