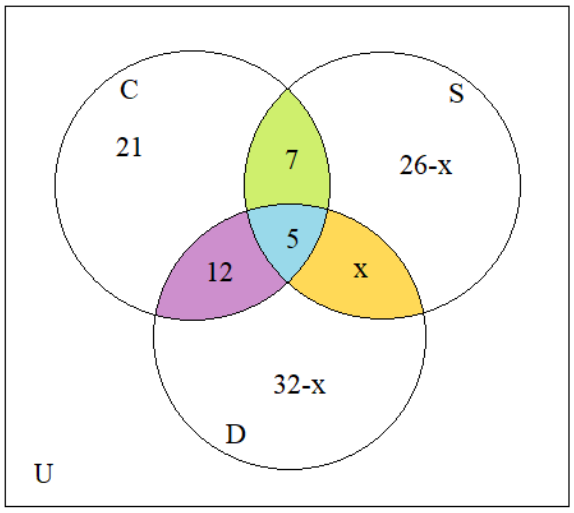
Answer on Question #85651 – Math – Discrete Mathematics

Question

According to information obtained from mathematics department regarding three mathematics units done by 100 students, those who are doing calculus are 45, those doing discrete are 49 and those doing statistics are 38. Those doing calculus and discrete are 17, those doing calculus and statistics are 12 and those doing the three units are 5. Use Venn diagram to find the number of students doing discrete and statistics but not calculus.

Solution



$n(U) = 100$
$n(C) = 45$
$n(D) = 49$
$n(S) = 38$
$n(C \cap D) = 17$
$n(C \cap S) = 12$
$n(C \cap S \cap D) = 5$

$n(C \cap S \cap D') = n(C \cap S) - n(C \cap S \cap D) = 12 - 5 = 7$
$n(C \cap D \cap S') = n(C \cap D) - n(C \cap S \cap D) = 17 - 5 = 12$
$n(D \cap S \cap C') = n(D \cap S) - n(C \cap S \cap D) = x$
$n(C \cap S' \cap D') = n(C) - (n(C \cap S \cap D') + n(C \cap D \cap S') + n(C \cap S \cap D)) =$
$= 45 - (7 + 12 + 5) = 21$
$n(D \cap C' \cap S') = n(D) - (n(C \cap D \cap S') + n(D \cap S \cap C') + n(C \cap S \cap D)) =$
$= 49 - (12 + x + 5) = 32 - x$
$n(S \cap C' \cap D') = n(S) - (n(C \cap S \cap D') + n(D \cap S \cap C') + n(C \cap S \cap D)) =$
$= 38 - (7 + x + 5) = 26 - x$

$n(U) = 100 = n(C \cap S' \cap D') + n(D \cap C' \cap S') + n(S \cap C' \cap D') +$

$+n(C \cap S \cap D') + n(C \cap D \cap S') + n(D \cap S \cap C') + n(C \cap S \cap D) =$
$= 21 + 32 - x + 26 - x + 7 + 12 + x + 5 = 103 - x$
$x = 103 - 100 = 3$

$n(D \cap S \cap C') = 3$