#3 (#7, Pg. 106) $P(\text{cancer}) = 1/5000$

$P(\text{diagnosis} \mid \text{cancer}) = 0.92$

$P(\text{diagnosis} \mid \text{cancer}^c) = 1/500$

$$P(\text{cancer} \mid \text{diagnosis}) = \frac{P(\text{diag.} \mid \text{cancer}) \cdot P(\text{cancer})}{P(\text{diag.} \mid \text{cancer}) \cdot P(\text{cancer}) + P(\text{diag} \mid \text{cancer}^c) P(\text{can}^c)}$$

$$= \frac{0.92\left(\frac{1}{5000}\right)}{0.92\left(\frac{1}{5000}\right) + \left(\frac{1}{500}\right)\left(\frac{4999}{5000}\right)} \doteq .084$$

#4 (#10, Pg 106)

The other side will be black only if it's the BR (black red) card

$$P(BR \mid R) = \frac{P(R \mid BR) \cdot P(BR)}{P(R \mid BR) \cdot P(BR) + P(R \mid RR) \cdot P(RR) + P(R \mid BB) \cdot P(BB)}$$

$$= \frac{1/2\,(1/3)}{1/2\,(1/3) + 1\,(1/3) + 0\,(1/3)} = 1/3$$