

Probability and Statistics (UCS410)
Experiment 5
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Batch - 3COE7
(Continuous Probability Distributions)

1. Consider that X is the time (in minutes) that a person has to wait in order to take a flight. If each flight takes off each hour $X \sim U(0, 60)$. Find the probability that
- (a) waiting time is more than 45 minutes, and
 - (b) waiting time lies between 20 and 30 minutes.



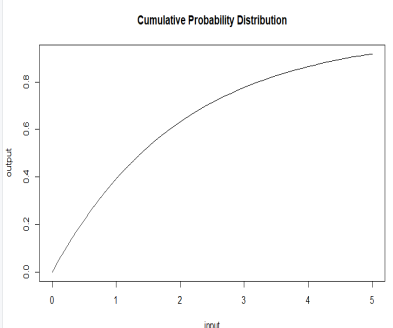
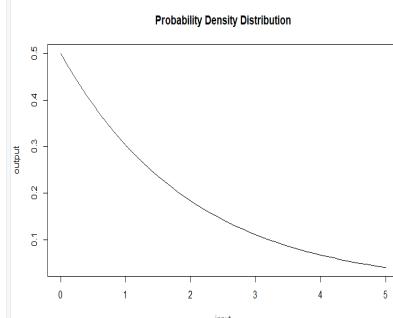
```
1 #q1-a
2 punif(45,0,60,lower.tail=FALSE)
3 #q2-b
4 diff(punif(c(20,30),0,60,lower.tail=TRUE))
```

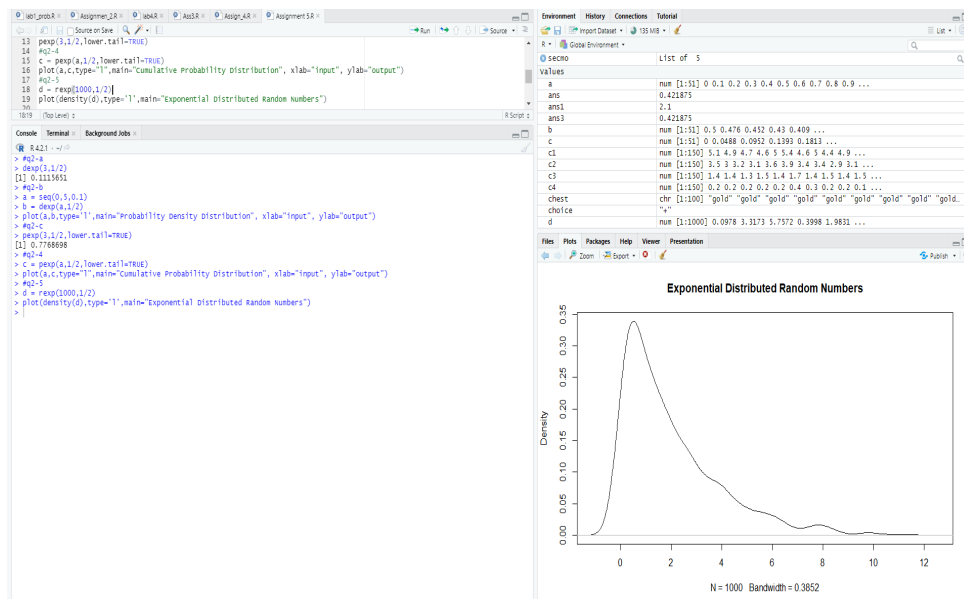
3:6 (Top Level) R Script

Console Terminal Background Jobs

```
R 4.2.1 ~ /
> #q1-a
> punif(45,0,60,lower.tail=FALSE)
[1] 0.25
> #q2-b
> diff(punif(c(20,30),0,60,lower.tail=TRUE))
[1] 0.1666667
>
```

2. The time (in hours) required to repair a machine is an exponential distributed random variable with parameter $\lambda = 1/2$.
- (a) Find the value of density function at $x = 3$.
 - (b) Plot the graph of exponential probability distribution for $0 \leq x \leq 5$.
 - (c) Find the probability that a repair time takes at most 3 hours.
 - (d) Plot the graph of cumulative exponential probabilities for $0 \leq x \leq 5$.
 - (e) Simulate 1000 exponential distributed random numbers with $\lambda = 1/2$ and plot the simulated data.





3. The lifetime of certain equipment is described by a random variable X that follows Gamma distribution with parameters $\alpha = 2$ and $\beta = 1/3$.
- Find the probability that the lifetime of equipment is at least 1 unit of time.
 - What is the value of c , if $P(X \leq c) \geq 0.70$? (**Hint:** try quantile function `qgamma()`)

