

IT2120- Probability and Statistics

Lab Sheet 07

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Exercise

1. A train arrives at a station uniformly between 8:00 a.m. and 8:40 a.m. Let the random variable X represent the number of minutes the train arrives after 8:00 a.m. What is the probability that the train arrives between 8:10 a.m. and 8:25 a.m.?

```
> setwd("C:\\Users\\sesal\\OneDrive\\Desktop\\IT24102543_07")
> setwd("C:\\Users\\sesal\\OneDrive\\Desktop\\IT24102543_07")
> getwd()
[1] "C:/Users/sesal/OneDrive/Desktop/IT24102543_07"
> #Q1
> #X with a=0 and b=40.
> punif(25, min=0, max=40, lower.tail = TRUE) - punif(10, min=0, max=40, lower.tail = TRUE)
[1] 0.375
```

2. The time (in hours) to complete a software update is exponentially distributed with rate $\lambda = 1/3$. Find the probability that an update will take at most 2 hours.

```
> #Q2
> #X with lambda=0.33
> pexp(2, rate=0.33, lower.tail = TRUE)
[1] 0.4831487
```

3. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.
- What is the probability that a randomly selected person has an IQ above 130?
 - What IQ score represents the 95th percentile?

```
> #Q3
> #X has mean=100 and standard deviation=15
> #(i)
> 1 - pnorm(130, mean = 100, sd = 15, lower.tail = TRUE)
[1] 0.02275013
> #(ii)
> qnorm(0.95, mean = 100, sd = 15, lower.tail = TRUE)
[1] 124.6728
> |
```
