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MATH240 Introduction to Probability and Statistics for Engineers
Project 1
People's Satisfaction from Work

In this project, what has been focused is the percentage of people's satisfaction from work in year 2020. The answers women and men gave to the question "How satisfied are you from your work?" is separated into five answers which are "very satisfied", "satisfied", "neither satisfied nor unsatisfied", "not satisfied" and "not satisfied at all".

To make following the data easier, the percentages can be collected into one simple table:

		2020 (%)
Total	**Very satisfied**	11,9
	Satisfied	62,9
	Neither satisfied, nor unsatisfied	15,8
	Not satisfied	7,4
	Not satisfied at all	1,9
Male	**Very satisfied**	11,4
	Satisfied	62,3
	Neither satisfied, nor unsatisfied	16,2
	Not satisfied	8,1
	Not satisfied at all	2,1
Female	**Very satisfied**	13,1
	Satisfied	64,5
	Neither satisfied, nor unsatisfied	15,1
	Not satisfied	5,7
	Not satisfied at all	1,6

(Figures in table may not add up to totals due to rounding.)
(Source: http://www.tuik.gov.tr/)

When it comes to our results, let us assume that 10 people will be selected randomly and asked the question "How satisfied are you from your work?". Suppose that what we are looking for is the probability that no one selected gave the answer "neither satisfied, nor unsatisfied" out of these 10 people which makes our n = 10 and x = number of people that give the answer "neither satisfied, nor unsatisfied" = 0. According to the table above, we know that the probability of selected people giving

the answer "neither satisfied, nor unsatisfied" is given as 15,8% and that makes our p = 0.158 and q = (1 − p) = (1 − 0.158) = 0.842. Using these parameters, we can calculate the binomial distribution to find the answer of probability of this occurrence:

$$P(X = 0) = b\ (x;\ n, p) = \binom{n}{x}\ (p^x)\ (q^{(n\text{-}x)}) = \binom{10}{0}\ (0.158^0)\ (0.842^{10}) \cong 0.179$$

Now, let us assume that 10 people will be selected randomly and asked the same question. Say that it is known 4 out of these 10 people gave the answer "neither satisfied nor unsatisfied", which makes our n = 10 and x = 4. Again, according to the table, the percentage of people who gave the answer "neither satisfied nor unsatisfied" is 15,8% and that makes our probability p = 0.158 and q = (1 − p) = (1 − 0.158) = 0.842. Using these parameters, we can calculate the binomial distribution to find the answer of probability of this occurrence:

$$P(X = 4) = b\ (x;\ n, p) = \binom{n}{x}\ (p^x)\ (q^{(n\text{-}x)}) = \binom{10}{4}\ (0.158^4)\ (0.842^6) \cong 0.04664$$

In conclusion, we can find probabilities that is asked about the table above with using relevant parameters (n, x, p, q) and binomial distribution. The factors that may affect our calculations are the differences in parameter values which might be the change of the number of people who is asked the question "How satisfied are you from your work?" (will affect n), the change of the number that is known what they selected as an answer (will affect x) or the change of percentages on the table above (will affect p and q).