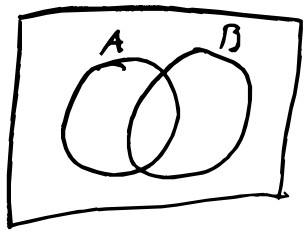
1.1) $1 - 0.45 = \boxed{0.55}$



1.2) $0.5 + 0.2 - 0.55 = \boxed{0.15}$

$$A \cup B = A + B - AB$$

$$AB = A + B - A \cup B$$

1.3) $P(A \cap \bar{B}) = P(A) - P(A \cap B) = 0.5 - 0.15 = \boxed{0.35}$

1.4) $\boxed{NO}$

2.1) $1-\left(\frac{1}{6}\right)^0\left(\frac{5}{6}\right)^4 \approx \boxed{0.5177 = \frac{671}{1296}}$

2.2) $1-\left(\frac{1}{6}\right)^0\left(\frac{5}{6}\right)^{20} \approx 0.9739$

2.3) $p = 1-\left(\frac{5}{6}\right)^n \quad n = \frac{\ln(1-p)}{\ln\left(\frac{5}{6}\right)} \quad p=0.9 \quad \boxed{n \approx 12.63 = \underline{\underline{13}}}$

3) $P(3)+P(2)+P(1) \rightarrow \frac{1}{9}+\frac{2}{9}+\frac{1}{9}=\boxed{\frac{4}{9}}$

$P(E)=2P(O)$

$2P(O)+P(O)=1$

$P(O)=\frac{1}{3}$ each odd face $P=\frac{1}{9}$

$P(E)=\frac{2}{3}$ each even face $P=\frac{2}{9}$

4.1) Total Books: $3+2+2+3 = 10$

$$_{10}C_3 = \frac{10!}{3!7!} = \frac{10 \cdot 9 \cdot 8}{3 \cdot 2} = 10 \cdot 3 \cdot 4 = \boxed{120 \text{ ways}}$$

4.2) $\boxed{\frac{3}{20}}$

$$\frac{{}_3C_1 \cdot {}_2C_1 \cdot {}_3C_1}{120} = \frac{18}{120} = \frac{3}{20}$$

5.1) $\frac{1}{3}P_A + \frac{1}{3}P_B + \frac{1}{3}P_C = \frac{0.002 + 0.02 + 0.001}{3} = \frac{23}{3000} \approx 0.007667$

5.2) $P(A|D) = \frac{P(D|A)P(A)}{P(D)} = \boxed{0.08696}$

$P(B|D) = \frac{P(D|B)P(B)}{P(D)} = \boxed{0.8696}$

$P(C|D) = \frac{P(D|C)P(C)}{P(D)} = \boxed{0.04348}$

5.3) $0.5P_A + 0.1P_B + 0.4P_C = \boxed{0.0034}$

5.4) $P(A|D) = \frac{P(D|A)P(A)}{P(D)} = \boxed{0.2941}$

$P(B|D) = \boxed{0.5882}$

$P(C|D) = \boxed{0.1176}$

6a) $\frac{4}{52} = \boxed{\frac{1}{13}}$

6b) $\boxed{\frac{1}{52}}$

6c) $\frac{1}{52} + \frac{1}{52} = \boxed{\frac{1}{26}}$

6d) $\boxed{\frac{1}{2}}$

7.1) $P(H_1) = \frac{13}{52}$

7.2) $P(H_2) = \underbrace{\frac{13}{52} \cdot \frac{12}{51}}_{\text{Prob of 1st draw being heart}} + \underbrace{\frac{39}{52} \cdot \frac{13}{51}}_{\text{Prob of 1st draw not being heart}} = \boxed{\frac{1}{4}}$