Q9: outcome = 5-3-9-3-8-4-7

1.) $P(\text{Dice}=A \mid \text{outcome}) = \frac{P(\text{outcome} \mid \text{Dice}=A) \cdot p(\text{Dice}=A)}{p(\text{outcome})}$

$$= \frac{\frac{1}{20} \cdot \frac{3}{20} \cdot \frac{1}{20} \cdot \frac{3}{20} \cdot \frac{1}{20} \cdot \frac{2}{20} \cdot \frac{1}{20} \cdot \frac{1}{2}}{\frac{1}{2} \cdot \frac{1 \cdot 3 \cdot 1 \cdot 3 \cdot 1 \cdot 2 \cdot 1}{20^7} + \frac{1}{2} \cdot \frac{2 \cdot 2 \cdot 1 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{20^7}}$$

$$= \frac{\frac{18}{20^7} \cdot \frac{1}{2}}{\frac{82}{20^7} \cdot \frac{1}{2}} = \frac{9}{41}$$

2) $p(\text{Dice}=A \mid \text{outcome}) = \frac{p(\text{outcome} \mid \text{Dice}=A)\, p(\text{Dice}=A)}{p(\text{outcome})}$

$p(\text{outcome} \mid \text{Dice}=A)$ is same as above since the same outcomes with different ordering

$$= \frac{\frac{18}{20^7} \cdot \frac{1}{3}}{\frac{1}{3} \cdot \left(\frac{18}{20^7} + \frac{64}{20^7} + \frac{1}{20^7}\right)} = \frac{18}{83}$$

$p(\text{Dice}=B \mid \text{outcome}) = \frac{p(\text{outcome} \mid \text{Dice}=B)\, p(\text{Dice}=B)}{p(\text{outcome})}$

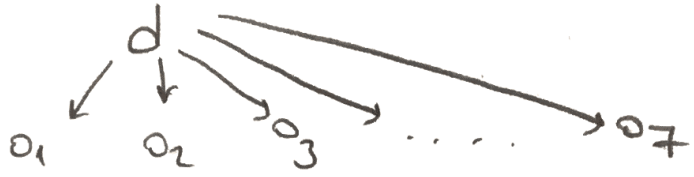
$$= \frac{\frac{64}{20^7} \cdot \frac{1}{3}}{\frac{83}{20^7} \cdot \frac{1}{3}} = \frac{64}{83}$$

$p(\text{Dice}=C \mid \text{outcome}) = 1 - p(\text{Dice}=A \mid \text{outcome}) - p(\text{Dice}=B \mid \text{outcome})$

$$= 1 - \frac{(18+64)}{83} = \frac{1}{83}$$

3) R.V. dice : d

each outcome : $o_1, o_2 \ldots o_7$



This graph represents both models in part 1 & 2 except for in model 1 event space of d is $\{d_1, d_2\}$ & in model 2 it is $\{d_1, d_2, d_3\}$. And event space of outcome in model 1 is $\{1, 2 \ldots 10\}$ and it is $\{1, 2 \ldots 20\}$ in model 2.