**In reference to Section 2.6,**

A company is selecting 2 graduates for jobs from a pool of 5 Computer Engineering graduates. The percentage of women in the pool is 20%. The selected graduates are chosen at random. Let Y denote the number of women in the selection. Find the probability distribution of Y.

P(Y=0)=3/10

P(Y=1)=6/10

P(Y=2)=1/10

**REFERENCE:** [Economic Guide to College Majors (data from 538) | Kaggle](https://www.kaggle.com/datasets/williecosta/economic-guide-to-college-majors)

**In reference to Section 2.7,**

For a certain population of students who drink alcohol, the percentage with parents who were apart or together, listed according to sex, were shown in the accompanying table. Of all the students who drink alcohol, 4.5% were in the male-apart category, 42.7% were in the male-together category, and so forth. Let A be the event that a student’s parents are apart and let M be the event that a male is selected.

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome | Male (M) | Female (F) | Total |
| Apart (A) | 18 | 23 | 41 |
| Together (A’) | 169 | 185 | 354 |
| Total | 187 | 208 | 395 |

1. Are the events A and M independent?

P(A)=.045

P(A|M)=P(A)\*P(M)/P(M) = P(A) 🡪 P(A|M)=(.045\*.473)/.473 = .045  
P(A)=P(A|M)  
A and M are independent.

1. Are the events A’ and F independent.

P(A’)=.468

P(A’|F)=P(A’)\*P(F)/P(F)=P(A) 🡪 P(A’|F)=(.468\*.524)/.524=.468

P(A’)=P(A’|F)

A’ and F are independent.

**REFERENCE:** [Student Alcohol Consumption | Kaggle](https://www.kaggle.com/datasets/uciml/student-alcohol-consumption)

**In reference to Section 2.8,**

According to various datasets, the Titanic had a total of 1309 passengers (not including crew), with 500 surviving passengers (not including crew). Let A represent the probability of being a woman, P(A)=.356. Let B represent the probability of survival, P(B)=.382.

1. Find P(A ∪ B).

P(A ∪ B) = P(A) + P(B) – P(A∩B)

P(A∩B)=P(A)P(B|A) 🡪 P(A∩B)=(.356)(.356\*.382/.356)=.135

P(A ∪ B) = .356+.382-.135=.603

1. Find P(A’ ∪ B’)

P(A’ ∪ B’) = 1 - .603 = .397

**REFERENCE:** [The Complete Titanic Dataset | Kaggle](https://www.kaggle.com/datasets/vinicius150987/titanic3)

**In reference to Section 3.5,**

In a large selection of Nuclear Engineering graduates from 2010-2012, 17.72% are unemployed. What is the probability of selecting an unemployed graduate

1. On or before the 20th person selected? 
2. On the 5th person selected?



1. After the 15th person selected?



**REFERENCE:** [Economic Guide to College Majors (data from 538) | Kaggle](https://www.kaggle.com/datasets/williecosta/economic-guide-to-college-majors)

**In reference to Section 3.7,**

In a survey of 100 Physical Science graduates, 38% are females. 20 of the graduates are selected randomly without replacement. What is the probability of exactly 5 females being selected?



**REFERENCE:** [Economic Guide to College Majors (data from 538) | Kaggle](https://www.kaggle.com/datasets/williecosta/economic-guide-to-college-majors)

**In reference to Section 3.8,**

In 1959, the average of total female births in California per day was 41.98. What is the probability of 5 births in one hour?



**REFERENCE:** [Daily total female births in California, 1959 | Kaggle](https://www.kaggle.com/datasets/dougcresswell/daily-total-female-births-in-california-1959)