

Name \_\_\_\_\_

Student Number \_\_\_\_\_

## STA256H5F Quiz 2B

1. (2 marks) An experiment consists of tossing 2 coins and observing the face of each coin. Let  $\mathcal{S} = \{HH, HT, TH, TT\}$ ,  $A = \{HH, HT\}$ ,  $B = \{HH, HT, TT\}$ . Are A and B independent?

P(A)=1/2, P(A|B)=2/3, so A and B are dependent

2. (2 marks) Are A and B mutually exclusive?

No,  $P(A \cap B) = 1/2$

3. (3 marks) *True or False* Let  $A, B \subseteq \mathcal{S}$ . If  $P(A|B)=0$ , with  $P(A), P(B) > 0$  are A and B mutually exclusive? Explain?

Yes,  $P(A|B)=0 = P(A \cap B)/P(B) \Rightarrow P(A \cap B)=0$

4. (3 marks) You are buying food for two friends at a local restaurant where they sell hotdogs with 3 possible toppings and hamburgers with 2 possible toppings. Your friends don't care what you order them, so you pick an item for each of them at random, with a random selection of one or more topping(s). What is the probability you don't order both your friends the same item with the same topping(s)?

$$1 - \frac{1}{\binom{3}{1} + \binom{3}{2} + \binom{3}{3} + \binom{2}{1} + \binom{2}{2}} = 9/10$$