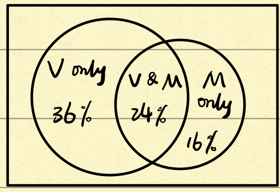
Problem 1

(a)



$P(\text{At least one of } V \text{ and } M) = 36\% + 24\% + 16\% = 76\%$

(b) $P(\text{Neither } V \text{ nor } M) = 1 - 76\% = 24\%$

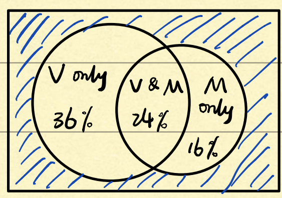
(c) $P(M \text{ only}) = 16\%$

(d) $P(V|M) = 24\% / 40\% = 60\%$

(e) $P(V|M^c) = 36\% / (1 - 40\%) = 60\%$

(f) $P(V|M) = P(V|M^c) = P(V) = 60\% \Rightarrow V$ and M are independent

(g)



V^c and M^c can both be true

They are non-disjoint.

Problem 2

(a) A = one roll shows 3 or more spots

$P(A) = 4/6 = 2/3$

$P(\text{All 4 rolls} \geq 3) = P^4(A) = 16/81 = 19.75\%$

(b) $P(A^c) = 1 - 2/3 = 1/3$

$P(\text{All 4 rolls} < 3) = P^4(A^c) = 1/81 = 1.23\%$

(c) $P(\text{At least 1 roll shows 6}) = 1 - P(\text{All 4 rolls} \neq 6)$

$= 1 - (\frac{5}{6})^4 = 671/1296 = 51.77\%$

Problem 3

(a) $p = \frac{4-1}{52-4} = \frac{1}{16}$

(b) $p = P(A) \times P(AB|A) \times P(ABC|AB) \times P(ABCD|ABC) \times P(ABCDE|ABCD)$

$= \frac{4}{52} \times \frac{3}{51} \times \frac{2}{50} \times \frac{4}{49} \times \frac{3}{48} \approx 9.2 \times 10^{-7}$