2013-2014 MAT250 ARA SINAVI ÇÖZÜMLERİ

① D: Rasgele seçilen bilgisayarın DVD sürücüsünün olması
T: " " " taşınabilir sabit diskinin olması

a) $P(D \cup T) = P(D) + P(T) - P(D \cap T)$
$= \frac{105}{120} + \frac{29}{120} - \frac{20}{120} = \frac{114}{120} = \frac{19}{20}$

b) $P(T' \mid D') = \frac{P(T' \cap D')}{P(D')} = \frac{6/120}{15/120} = \frac{2}{5}$

c) $P(D' \cap T) = \frac{9}{120}$

②

x	1	3	4	5	7
$f(x)$	0.05	0.25	0.35	0.20	0.15

a) $F(1) = P(X \leq 1) = 0.05$
$F(3) = P(X \leq 3) = 0.05 + 0.25 = 0.30$
$F(4) = P(X \leq 4) = 0.05 + 0.25 + 0.35 = 0.65$
$F(5) = P(X \leq 5) = 0.05 + 0.25 + 0.35 + 0.20 = 0.85$
$F(7) = P(X \leq 7) = 0.05 + 0.25 + 0.35 + 0.20 + 0.15 = 1$

$$F(x) = \begin{cases} 0 & , \quad x < 1 \\ 0.05 & , \quad 1 \leq x < 3 \\ 0.30 & , \quad 3 \leq x < 4 \\ 0.65 & , \quad 4 \leq x < 5 \\ 0.85 & , \quad 5 \leq x < 7 \\ 1 & , \quad x \geq 7 \end{cases}$$

b) $E(Y) = E(-2X - 5) = -2E(X) - 5 = -2(4.25) - 5 = -13.5$
$E(X) = \sum_x x \cdot f(x) = 1(0.05) + 3(0.25) + 4(0.35) + 5(0.2) + 7(0.15) = 4.25$
$Var(Y) = Var(-2X - 5) = 4 Var(X)$
$Var(X) = E(X^2) - [E(X)]^2$
$E(X^2) = \sum x^2 \cdot f(x) = 1(0.05) + 9(0.25) + 16(0.35) + 25(0.2) + 49(0.15) = 20.25$
$Var(X) = 20.25 - (4.25)^2 = 2.1875$
$Var(Y) = 4(2.1875) = 8.75$

c) $P(X = 2) = 0$
$P(1 \leq X < 5) = f(1) + f(3) + f(4) = 0.05 + 0.25 + 0.35 = 0.65$