Show all work and don’t forget to check your answers.

Suppose \( \Omega = \{1, 2, 3, 4, 5\} \), \( A = \{2, 4, 5\} \), \( B = \{3\} \).

1. (1 point) Are \( A \) and \( B \) disjoint?
   \[ A \cap B = \emptyset, \quad \text{yes} \]

2. (1 point) Find \( A \cup B \).
   \[ A \cup B = \{2, 3, 4, 5\} \]

3. (4 points) If \( P(A) = .5 \), \( P(B) = .2 \), then find \( P(\overline{1}) \) and \( P(A \cup B) \).
   \[ \overline{1} = (A \cup B)^c \Rightarrow P(\overline{1}) = 1 - P(C_{A \cup B}) = 1 - .7 = .3 \]
   \[ P(A \cup B) = P(A) + P(B) = .5 + .2 = 0.7 \]

4. (4 points) Suppose you toss 3 fair coins. What is the probability of getting exactly one tail?
   \[ 2 \cdot 2 \cdot 2 = 2^3 = 8 \]
   \( A \): event of getting exactly one tail,
   \[ |A| = \binom{3}{1} = 3 = \# \text{ of positions T could be} \]
   \[ \Rightarrow \frac{|A|}{1024} = \frac{3}{8} \]