

Exercise

1

i.

```
Untitled.R
1 setwd("/Users/dumeesha/Desktop/IT24100338")
2
3 cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
4 cat("  X ~ Binomial(n = 50, p = 0.85)\n\n")

R Console
~/Desktop/IT24100338
> setwd("/Users/dumeesha/Desktop/IT24100338")
>
> cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
Distribution of X: Binomial distribution with n = 50 and p = 0.85
> cat("  X ~ Binomial(n = 50, p = 0.85)\n\n")
  X ~ Binomial(n = 50, p = 0.85)
```

ii.

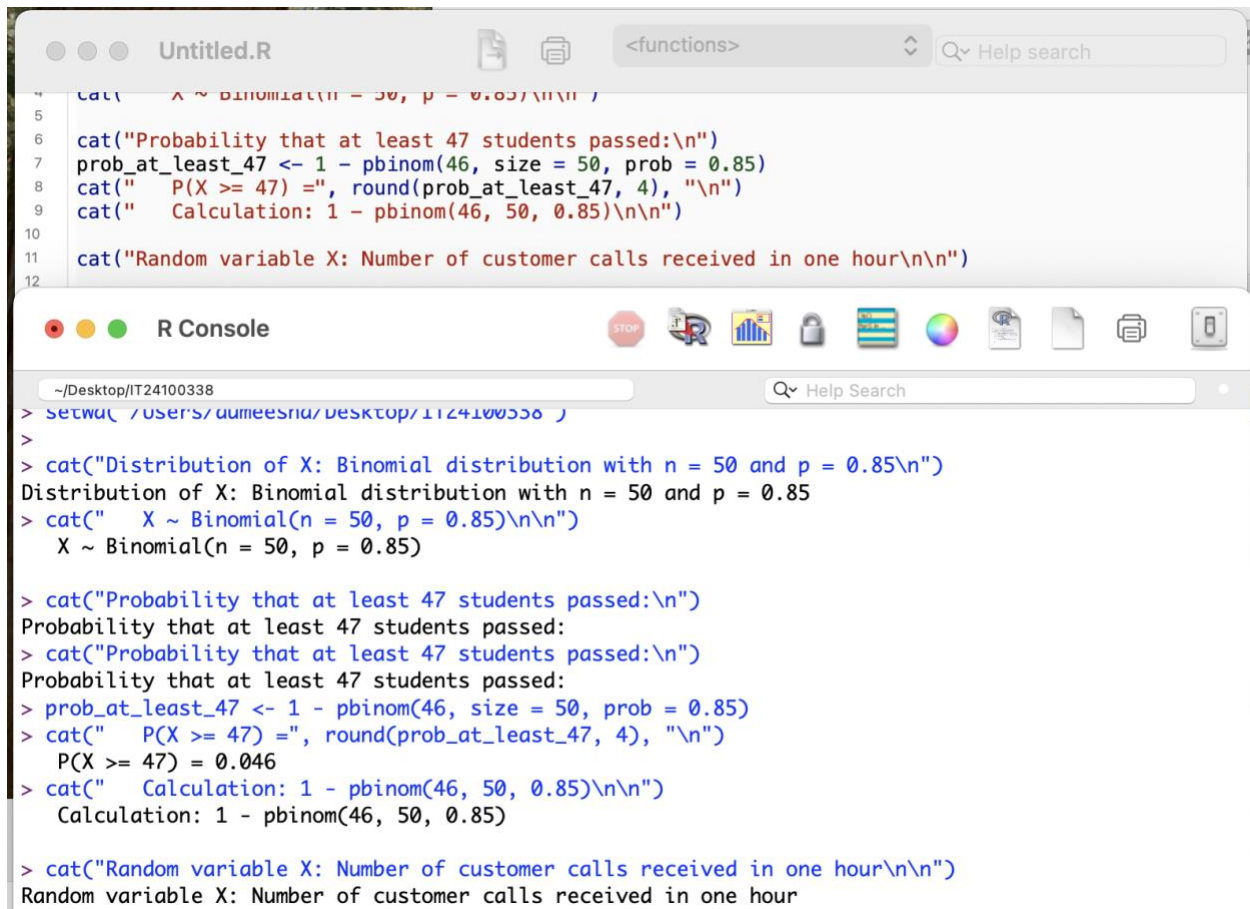
```
Untitled.R
4 cat("  X ~ Binomial(n = 50, p = 0.85)\n\n")
5
6 cat("Probability that at least 47 students passed:\n")
7 prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
8 cat("  P(X >= 47) =", round(prob_at_least_47, 4), "\n")
9 cat("  Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
10

R Console
~/Desktop/IT24100338
> setwd(/Users/dumeesha/Desktop/IT24100338)
Error: unexpected '/' in "setwd(/"
> setwd("/Users/dumeesha/Desktop/IT24100338")
>
> cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
Distribution of X: Binomial distribution with n = 50 and p = 0.85
> cat("  X ~ Binomial(n = 50, p = 0.85)\n\n")
  X ~ Binomial(n = 50, p = 0.85)

> cat("Probability that at least 47 students passed:\n")
Probability that at least 47 students passed:
> cat("Probability that at least 47 students passed:\n")
Probability that at least 47 students passed:
> prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
> cat("  P(X >= 47) =", round(prob_at_least_47, 4), "\n")
  P(X >= 47) = 0.046
> cat("  Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
  Calculation: 1 - pbinom(46, 50, 0.85)
```

2

I.



