IB HL Mathematics: Counting and Probability

1. At a particular school with 43 students, each student takes chemistry, biology, or both. The chemistry class is three times as large as the biology class, and 5 students are taking both classes. How many people are in the chemistry class?

2. If all multiples of 3 and all multiples of 4 are removed from the list of whole numbers 1 through 100, then how many whole numbers are left?

3. If a, b and c are three (not necessarily different) numbers chosen randomly and with replacement from the set $\{1, 2, 3, 4, 5\}$, what is the probability that $ab + c$ is even?

4. If three, standard, 6-faced dice are rolled, what is the probability that the sum of the face up integers is 16?

5. A bag contains 10 red marbles and 6 blue marbles. Three marbles are selected at random and without replacement. What is the probability that one marble is red and two are blue? Express your answer as a common fraction.

6. John rolls a pair of standard 6-sided dice. What is the probability that the two numbers he rolls are relatively prime? Express your answer as a common fraction.

7. A rectangle has a perimeter of 64 inches and each side has an integer length. How many non-congruent rectangles meet these criteria?

8. a is chosen from the set $\{1, 2, 3, 4\}$, and b is chosen from the set $\{5, 6, 7, 8, 9\}$. What is the probability that the product ab is a prime number?

9. A bag has 4 red and 6 blue marbles. A marble is selected and not replaced, then a second is selected. What is the probability that both are the same color?

10. When Trilisa takes pictures, they turn out with probability $\frac{1}{5}$. She wants to take enough pictures so that the probability of at least one turning out is at least $\frac{3}{4}$. How few pictures can she take to accomplish this?