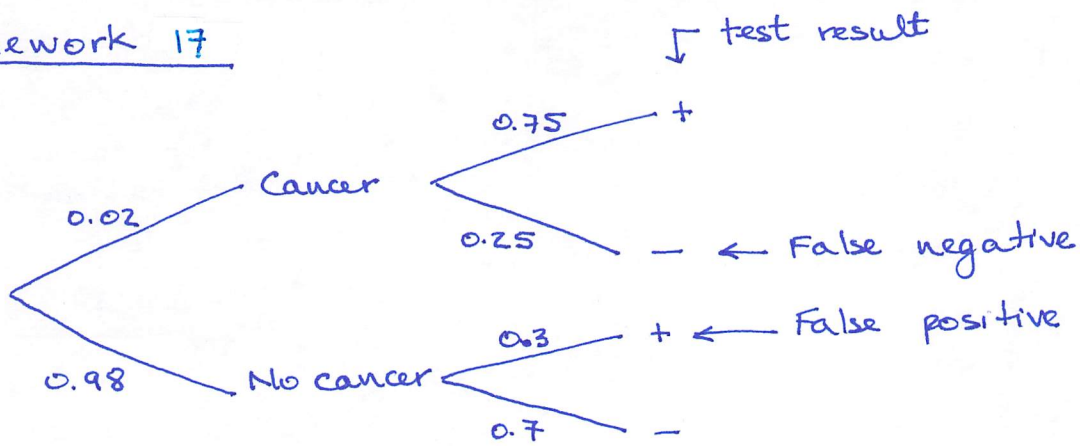


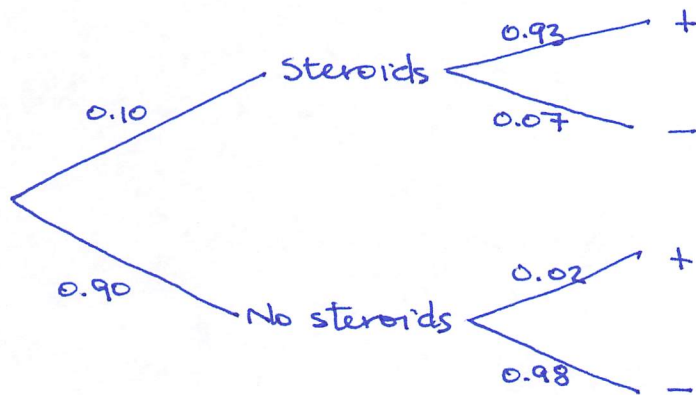
Homework 17

1.



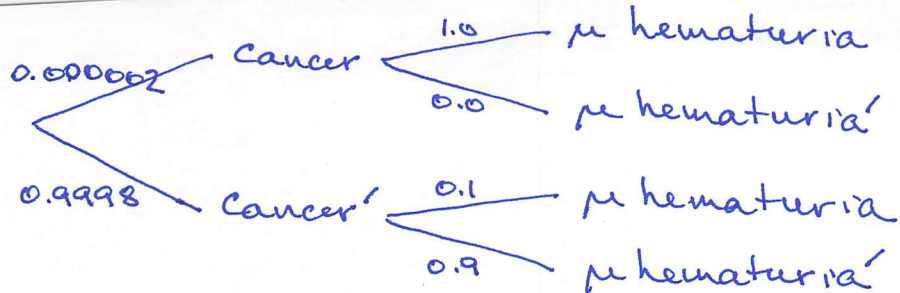
$$\begin{aligned} p(\text{cancer} | +) &= \frac{p(\text{cancer} \cap +)}{p(\text{cancer} \cap +) + p(\text{no cancer} \cap +)} \\ &= \frac{0.02(0.75)}{0.02(0.75) + 0.98(0.3)} \approx 0.0485 \approx 5\% \end{aligned}$$

2.



$$\begin{aligned} p(\text{steroids} | +) &= \frac{p(\text{steroids} \cap +)}{p(\text{steroids} \cap +) + p(\text{steroids}' \cap +)} \\ &= \frac{0.1(0.93)}{0.1(0.93) + 0.9(0.02)} \\ &\approx 0.838 \approx 84\% \end{aligned}$$

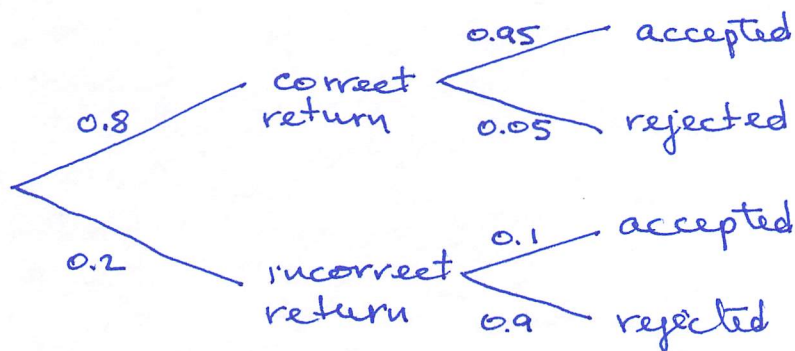
3.



$$p(\text{cancer} | \mu \text{ hematuria}) = \frac{0.000002 (1.0)}{0.000002 (1.0) + 0.99998 (0.1)} \approx 0.00002$$

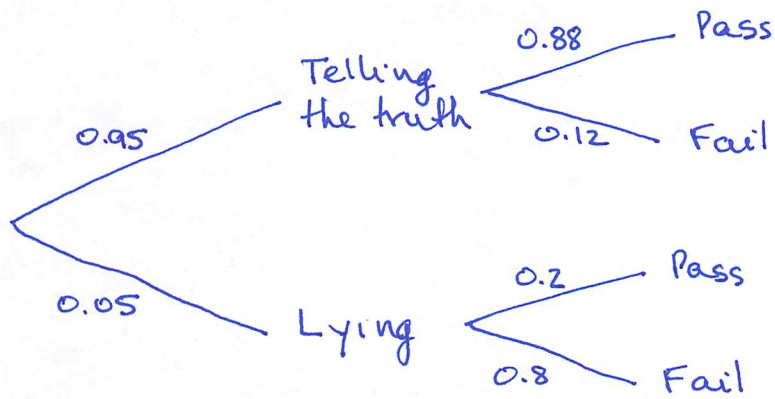
or around a "2 in 100,000" chance.

4.



$$\begin{aligned}
 p(\text{correct} | \text{rejected}) &= \frac{p(\text{correct} \cap \text{rejected})}{p(\text{rejected})} \\
 &= \frac{0.8 (0.05)}{0.8 (0.05) + 0.2 (0.9)} = 0.18
 \end{aligned}$$

5.



$$p(\text{Telling the truth} | \text{Fail}) = \frac{0.95(0.12)}{0.95(0.12) + 0.05(0.8)}$$

$$\approx 0.74$$