

Printed name: _____ Row: _____ Seat number: _____

You may work together on this take-home quiz. You may use your calculators, book, notes, and other supplementary materials of your choosing. You **must show all your work** to receive credit and partial credit on the questions. Write down and explain what you are calculating.

You may **staple** extra sheets of paper to this quiz if you need extra room to show your work.

1) Recall the standard deck of 52 cards. A poker hand consists of 5 cards chosen from the deck regardless of order (order doesn't matter). A pair is two cards of the same rank, e.g. the 4 of diamonds and the 4 of spades form a pair. A triplet is three cards of the same rank, e.g. the 6 of hearts, the 6 of clubs and the 6 of diamonds form a triplet.

a. (2 points) Find the number of ways of getting at least a pair in a poker hand, without any restrictions on the other 3 cards. Let this be event A .

b. (2 points) Find the number of ways of getting at least a triplet in a poker hand, without any restrictions on the other two cards. Let this be event B .

c. (2 points) Can you get both a pair and a triplet in a poker hand? If so, find the number of ways you can do this. Hint: this is $A \cap B$.

d. (2 points) What is the number of different poker hands in the event $E = A \cup B$ of getting a poker hand that has either a pair with no restrictions on the remaining three cards or a triplet with no restrictions on the remaining two cards?

e. (1 point) How many poker hands are there? (Hint: this is S , your sample space.)

f. (1 point) What is the probability of the event E of getting a poker hand with either a pair with no restrictions on the remaining 3 cards, or a triplet with no restrictions on the remaining two cards? Write your answer to three significant figures.

2) Use the definitions in problem one. A quadruplet is all four of a kind, e.g. all four 9s in the deck, the 9 of diamonds, 9 of hearts, 9 of clubs and 9 of spades.

a. (1 point extra credit) Find the number of ways of getting a pair in a poker hand, where none of the remaining three cards may form a triplet with the **pair** selected.

b. (1 point extra credit) Find the number of ways of getting at least a triplet in a poker hand, where the remaining two cards may not form a quadruplet with the **triplet** selected.

c. (1 point extra credit) In this case, can you get both a pair and at triplet in a poker hand? How many ways are there of doing this?

d. (1 point extra credit) What is the number of different poker hands in the event E of getting a poker hand that has either a pair with the restriction above or a triplet with the restriction above?

e. (1 point extra credit) What is the probability of the event E of getting either a pair with the restriction above, or a triplet with the restriction above in a poker hand? Write your answer to three significant figures.