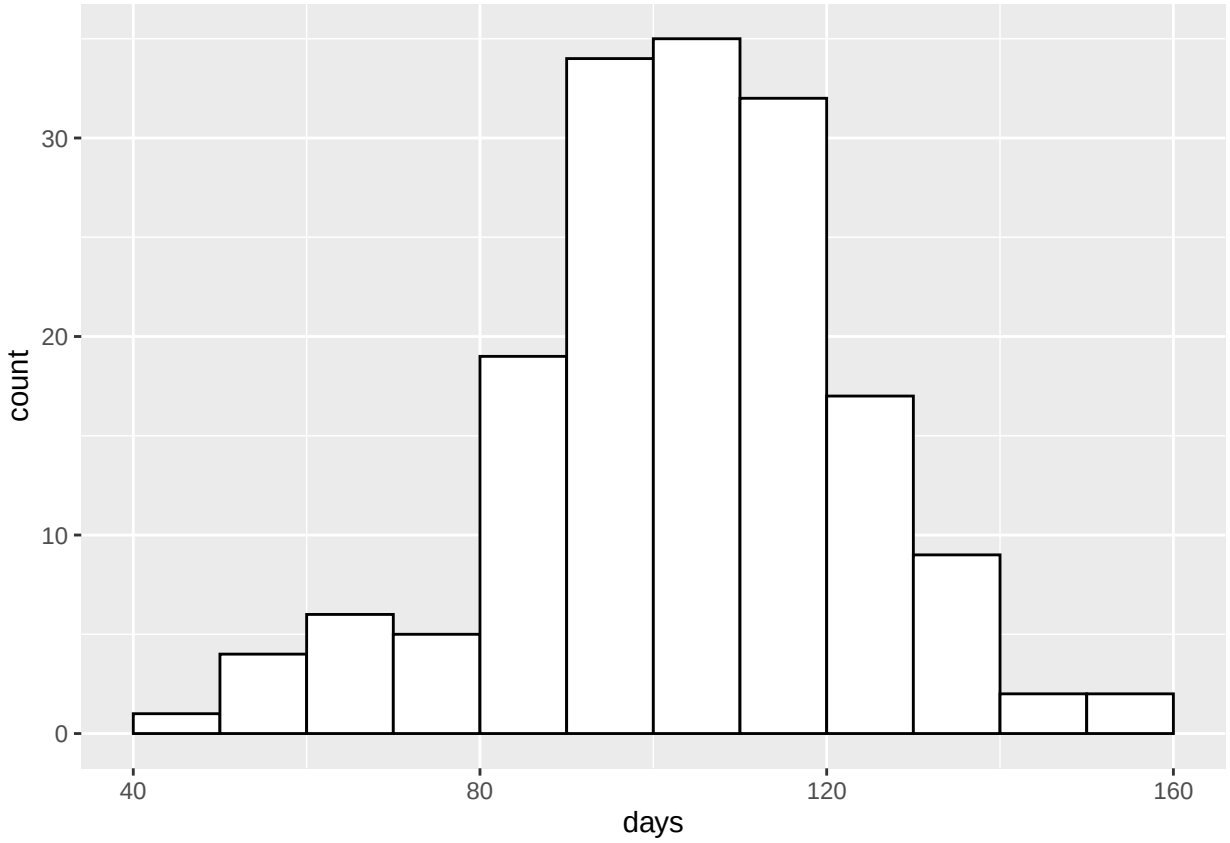
Assignment 2

Problems

1

The following code makes a histogram of the `days` variable in the Lake Monona data set.

```
ggplot(monona, aes(x=days)) +
  geom_histogram(boundary=0,binwidth=10,color="black",fill="white")
```



What is the approximate length in days during a typical winter over the past 170 years or so that Lake Monona has been at least 50% covered with ice?

