

# Module 4 Assignment 3 Answer Key

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1.

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.2
## v ggplot2   4.0.0     v tibble    3.3.0
## v lubridate 1.9.4     v tidyr    1.3.1
## v purrr    1.1.0
## -- Conflicts -----
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()   masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
## Loading required package: MASS
##
##
## Attaching package: 'MASS'
##
##
## The following object is masked from 'package:dplyr':
##
##      select
##
##
## 'drc' has been loaded.
##
##
## Please cite R and 'drc' if used for a publication,
##
## for references type 'citation()' and 'citation('drc')'.
##
##
## Attaching package: 'drc'
##
##
## The following objects are masked from 'package:stats':
##
##      gaussian, getInitial

2.

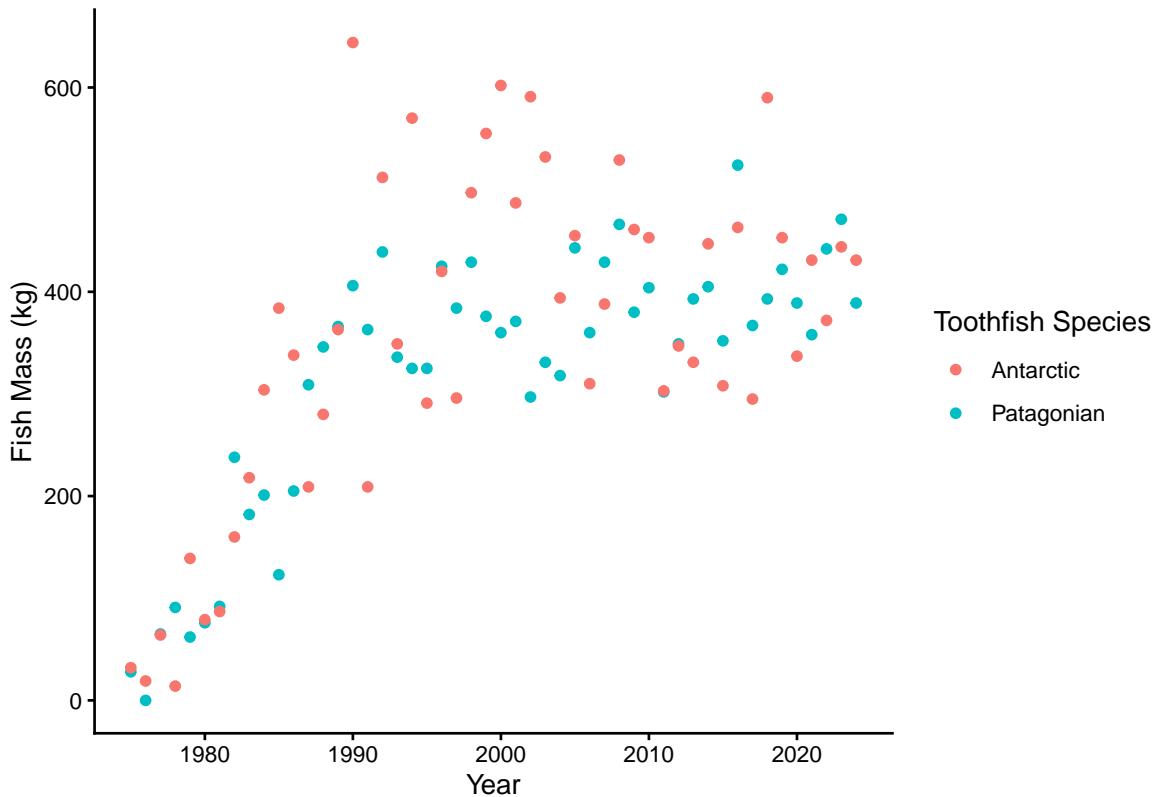
## Rows: 100 Columns: 3
## -- Column specification -----
```

```

## Delimiter: ","
## chr (1): species
## dbl (2): fish_kg, date
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.

## # A tibble: 100 x 3
##   species    fish_kg   date
##   <chr>      <dbl>     <dbl>
## 1 Patagonian    28  1975
## 2 Patagonian     0  1976
## 3 Patagonian    65  1977
## 4 Patagonian    91  1978
## 5 Patagonian    62  1979
## 6 Patagonian    76  1980
## 7 Patagonian    92  1981
## 8 Patagonian   238  1982
## 9 Patagonian   182  1983
## 10 Patagonian   201  1984
## # i 90 more rows

```



4.

5.

