UNEXAM #1

Remember that the important aspect of this assignment is not the answer, but the solution. I am not looking for an explanation which includes all of your reasoning, but just a simple, clear, thoughtful, direct, short explanation. Don't try to explain you arithmetic, just how we use what we know (mostly addition and multiplication principle) to determine the answer.

It is important that if you make a connection between the problem and the answer so I am going to impose two important rules:
(a) you must start your solution with the question (RECOPY IT!)
(b) if you use words like 'set,' 'spaces,' 'list' or 'choose' it needs to be clear how these things are related to non-negative integers for the first problem and sequences of cards for the second.

The assignment is due December 3. Please work alone on this assignment. Do not discuss the problems with your classmates.

(1) How many solutions to the equation

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 = 20$$

are there where each of the x_i are non-negative integers and $x_1 + x_2 + x_3 \equiv 3 \ mod \ 6$?
Answer: 8,856

(2) How many 7 card hands are there that contain a 5 card straight and a three of a kind? (A is a high card only, a 5 card straight is any increasing sequence of five cards without regard to suit)
Answer: 46,080