Probability Assignment

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***Abstract*—This document contains the solution to Question 21 of Exercise 3 in Chapter 16 of the class 11 NCERT textbook.**

1) In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that
   a) The student opted for NCC or NSS.
   b) The student has opted neither NCC nor NSS.
   c) The student has opted NSS but not NCC.

   Solution: Let C denote the event that the student opted for NCC, and S the event that the student opted for NSS. From the given data,

$$\Pr(C) = \frac{30}{60} = \frac{1}{2} \tag{1}$$

$$\Pr(S) = \frac{32}{60} = \frac{8}{15} \tag{2}$$

$$\Pr(CS) = \frac{24}{60} = \frac{2}{5} \tag{3}$$

   a) We are required to find $\Pr(C+S)$. Thus

$$\Pr(C+S) = \Pr(C) + \Pr(S) - \Pr(CS) \tag{4}$$

$$= \frac{1}{2} + \frac{8}{15} - \frac{2}{5} \tag{5}$$

$$= \frac{19}{30} \tag{6}$$

   b) We are required to find $\Pr\left((C+S)'\right)$. From (6),

$$\Pr\left((C+S)'\right) = 1 - \Pr(C+S) = \frac{11}{30} \tag{7}$$

   c) We are required to find $\Pr(C'S)$. Hence

$$\Pr(C'S) = \Pr((1-C)S) \tag{8}$$

$$= \Pr(S - CS) \tag{9}$$

$$= \Pr(S) - \Pr(CS) \tag{10}$$

$$= \frac{8}{15} - \frac{2}{5} = \frac{2}{15} \tag{11}$$

   where (10) follows because $CS \subseteq S$.