Q1 Dice
2 Points

Suppose you roll two dice. Which of the following definitions of events $E$ and $F$ are mutually exclusive? Select all that apply.

- $E$: you roll exactly 1 one, $F$: you roll exactly 1 two
- $E$: you roll exactly 1 one, $F$: you roll exactly 2 two's
- $E$: dice 1 outcome is even, $F$: dice 2 outcome is odd
- $E$: dice 1 outcome is even, $F$: dice 1 outcome is odd

Q2 Poker Hands
2 Points

Q2.1
1 Point

A 52-card deck has 4 suits (Diamond/Club/Heart/Spade), each with 13 ranks (Ace, 2, 3, ..., 9, 10, Jack, Queen, King). How many unordered 5-card hands would result in a three of a kind in poker using a standard 52-card deck? A three of a kind occurs when the cards have ranks $a$, $a$, $a$, $b$, $c$, where $a$, $b$ and $c$ are all distinct. Example unordered three-of-a-kind hand: (Jack Club, Jack Spade, Jack Heart, 9 Heart, 10 Heart).

- $54,912 = 13 \cdot \binom{4}{3} \cdot \binom{12}{2} \cdot 4^2$
- $58,656 = 13 \cdot \binom{4}{3} \cdot \binom{12}{2}$
- $13 \cdot 12 \cdot 11 \cdot 10 \cdot 9$
- $858 = 13 \cdot \binom{12}{2}$

Q2.2
1 Point

If you are dealt 5 cards from a 52-card deck, what is the probability of getting a three of a kind? Please provide a decimal answer (e.g. 0.0034).

0.021