

Probability and Statistics - IT2120

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Lab Sheet 07

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.?

```
#Lab Sheet 07 Exercise  
#1. Train Arrival  
  
punif(25, min=0, max=40) - punif(10, min=0, max=40)
```

```
> punif(25, min=0, max=40) - punif(10, min=0, max=40)  
[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.

- Approximately 0.4866

```
#2. Software Update Time  
pexp(2, rate=1/3)
```

```
> pexp(2, rate=1/3)  
[1] 0.4865829  
> |
```

3. IQ Scores

I. Probability of IQ above 130: $P(X > 130)$

```
#3. IQ Scores
#i. Probability of IQ above 130:  $P(X > 130)$ 
1 - pnorm(130, mean=100, sd=15)

> #3. IQ Scores
> #i. Probability of IQ above 130:  $P(X > 130)$ 
> 1 - pnorm(130, mean=100, sd=15)
[1] 0.02275013
```

II. IQ score at the 95th percentile

```
#ii. IQ score at the 95th percentile
qnorm(0.95, mean=100, sd=15)

> #ii. IQ score at the 95th percentile
> qnorm(0.95, mean=100, sd=15)
[1] 124.6728
```