1a/ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

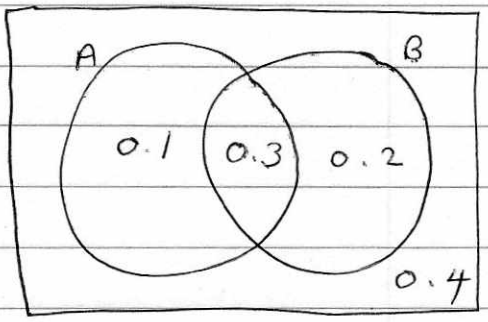
$= 0.4 + 0.5 - 0.3$

$= \underline{0.6}$

b/ $P(A/B) = \dfrac{P(A \cap B)}{P(B)}$

$= \dfrac{0.3}{0.5}$

$= \underline{0.6}$



c/ $P(A'/B') = \dfrac{P(A' \cap B')}{P(B')}$

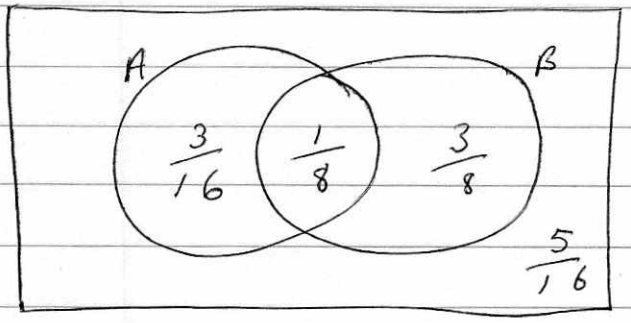
$= \dfrac{0.4}{0.5}$

$= \underline{0.8}$

2a/ $$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$\frac{1}{4} = \frac{P(A \cap B)}{\frac{1}{2}}$$

$$P(A \cap B) = \frac{1}{8}$$



b/ $$P(B'|A) = \frac{P(B' \cap A)}{P(A)}$$

$$= \frac{3}{16} \div \frac{5}{16}$$

$$= \frac{3}{5}$$

c/ $$P(A' \cup B) = \frac{3}{8} + \frac{5}{16} + \frac{1}{8}$$

$$= \frac{13}{16}$$

d/ If independent $P(A) \times P(B) = P(A \cap B)$

$$\frac{5}{16} \times \frac{1}{2} = \frac{5}{32}$$

$$\frac{5}{32} \neq \frac{1}{8}$$

A and B are not independent

3a/ $P(A' \cap B') = 1 - 0.7$

$= \underline{0.3}$

b/ $P(A' \cap B) = 1 - 0.3 - 0.3$

$= 0.4$

c/ $P(A) \times P(B) = P(A \cap B)$

$0.3P(B) = P(A \cap B)$ (1)

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

$P(A \cap B) = 0.3 + P(B) - 0.7$

$P(A \cap B) = P(B) - 0.4$ (2)

