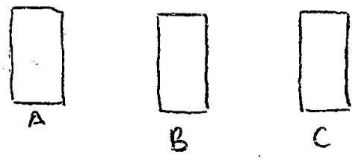
Name: Elif Cemre Durgut Recitation section: A5

ID: 26493 Signature: Elif

Question 1: (Lecture)

I would switch because if we write all possibilities:



I should:

If the pack of gold is behind A and if I choose A → STAY
If I choose B → SWITCH
If I choose C → SWITCH

If the pack of gold is behind B and If I choose A → switch
" " B → STAY
" " C → SWITCH

If the pack of gold is behind C and " " A → SWITCH
B → SWITCH
C → STAY

3 STAY
6 SWITCH
↓
If I choose to switch, my winning probability is $\frac{6}{9}$ which is higher than staying.

Question 2: (Recitation)

Step 1: $F_Y(y) = P(Y \le y)$

Step 2: $P(Y \le y) = P(\max(X_1, X_2) \le y)$ ⇒ If the maximum of X_1 and X_2 is smaller than y, then both should be smaller than y.

$= P(X_1 \le y, X_2 \le y)$ } since they are independent.

$= P(X_1 \le y) \cdot P(X_2 \le y)$

Step 3: $P(X_1 \le y) \cdot P(X_2 \le y) = \int_0^y e^{-x} dx \cdot \int_0^y e^{-x} dx = -e^{-x}\Big|_0^y \cdot e^{-x}\Big|_0^y = (-e^{-y}+1)(-e^{-y}+1)$

$F_Y(y) = (1-e^{-y})^2, \quad y > 0$

Step 4: $f_Y(y) = \frac{d(F_Y(y))}{dy} = \frac{d(1-e^{-y})^2}{dy} = 2(1-e^{-y}) \cdot e^{-y}, \quad y > 0$ //