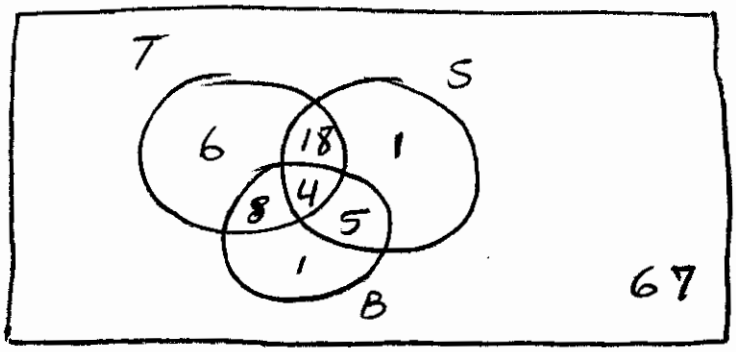
1.



$P(\text{student plays at least one of the sports})$

$$= \frac{6+18+4+8+5+1+1}{100}$$

$$= 0.43$$

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2. $P(A \cup B) = 0.75$; $P(A \cap B) = 0.5$; $P(B|C) = 0.5$
$P(B \cup C) = 0.75$; $\boxed{P(A \cap C) = 0.25}$; $P(A|B) = 0.75$

(a) $$P(B) = \frac{P(A \cap B)}{P(A|B)} = \frac{0.5}{0.75} = \frac{2}{3} = 0.67 \checkmark$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\Rightarrow P(A) = 0.75 + 0.5 - 0.67 = 0.58 \checkmark$$

$$P(B \cap C) = P(B|C)\,P(C) = 0.5\,P(C)$$

Also; $$P(B \cup C) = P(B) + P(C) - P(B \cap C)$$
$$0.75 = 0.67 + P(C) - 0.5\,P(C)$$

$$\Rightarrow P(C) = 0.16 \checkmark$$

$P(B \cap C) = 0.08$ ✓

$$P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{0.5}{0.58} = 0.86$$ ✓

$P(A^c \cup B^c) = P(A \cap B)^c = 1 - P(A \cap B) = 0.5$ ✓

$P(B^c|A) = 1 - P(B|A) = 0.14$ ✓

Notice that $P(A \cap C)$ should be $< 0.16 = P(C)$

But it is <u>not</u> <u>needed</u> in order to solve the problem.

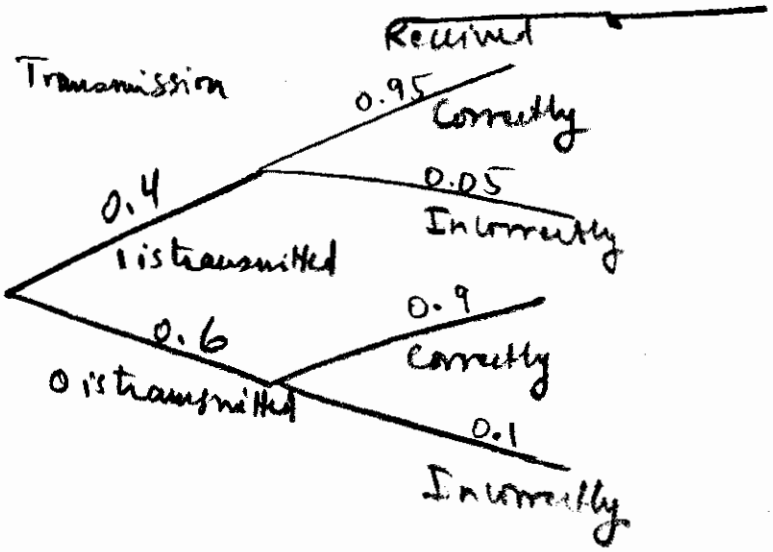
(b) B and C are <u>not</u> mutually exclusive since

$P(B \cap C) = 0.08$

(c) B and C are not independent since

$0.67 = P(B) \neq P(B|C) = 0.50$.

3.



3. (a) P(1 Received) = P(1 transmitted and 1 Received)
+P(0 transmitted and 1 Received)

$= (0.4)(0.95) + (0.6)(0.1)$

$= 0.44$

(b) $P(1\text{Transmitted} \mid 1\text{Received}) = \frac{0.38}{0.44} = 0.864$

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4. (a) P(at least one error)

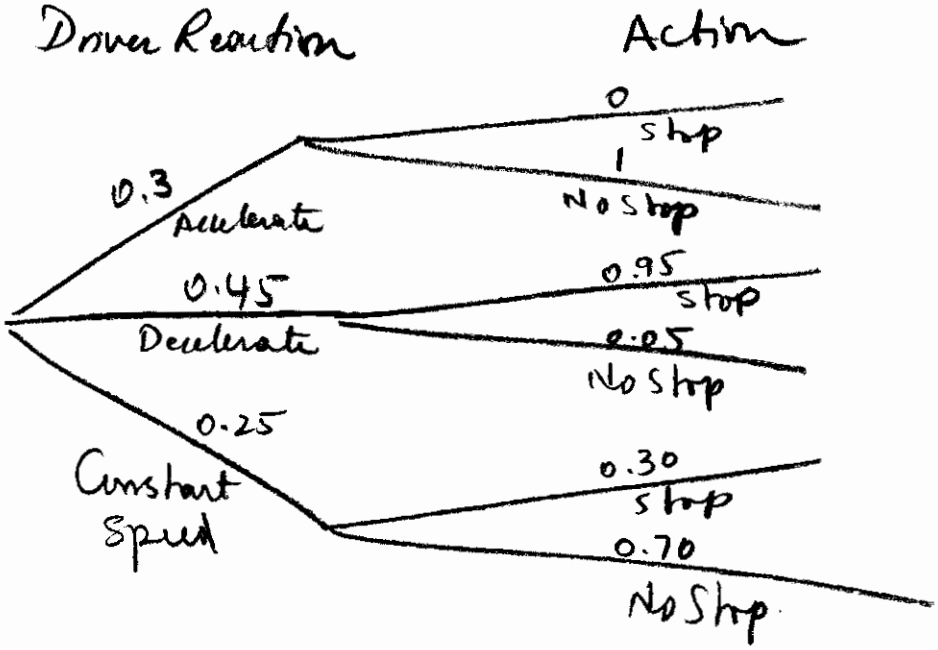
$= 1 - P(\text{No error})$

$= 1 - (0.99)^{20} = 0.878$

(b) $P(1^{st}\text{ error on }5^{th}\text{ question}) = (0.99)^4(0.01)$

$= 0.066$

5.



(a) $P(\text{Decelerate but not stop}) = (0.45)(0.05)$

$= 0.0225$

(b) $P(\text{Driver does not stop}) = (0.3)(1) + (0.45)(0.05) + (0.25)(0.70)$

$= 0.4975$

(c) $P(\text{Driver Decelerates} \mid \text{Driver Stopped})$

$= \dfrac{(0.45)(0.95)}{1-0.4975}$

$= 0.8507$