$0.3P(B) = P(B) - 0.4$

$0.4 = 0.7P(B)$

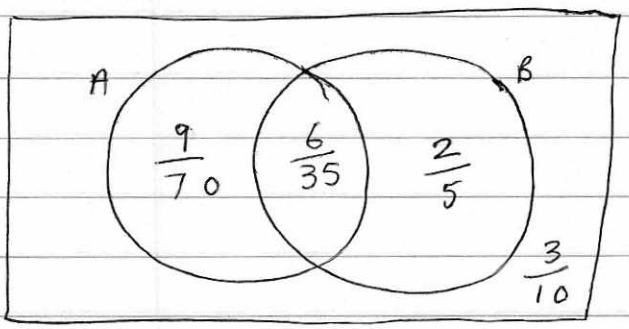
$P(B) = \frac{4}{7}$

d/ $P(A \cap B) = \frac{4}{7} - 0.4$

$= \frac{6}{35}$

$P(A' \cup B') = 1 - \frac{6}{35}$

$= \frac{29}{35}$



4a/ $P(A|B) = \dfrac{P(A \cap B)}{P(B)}$

$\dfrac{5}{14} = \dfrac{\frac{1}{20}}{P(B)}$

$P(B) = \frac{1}{20} \div \frac{5}{14}$

$= \frac{7}{50}$

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

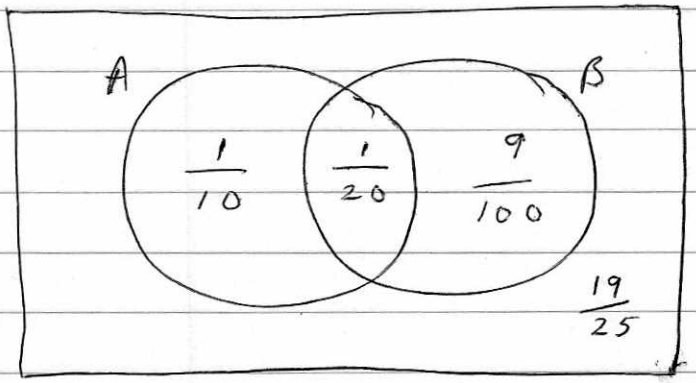
$= \frac{3}{20} + \frac{7}{50} - \frac{1}{20}$

$= \frac{6}{25}$

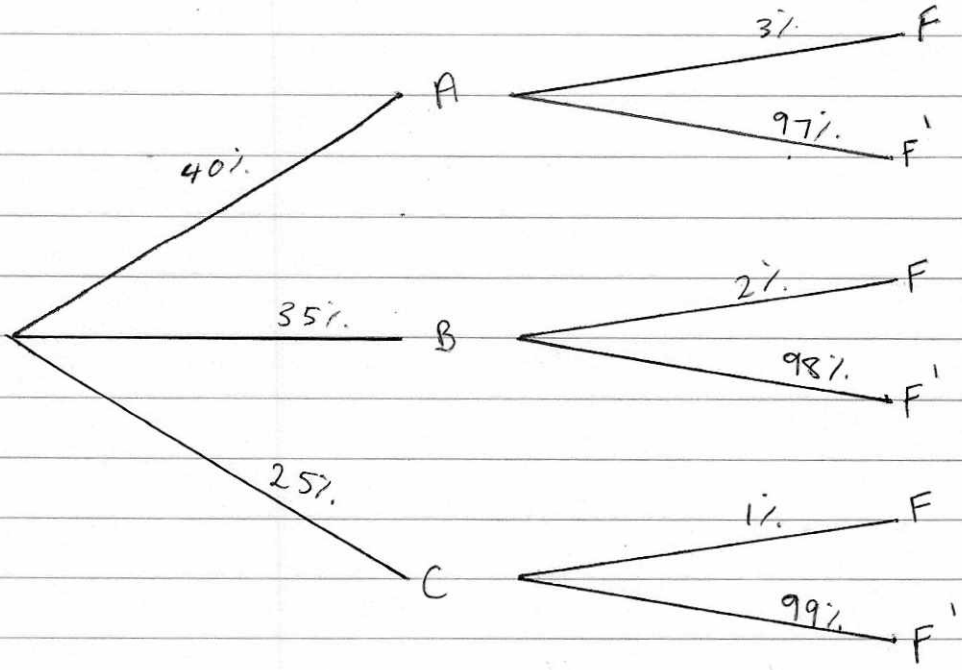
c/ $P(B|A') = \dfrac{P(B \cap A')}{P(A')}$

$= \frac{9}{100} \div \frac{17}{20}$

$= \frac{9}{85}$



5a)