Response

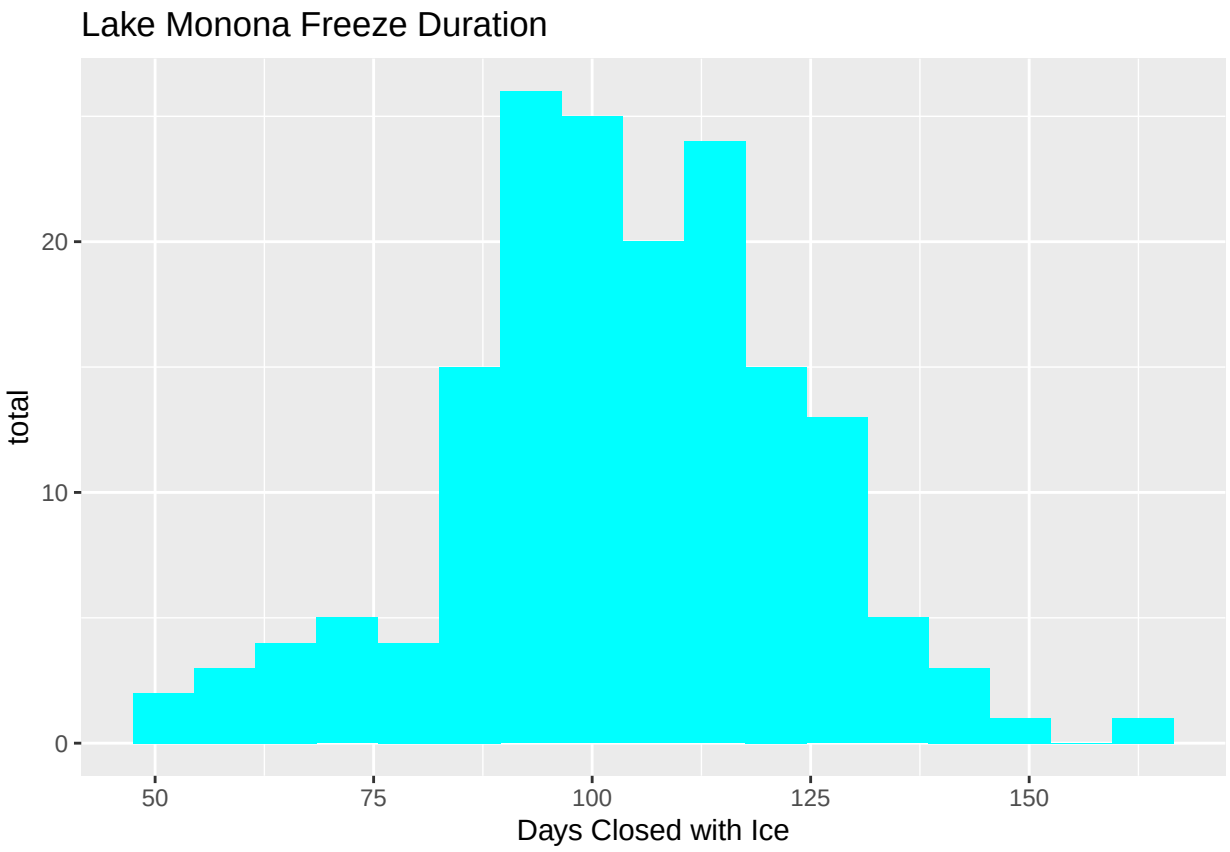
Approximately 100 days during a typical winter over the past 170 years.

2

Modify the code below so that:

- one of the bars is centered at 100 days
- the width of each bar is 7 days
- the fill color is your favorite color
- the x label says “Days Closed with Ice”
- the y label says “total”
- there is a title with words of your choosing

