Math 55 Quiz 7 DIS 106

Name: _____   11 Apr 2022

1. A dodecahedral die has 12 faces that are numbered 1 through 12. What is the variance of the number that comes up when a fair dodecahedral die is rolled? [5 points]

Let X be the number that comes up. $E(X) = 1 \cdot \frac{1}{12} + ... + 12 \cdot \frac{1}{12} = \frac{12 \cdot 13}{2} \cdot \frac{1}{12} = \frac{13}{2}$ and $E(X^2) = 1^2 \cdot \frac{1}{12} + ... + 12^2 \cdot \frac{1}{12} = \frac{12 \cdot 13 \cdot 25}{6} \cdot \frac{1}{12} = \frac{325}{6}$. Hence $V(X) = E(X^2) - E(X)^2 = \frac{143}{12}$.

2. There are 2504 computer science students at a school. Of these, 1876 have taken a course in Java, 999 have taken a course in Linux, and 345 have taken a course in C. Further, 876 have taken courses in both Java and Linux, 231 have taken courses in both Linux and C, and 290 have taken courses in both Java and C. If 189 of these students have taken courses in Linux, Java, and C, how many of these 2504 students have not taken a course in any of these three programming languages? [5 points]

Let S be the set of all computer science students, J be the set of students who have taken a course in Java, L be the set of students who have taken a course in Linux, and C be the set of students who have taken a course in C. The number of students who have not taken a course in any of these three programming languages is

$$
\begin{aligned}
|S \setminus (J \cup L \cup C)| &= |S| - (|J| + |L| + |C| - |J \cap L| - |J \cap C| - |L \cap C| + |J \cap L \cap C|) \\
&= 2504 - (1876 + 999 + 345 - 876 - 290 - 231 + 189) \\
&= 492
\end{aligned}
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