```

## # A tibble: 50 x 3
##   species    fish_kg   date
##   <chr>      <dbl>     <dbl>
## 1 Patagonian    28  1975
## 2 Patagonian     0  1976

```

```

## 3 Patagonian      65 1977
## 4 Patagonian      91 1978
## 5 Patagonian      62 1979
## 6 Patagonian      76 1980
## 7 Patagonian      92 1981
## 8 Patagonian     238 1982
## 9 Patagonian     182 1983
## 10 Patagonian    201 1984
## # i 40 more rows

## # A tibble: 50 x 3
##   species   fish_kg   date
##   <chr>     <dbl>   <dbl>
## 1 Antarctic     32  1975
## 2 Antarctic     19  1976
## 3 Antarctic     64  1977
## 4 Antarctic     14  1978
## 5 Antarctic    139  1979
## 6 Antarctic     79  1980
## 7 Antarctic     87  1981
## 8 Antarctic    160  1982
## 9 Antarctic    218  1983
## 10 Antarctic   304  1984
## # i 40 more rows

7.

##
## A 'drc' model.
##
## Call:
## drm(formula = fish_kg ~ date, data = pat, fct = LL.4())
##
## Coefficients:
## b:(Intercept)  c:(Intercept)  d:(Intercept)  e:(Intercept)
## -628.9632      -0.6173       391.1327      1983.6795

8.

##
## A 'drc' model.
##
## Call:
## drm(formula = fish_kg ~ date, data = ant, fct = LL.4())
##
## Coefficients:
## b:(Intercept)  c:(Intercept)  d:(Intercept)  e:(Intercept)
## -719.317       -1.875        430.739       1983.039

10.

## # A tibble: 50 x 4
##   species   fish_kg   date predicted_values
##   <chr>     <dbl>   <dbl>           <dbl>
## 1 Patagonian     28  1975          22.7
## 2 Patagonian      0  1976          30.8
## 3 Patagonian     65  1977          41.3

```

```

## 4 Patagonian      91 1978      54.8
## 5 Patagonian      62 1979      71.7
## 6 Patagonian      76 1980      92.3
## 7 Patagonian      92 1981     117.
## 8 Patagonian     238 1982     144.
## 9 Patagonian     182 1983     174.
## 10 Patagonian    201 1984     205.
## # i 40 more rows

