Dolamulla H.D.K.P.D

IT24103522

Probability and Statistics

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.?

```
1  setwd("C:/Users/ROG/Desktop/IT24103522")
32  # Q1
33  prob_train <- (25 - 10) / (40 - 0)
34  prob_train
> # Q1
> prob_train <- (25 - 10) / (40 - 0)
> prob_train
[1] 0.375
```

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

```
37  # Q2
38  prob_update <- pexp(2, rate = 1/3)
39  round(prob_update, 4)
> # Q2
> prob_update <- pexp(2, rate = 1/3)
> round(prob_update, 4)
[1] 0.4866
```

3. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.

   i. What is the probability that a randomly selected person has an IQ above 130?
   ii. What IQ score represents the 95th percentile?

```
42  # Q3(i)
43  prob_above_130 <- 1 - pnorm(130, mean = 100, sd = 15)
44  round(prob_above_130, 4)
45
46
47  # Q3(ii)
48  iq_95th <- qnorm(0.95, mean = 100, sd = 15)
49  round(iq_95th, 2)
```

```
> # Q3(i)
> prob_above_130 <- 1 - pnorm(130, mean = 100, sd = 15)
> round(prob_above_130, 4)
[1] 0.0228
>
>
> # Q3(ii)
> iq_95th <- qnorm(0.95, mean = 100, sd = 15)
> round(iq_95th, 2)
[1] 124.67
```

Values	
iq_95th	124.672804404272
prob_above_130	0.0227501319481792
prob_at_least_47	0.0460465788923019
prob_exactly_15	0.0723911201466387
prob_train	0.375
prob_update	0.486582880967408