IT2120 - Probability and Statistics

Lab Sheet 07

IT24101821

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Exercise

1)

```
#Exercise
# Q1 - Train arrival (Uniform Distribution)
# Random variable: X = minutes after 8:00 a.m. (Uniform(0, 40))
# We want P(10 <= X <= 25)
punif(25, min = 0, max = 40) - punif(10, min = 0, max = 40)

```

```
> #Exercise
> # Q1 - Train arrival (Uniform Distribution)
> # Random variable: X = minutes after 8:00 a.m. (Uniform(0, 40))
> # We want P(10 <= X <= 25)
> punif(25, min = 0, max = 40) - punif(10, min = 0, max = 40)
[1] 0.375
```

2)

```
# Q2 - Software update time (Exponential Distribution)
# Random variable: X = time to complete update (hours)
# X ~ Exponential(rate = λ = 1/3)
# We want P(X <= 2)

pexp(2, rate = 1/3)

```

```
> # Q2 - Software update time (Exponential Distribution)
> # Random variable: X = time to complete update (hours)
> # X ~ Exponential(rate = λ = 1/3)
> # We want P(X <= 2)
>
> pexp(2, rate = 1/3)
[1] 0.4865829
```

3)

```
86
87  # Q3 - IQ scores (Normal Distribution)
88  # Random variable: X = IQ score
89  # X ~ Normal(mean = 100, sd = 15)
90  # (i) Probability IQ > 130
91  1 - pnorm(130, mean = 100, sd = 15)
92
93  # (ii) 95th percentile IQ score
94  qnorm(0.95, mean = 100, sd = 15)
```

```
> # Q3 - IQ scores (Normal Distribution)
> # Random variable: X = IQ score
> # X ~ Normal(mean = 100, sd = 15)
> # (i) Probability IQ > 130
> 1 - pnorm(130, mean = 100, sd = 15)
[1] 0.02275013
>
> # (ii) 95th percentile IQ score
> qnorm(0.95, mean = 100, sd = 15)
[1] 124.6728
```