Please write* *Your name: _____

Show all work: either write at least a sentence explaining your reasoning, or annotate your math work with brief explanations. Correct answer with no solution will give only a partial credit. There is NO need to simplify, and NO calculators are allowed. You may leave your answer in terms of sums, products, factorials or binomial coefficients, and fractions.

. . . . . .

(1) Suppose we roll two dice, and consider events $\boldsymbol{A} = \{$the first die is a 5$\}$, $\boldsymbol{B} = \{$the sum is **10**$\}$. Are these two events independent? Explain.

Please write your answer here:

$\mathbb{P}(\boldsymbol{A}) =$	$\mathbb{P}(\boldsymbol{B}) =$	$\mathbb{P}(\boldsymbol{A} \cap \boldsymbol{B}) =$	Are $\boldsymbol{A}$ and $\boldsymbol{B}$ independent?

(2) In the same situation, compute $\mathbb{P}(\boldsymbol{A} \mid \boldsymbol{B})$ and $\mathbb{P}(\boldsymbol{B} \mid \boldsymbol{A})$.

Please write your answer here:

$\mathbb{P}(\boldsymbol{A} \mid \boldsymbol{B}) =$	$\mathbb{P}(\boldsymbol{B} \mid \boldsymbol{A}) =$

Please go to the next page ...

Suppose that

- a flu test indicates the presence of the flu $\frac{4}{5}$ of the times when the patient actually has the flu (this is called the true positive rate);
- the same test indicates the absence of flu $\frac{4}{5}$ of the times when the patient actually does not have the flu (this is called the true negative rate);
- currently $\frac{1}{4}$ of the population has the flu.

(3) For a random person, what is the probability that the flu test is positive?

Please write your answer here:

(4) Calculate the probability that a random person actually has the flu, given that the flu test is positive.

Please write your answer here:

End of the quiz