

Faculty of Computing

Year 2 Semester 1 (2025)

IT2120 - Probability and Statistics

Lab Sheet 07

IT24101825

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LAB-07

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> ##A bus arrives at a bus stop uniformly between 7:00 a.m. and 7:30 a.m. #
> #Let the random variable X represent the number of minutes waiting for the bus between 7:00 a.m. and 7:30 a.m. #
> #What is the probability that the bus arrives within the first 10 minutes after 7:00 a.m. #
>
> punif(10,min = 0,max = 30,lower.tail = TRUE)
[1] 0.3333333
>
> #What is the probability that the bus arrives after 7:20 a.m. ?#
>
> #p(X>20) = 1 - p(X<=20)#
>
> 1-punif(20,min = 0,max = 30,lower.tail = TRUE)
[1] 0.3333333
>
> #or#
>
> punif(20,min = 0,max = 30, lower.tail = FALSE)
[1] 0.3333333
>

> #The time (in hours) required to repair a machine is an exponentially distributed
> #random variable with parameter  $\lambda = 0.5$ #
>
> #Find the probability that a repair time takes at most 3 hours.#
>
> pexp(3, rate = 0.5,lower.tail = TRUE)
[1] 0.7768698
>
> #Find the probability that a repair time exceeds 4 hours#
>
> 1-pexp(4,rate = 0.5,lower.tail= TRUE )
[1] 0.1353353
>
> #or#
>
> pexp(4,rate=0.5,lower.tail = FALSE)
[1] 0.1353353
>
```

```
> #Find the probability that a repair time takes between 2 to 4 hours#
> pexp(4,rate =0.5,lower.tail=TRUE)-pexp(2,rate=0.5,lower.tail = TRUE)
[1] 0.2325442
> pnorm(37.9,mean =36.8, sd=0.4, lower.tail = TRUE)
[1] 0.9970202
> pnorm(36.9,mean =36.8, sd=0.4, lower.tail = TRUE)-pnorm(36.4,mean = 36.8, sd=0.4,lower.tail = TRUE)
[1] 0.4400511
> qnorm(0.012,mean =36.8, sd=0.4, lower.tai = TRUE)
[1] 35.89715
> qnorm(0.01,mean = 36.8, sd=0.4, lower.tail = FALSE)
[1] 37.73054
> 1 - punif(10, min=0, max=40, lower.tail=TRUE) - punif(25, min=0, max=40, lower.tail=FALSE)
[1] 0.375
> pexp(2, rate=0.3333333, lower.tail=TRUE)
[1] 0.4865828
> pnorm(130, mean=100, sd=15, lower.tail=FALSE)
[1] 0.02275013
> qnorm(0.95, mean=100, sd=15, lower.tail=TRUE)
[1] 124.6728
```