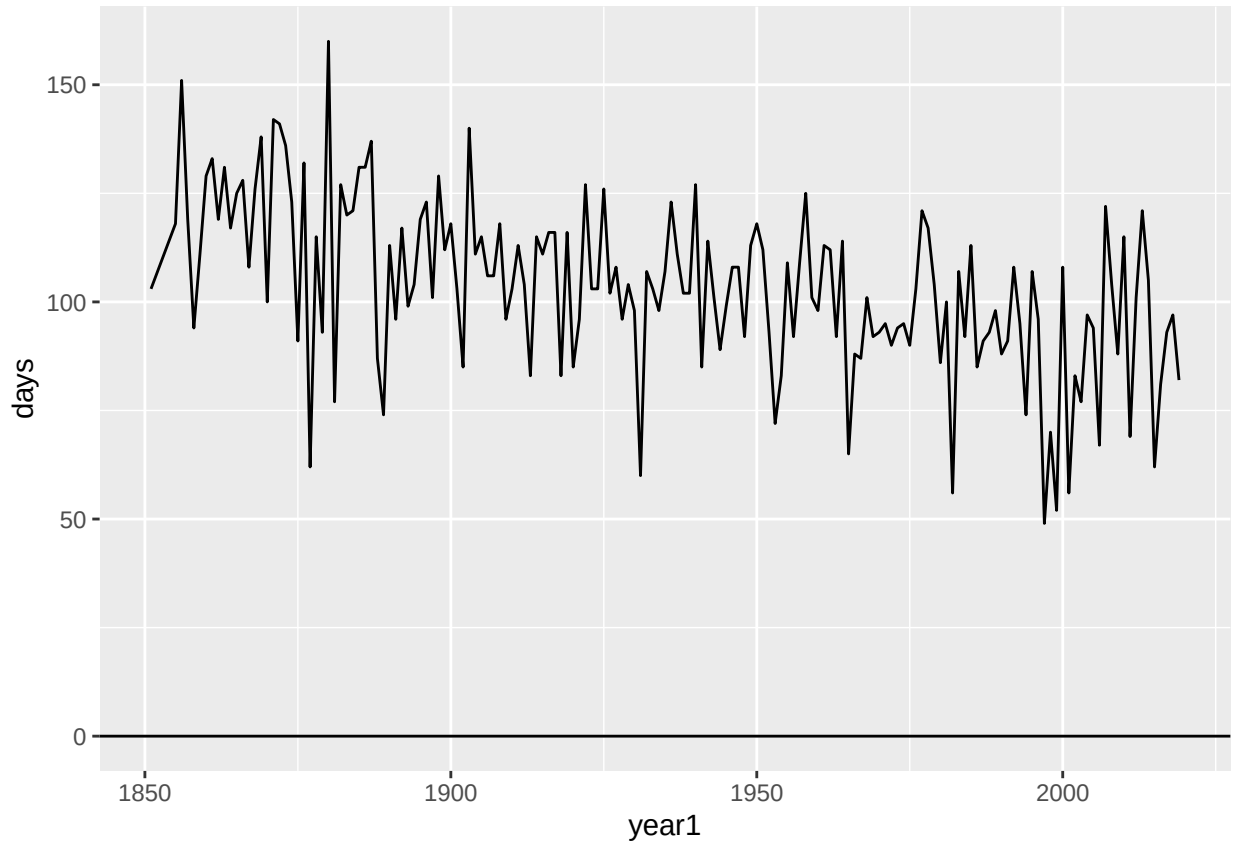
```
ggplot(monona, aes(x = days)) +
  geom_histogram(center=100, binwidth=7, fill="cyan") +
  xlab("Days Closed with Ice") +
  ylab("total") +
  ggtitle("Lake Monona Freeze Duration")
```



3

Code in the next chunk makes a line plot that shows how the variable `days` changes with time (using `year1`).

```
ggplot(monona, aes(x = year1, y = days)) +
  geom_line() +
  geom_hline(yintercept=0)
```



What does the line of code `geom_hline(yintercept=0)` do?

