Honors Discrete Mathematics

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   Prove all of your answers.  All dice in all problems are fair.
If you work with others put their names clearly at the top of the
assignment.  Everyone must turn in their own independently written
solutions.  Homework is due at the beginning of class unless submitted
by e-mail as a PDF file prepared from a TeX source.  Electronic
submissions conforming to these standards (no scans please) are
accepted until Wednesday midnight at lenacore@uchicago.edu.
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Homework 6, due November 16

1. We simultaneously roll a standard (cubical) die, an icosahedral one (with 20 facets numbered from 1 to 20) and a dodecahedral one (numbered 1-12). Prove that the probability to get a total of 20 is equal to the probability to get a total of 21.

2. Give an example of four events A, B, C, D in the same sample space such that every three of them are mutually independent while $A \wedge B$ and $C \wedge D$ are not independent.

3. We roll a pair of fair (cubical) dice. Compute the expectation of the *ratio* of the number of points rolled on the first die to the number of points on the second.

4. We throw a fair (cubical) die, and then we throw as many additional dice as the number of points rolled on it. Compute the expectation of the total (including the first die).