

Question #4

- a) Probability that this player played less than 16 minutes given that he was a starter for a game.

$$= P(T_1/A) = \frac{P(A|T_1) P(T_1)}{P(A)} \quad [\text{By the Bayes theorem}]$$

$$= \frac{0.15 \times 0.40}{P(A)}$$

$$\text{Now, } P(A) = \sum_{i=1}^3 P(T_i) P(A|T_i) \quad [\text{By the theorem of total probability}]$$

$$= 0.40 \times 0.15 + 0.40 \times 0.40 + 0.20 \times 0.80$$

$$= 0.38$$

$$\therefore P(T_1/A) = \frac{0.15 \times 0.40}{0.38} = \underline{\underline{0.16}}$$

- ⑥ Probability that the player played more than 16 minutes given that he is ~~not~~ a starter for a game

(say the event $A' = \Omega - A$)

$$\Rightarrow P(T_1/A')$$

$$= 1 - P(T_1/A)$$

$$= 1 - \frac{P(T_1) - P(A'/T_1)}{P(A')}$$

$$\text{Now, } P(A|T_1) = 0.15, \therefore P(A'/T_1) = 1 - P(A|T_1) = 0.85$$

$$P(A) = 0.38 \therefore P(A') = 1 - P(A) = 1 - 0.38 = 0.62$$

$$\therefore P(T_1/A') = 1 - \frac{0.40 \times 0.85}{0.62}$$

$$= \underline{\underline{0.45}}$$