b) $P(\text{Faulty}) = 0.4 \times 0.03 + 0.35 \times 0.02 + 0.25 \times 0.01$

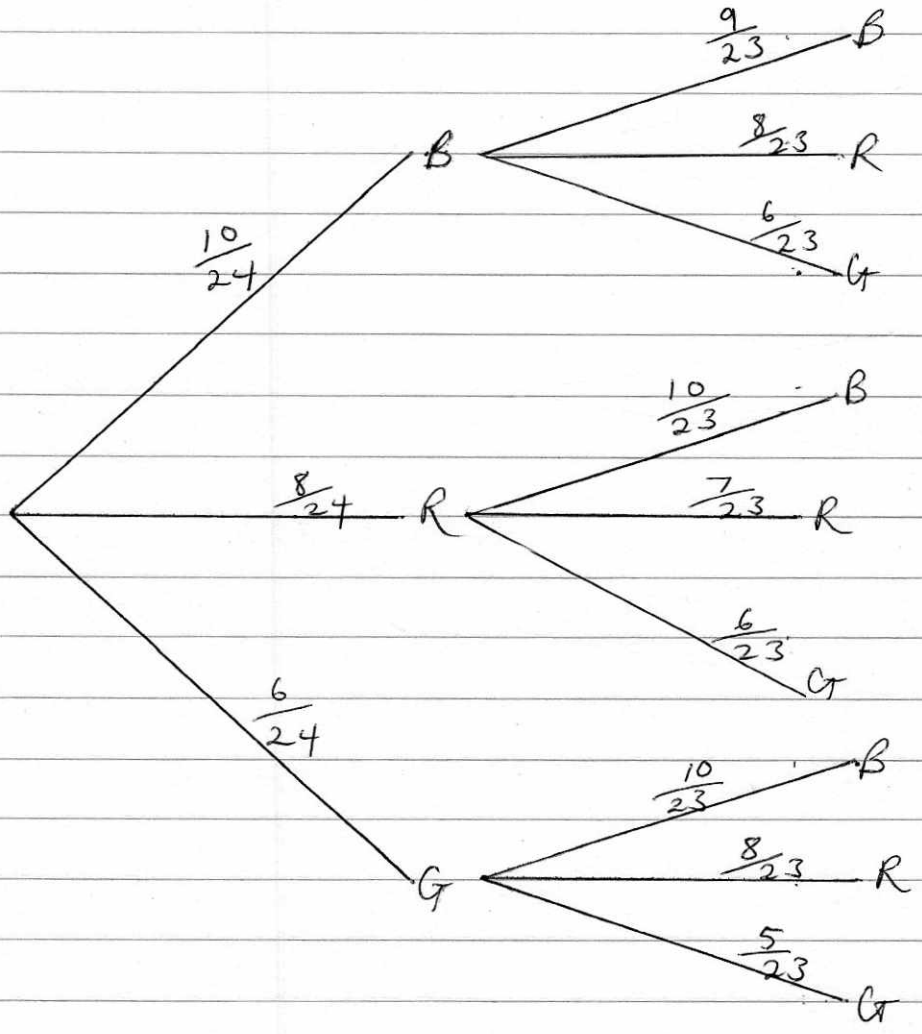
$= \underline{\underline{0.0215}}$

c) $P(\text{produced by machine C} \mid \text{Faulty}) = \dfrac{P(\text{Machine C} \cap \text{Faulty})}{P(\text{Faulty})}$

$= \dfrac{0.25 \times 0.01}{0.0215}$

$= \underline{\underline{\dfrac{5}{43}}}$

6/



b/ $\frac{6}{24} \times \frac{5}{23} = \frac{5}{92}$

c/ $P(\text{Both Red} \mid \overset{\text{At least}}{\text{One Red}})$

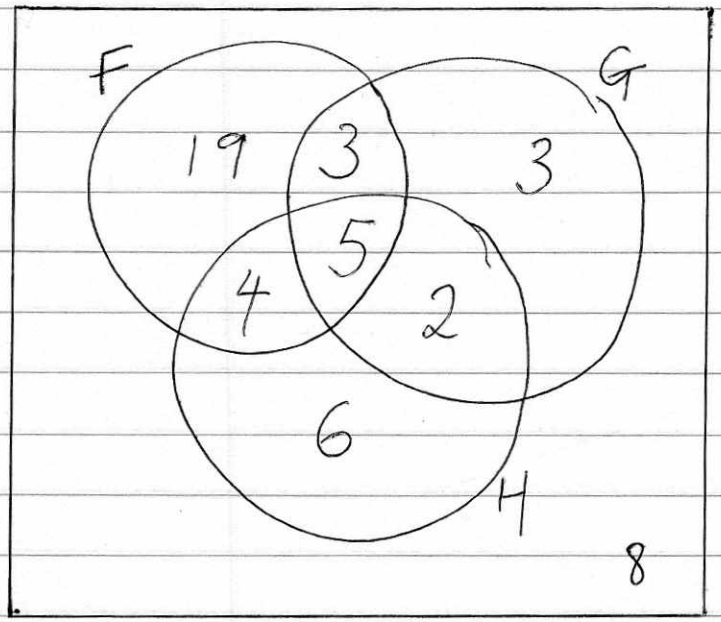
$P(\overset{\text{At least}}{\text{One Red}}) = \left(\frac{10}{24} \times \frac{8}{23}\right) + \frac{8}{24} + \left(\frac{6}{24} \times \frac{8}{23}\right)$

$= \frac{13}{23}$

$P(\text{Both Red}) = \frac{8}{24} \times \frac{7}{23} = \frac{7}{69}$

$\frac{7}{69} \div \frac{13}{23} = \frac{7}{39}$

7/



b/ $P(H' \mid F) = \frac{22}{31}$