Response

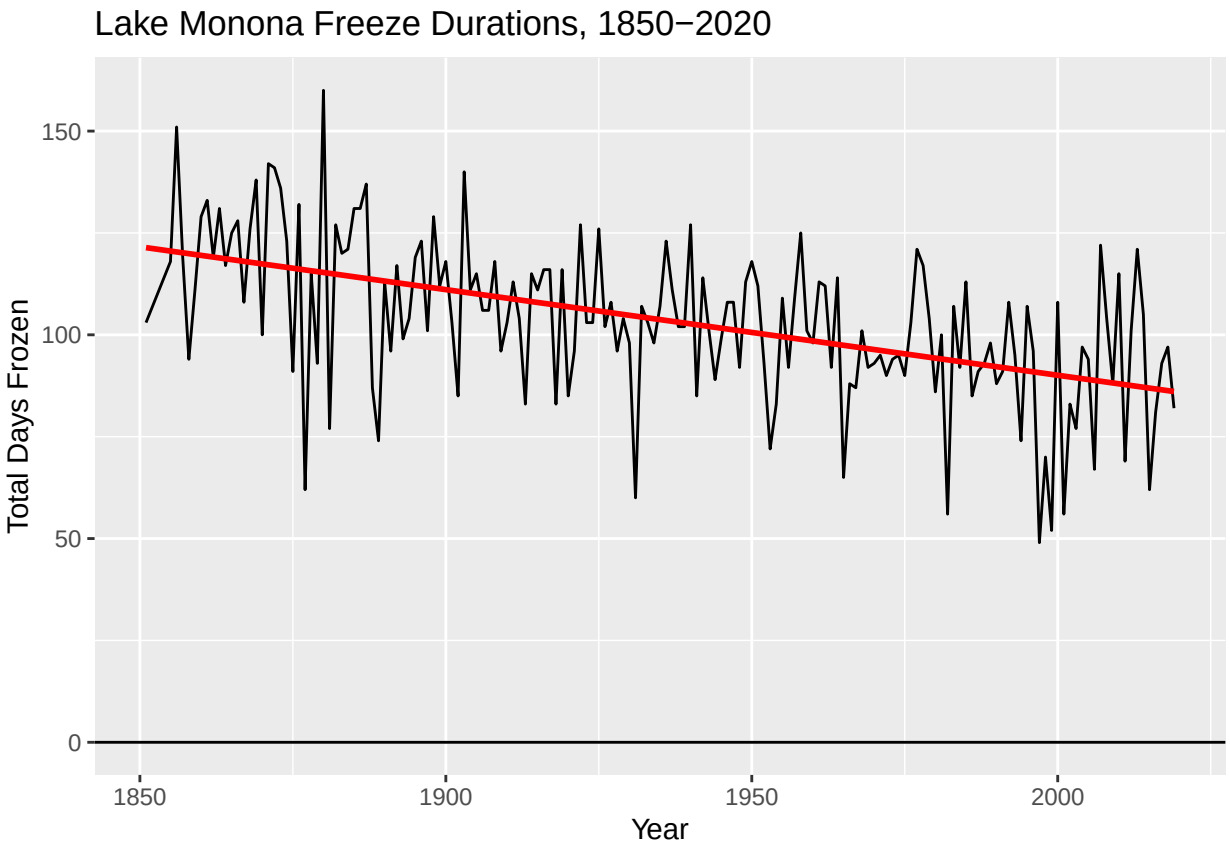
set the horizontal line at y-intercept = 0

4

Modify the code in the following chunk so that:

- There are more descriptive axis labels
- There is an informative plot title
- There is a smooth trend line that has is colored red

```
ggplot(monona, aes(x = year1, y = days)) +
  geom_line() +
  geom_hline(yintercept=0) +
  geom_smooth(se=FALSE,color="red", method="lm") +
  xlab("Year") +
  ylab("Total Days Frozen") +
  ggtitle("Lake Monona Freeze Durations, 1850-2020")
```



- Describe the pattern of the trend.
- How long was Lake Monona closed with ice in a typical year near 1850?
- How long was Lake Monona closed with ice in a typical year near the present?
- About how many days less is the period of closure with ice changing per decade?
- Has the change been fairly steady, or has the change been substantially faster or slower in some time periods?

Response

1.As time goes down, total days frozen of Lake Monona steadily decrease 2.Approximately 120 days 3.Approximately 85 days 4.Approximately 2 days (120-85) / 17 decades (1850~2020) 5.The change has been fairly steady.