The image shows a screenshot of an R script editor window titled "Untitled.R" and an R Console window. The script in the editor defines a binomial distribution with $n = 50$ and $p = 0.85$, calculates the probability that at least 47 students passed, and prints the results. The console shows the execution of these commands, including the assignment of the probability to a variable and the final output.

```
4 cat("X ~ Binomial(n = 50, p = 0.85)\n\n")
5
6 cat("Probability that at least 47 students passed:\n")
7 prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
8 cat("  P(X >= 47) =", round(prob_at_least_47, 4), "\n")
9 cat("  Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
10
11 cat("Random variable X: Number of customer calls received in one hour\n\n")
12
```

```
> setwd("~/Desktop/IT24100338")
>
> cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
Distribution of X: Binomial distribution with n = 50 and p = 0.85
> cat("  X ~ Binomial(n = 50, p = 0.85)\n\n")
  X ~ Binomial(n = 50, p = 0.85)

> cat("Probability that at least 47 students passed:\n")
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Probability that at least 47 students passed:
> prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
> cat("  P(X >= 47) =", round(prob_at_least_47, 4), "\n")
  P(X >= 47) = 0.046
> cat("  Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
  Calculation: 1 - pbinom(46, 50, 0.85)

> cat("Random variable X: Number of customer calls received in one hour\n\n")
Random variable X: Number of customer calls received in one hour
```

II.

```
Untitled.R
4 cat("X ~ Binomial(n = 50, p = 0.85)\n\n")
5
6 cat("Probability that at least 47 students passed:\n")
7 prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
8 cat("P(X >= 47) =", round(prob_at_least_47, 4), "\n")
9 cat("Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
10
11 cat("Random variable X: Number of customer calls received in one hour\n\n")
12
13 cat("Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour\n")
14 cat("X ~ Poisson( $\lambda = 12$ )\n\n")

R Console
~/Desktop/IT24100338
> setwd("~/Users/aumeesha/Desktop/1124100338")
>
> cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
Distribution of X: Binomial distribution with n = 50 and p = 0.85
> cat("X ~ Binomial(n = 50, p = 0.85)\n\n")
X ~ Binomial(n = 50, p = 0.85)

> cat("Probability that at least 47 students passed:\n")
Probability that at least 47 students passed:
> cat("Probability that at least 47 students passed:\n")
Probability that at least 47 students passed:
> prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
> cat("P(X >= 47) =", round(prob_at_least_47, 4), "\n")
P(X >= 47) = 0.046
> cat("Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
Calculation: 1 - pbinom(46, 50, 0.85)

> cat("Random variable X: Number of customer calls received in one hour\n\n")
Random variable X: Number of customer calls received in one hour

> cat("Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour\n")
Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour
> cat("X ~ Poisson( $\lambda = 12$ )\n\n")
X ~ Poisson( $\lambda = 12$ )
```

III.

```
Untitled.R
cat("Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
cat("Random variable X: Number of customer calls received in one hour\n\n")
cat("Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour\n")
cat("X ~ Poisson( $\lambda = 12$ )\n\n")
cat("Probability that exactly 15 calls are received:\n")
prob_exactly_15 <- dpois(15, lambda = 12)
cat("P(X = 15) =", round(prob_exactly_15, 4), "\n")
cat("Calculation: dpois(15, 12)\n\n")

R Console
~/Desktop/IT24100338
> setwd("/Users/dumeesna/Desktop/1124100338")
>
> cat("Distribution of X: Binomial distribution with n = 50 and p = 0.85\n")
Distribution of X: Binomial distribution with n = 50 and p = 0.85
> cat("X ~ Binomial(n = 50, p = 0.85)\n\n")
X ~ Binomial(n = 50, p = 0.85)
> cat("Probability that at least 47 students passed:\n")
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> cat("Probability that at least 47 students passed:\n")
Probability that at least 47 students passed:
> prob_at_least_47 <- 1 - pbinom(46, size = 50, prob = 0.85)
> cat("P(X >= 47) =", round(prob_at_least_47, 4), "\n")
P(X >= 47) = 0.046
> cat("Calculation: 1 - pbinom(46, 50, 0.85)\n\n")
Calculation: 1 - pbinom(46, 50, 0.85)
> cat("Random variable X: Number of customer calls received in one hour\n\n")
Random variable X: Number of customer calls received in one hour
> cat("Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour\n")
Distribution of X: Poisson distribution with  $\lambda = 12$  calls per hour
> cat("X ~ Poisson( $\lambda = 12$ )\n\n")
X ~ Poisson( $\lambda = 12$ )
> cat("Probability that exactly 15 calls are received:\n")
Probability that exactly 15 calls are received:
> prob_exactly_15 <- dpois(15, lambda = 12)
> cat("P(X = 15) =", round(prob_exactly_15, 4), "\n")
P(X = 15) = 0.0724
> cat("Calculation: dpois(15, 12)\n\n")
Calculation: dpois(15, 12)
```