Pigeon-hole's Principle	
[Note: Select always minimum number]	
Q152.	Minimum how many students must be there in a class to ensure that at least 5 were born on the same day of the week? _____ Answer: 29 Solution: Required number of ways = $4 \times 7 + 1 = 29$
Q153.	Minimum how many students must be in a class to ensure that at least 3 students with the same birthday (Date of birth) in the year 2016? _____ Answer: 733 Solution: Required number of ways = $2 \times 366 + 1 = 733$
Q154.	What is the minimum number of people that must be chosen to ensure that at least three have the same birth month and were born on the same day of the week? _____ Answer: 169 Solution: Required number of ways = $2 \times 12 \times 7 + 1 = 169$
Q155.	Minimum how many distinct integers (say n) can be selected from the set S = {1, 2, 3, 4, 5 ... 9}, so that the sum of two of the n integers is even? _____ Answer: 3 Solution: odd-set = {1, 3, 5, 7, 9} and even-set = {2, 4, 6, 8} We know that odd + even = odd. So, if we select one odd and one even then sum is odd. But if we add one more element from any set then definitely, we have two number in that set such that their sum is even. So, required number of ways = 2 + 1 = 3.
Q156.	Minimum how many distinct integers (say n) can be selected from the set S = {1, 2, 3, 4, 5 ... 9}, so that the difference of two distinct integers (out of selected n integers) is 5? _____ Answer: 6 Solution: In worst case if we select {1, 2, 3, 4, 5} then maximum difference is 4. Now if we add 6 then difference of 1 and 6 is 5,

Q157.	Let A = {1, 2, 3 ... 10}. Minimum how many ordered pairs from A × A we need to select to ensure that we can always find two of the chosen pairs that gives the same sum when the numbers within the pair are added together. _____ Answer: 20 Solution: There are 19 different possible sums: {2, 3, 4 ... 20} Minimum sum for pair (1, 1) = 1 + 1 = 2 Maximum sum for pair (10, 10) = 10 + 10 = 20 So, required number of ways = 19 + 1 = 20.
Q158.	Minimum how many students have to be in the same class to ensure that 13 students in that class have the same initial letter in their name? _____ Answer: 313 Solution: Required number of ways = $12 \times 26 + 1 = 313$
Q159.	Suppose that we have a deck of 52 cards. Minimum how many cards must be picked to ensure that at least one of them is red? _____ Answer: 27 Solution: Required number of ways = $26 \times 1 + 1 = 27$
Q160.	Suppose that we have a deck of 52 cards. Minimum how many cards must be picked ensure that at least one of them is an ace? _____ Answer: 49 Solution: Required number of ways = $12 \times 4 + 1 = 49$