## # A tibble: 50 x 4
##   species   fish_kg   date predicted_values
##   <chr>     <dbl> <dbl>             <dbl>
## 1 Antarctic     32   1975            20.2
## 2 Antarctic     19   1976            29.2
## 3 Antarctic     64   1977            41.5
## 4 Antarctic     14   1978            57.9
## 5 Antarctic    139   1979            79.2
## 6 Antarctic     79   1980           106.
## 7 Antarctic     87   1981           138.
## 8 Antarctic    160   1982           174.
## 9 Antarctic    218   1983           213.
## 10 Antarctic   304   1984           252.
## # i 40 more rows

```

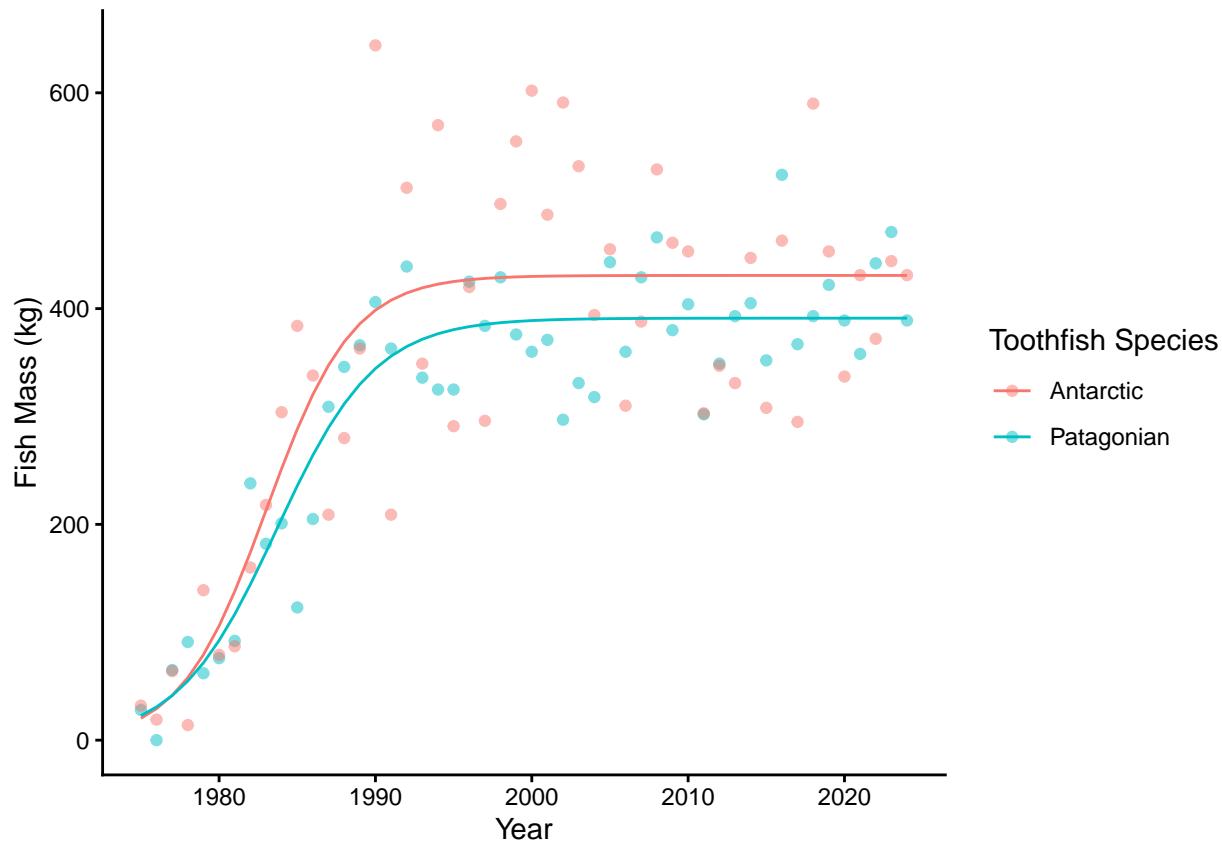
11.

```

## # A tibble: 100 x 4
##   species   fish_kg   date predicted_values
##   <chr>     <dbl> <dbl>             <dbl>
## 1 Patagonian     28   1975            22.7
## 2 Patagonian      0   1976            30.8
## 3 Patagonian     65   1977            41.3
## 4 Patagonian     91   1978            54.8
## 5 Patagonian     62   1979            71.7
## 6 Patagonian     76   1980            92.3
## 7 Patagonian     92   1981           117.
## 8 Patagonian    238   1982           144.
## 9 Patagonian    182   1983           174.
## 10 Patagonian   201   1984           205.
## # i 90 more rows

```

12.



13.

```
## # A tibble: 60 x 4
##   species   fish_kg   date predicted_values
##   <chr>     <dbl>   <dbl>             <dbl>
## 1 Patagonian 325    1995            381.
## 2 Patagonian 425    1996            383.
## 3 Patagonian 384    1997            385.
## 4 Patagonian 429    1998            387.
## 5 Patagonian 376    1999            388.
## 6 Patagonian 360    2000            389.
## 7 Patagonian 371    2001            389.
## 8 Patagonian 297    2002            390.
## 9 Patagonian 331    2003            390.
## 10 Patagonian 318   2004            390.
## # i 50 more rows
```

14.

```
## # A tibble: 2 x 3
##   species   avg_fish_kg stdev_fish_kg
##   <chr>     <dbl>         <dbl>
## 1 Antarctic  427.        94.9
## 2 Patagonian 388.        51.8
```

16.

```
##
## Welch Two Sample t-test
```

```
##  
## data: fish_kg by species  
## t = 1.9562, df = 44.877, p-value = 0.05669  
## alternative hypothesis: true difference in means between group Antarctic and group Patagonian is not  
## 95 percent confidence interval:  
## -1.147373 78.414040  
## sample estimates:  
## mean in group Antarctic mean in group Patagonian  
## 427.1000 388.4667
```