109090046 HW1

Question 1. What is the 5th element in the original list of ages?

Output: 45

```
my_list <- customers$age
# We store first column (age) into new variable (my_list)
my_list[5]
# 5th value of the list
```

Question 2. What is the fifth lowest age?

Output: 19

```
sort(my_list)[5]
# rearrange the list to incremental order and find the 5th value
```

Question 3. Extract the five lowest ages together

Output: 18 19 19 19 19

```
sort(my_list)[1:5]
# rearrange the list to incremental order and find the 1st to 5th
values
```

Question 4. Get the five highest ages by first sorting them in decreasing order first.

Output: 85 83 82 82 81

```
sort(my_list, decreasing = TRUE)[1:5]
# rearrange the list to decremental order and find the 1st to 5th
values
```

Question 5. What is the average (mean) age?

Output: 46.80702

```
mean(my_list)
# find the mean value of the data
```

Question 6. What is the standard deviation of ages?

Output: 16.3698

```
sd(my_list)
# find the standard deviation of the data
```

Question 7. Make a new variable called *age_diff*, with the difference between each age and the *mean* age

Output:

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```
[1]   2.1929825  22.1929825  -5.8070175  26.1929825  -1.8070175  24.1929825   3.1929825
 [8]  -3.8070175  23.1929825 -14.8070175   0.1929825  30.1929825  17.1929825   3.1929825
[15]   3.1929825  -1.8070175   2.1929825   0.1929825  15.1929825   3.1929825   0.1929825
[22]  25.1929825   0.1929825  16.1929825 -25.8070175   2.1929825   3.1929825   1.1929825
[29] -11.8070175  30.1929825   1.1929825   1.1929825   3.1929825   0.1929825 -17.8070175
[36]  -4.8070175  -4.8070175  38.1929825  -1.8070175   2.1929825  -1.8070175  -3.8070175
[43]   2.1929825  21.1929825  -4.8070175   1.1929825  25.1929825  32.1929825   1.1929825
[50]   3.1929825   0.1929825  -1.8070175 -16.8070175  29.1929825 -15.8070175   2.1929825
[57]  27.1929825  25.1929825   1.1929825   2.1929825  26.1929825   3.1929825   0.1929825
[64]   0.1929825  36.1929825  25.1929825  28.1929825   3.1929825   3.1929825   2.1929825
[71]   1.1929825  -1.8070175   2.1929825   2.1929825   2.1929825  25.1929825   3.1929825
[78]  28.1929825  27.1929825  25.1929825  27.1929825  29.1929825   2.1929825   3.1929825
[85]  29.1929825 -10.8070175  -1.8070175 -11.8070175 -22.8070175  -1.8070175   3.1929825
[92]  -4.8070175 -24.8070175  13.1929825  12.1929825  -1.8070175   4.1929825  -0.8070175
[99]   0.1929825 -12.8070175  16.1929825  24.1929825  -9.8070175 -25.8070175  -3.8070175
[106] -14.8070175   0.1929825 -11.8070175  23.1929825 -20.8070175  16.1929825   7.1929825
[113]  -1.8070175   0.1929825 -20.8070175 -11.8070175 -24.8070175 -15.8070175  23.1929825
[120]   4.1929825  -9.8070175  -5.8070175   6.1929825 -12.8070175  -1.8070175 -12.8070175
[127]  -3.8070175   3.1929825 -17.8070175   2.1929825  -0.8070175  -2.8070175 -20.8070175
[134]   2.1929825   1.1929825 -20.8070175 -12.8070175 -21.8070175  -8.8070175 -21.8070175
[141]  31.1929825  -1.8070175 -15.8070175   0.1929825  10.1929825 -18.8070175  28.1929825
[148]   2.1929825 -20.8070175   2.1929825 -12.8070175 -21.8070175   2.1929825 -12.8070175
[155] -27.8070175 -14.8070175   5.1929825  26.1929825  -7.8070175 -15.8070175   1.1929825
[162]  35.1929825 -13.8070175 -16.8070175  -9.8070175 -13.8070175   0.1929825 -17.8070175
[169]   0.1929825  -9.8070175 -17.8070175  -6.8070175  15.1929825   1.1929825 -10.8070175
[176]  -5.8070175  10.1929825  10.1929825 -12.8070175 -21.8070175  31.1929825 -23.8070175
[183] -14.8070175  -5.8070175 -26.8070175  26.1929825   2.1929825   3.1929825  -0.8070175
[190]   3.1929825 -19.8070175  -1.8070175 -17.8070175   9.1929825  28.1929825   6.1929825
[197]   0.1929825  -7.8070175  31.1929825  -3.8070175  -1.8070175   5.1929825   1.1929825
[204] -10.8070175  31.1929825   0.1929825 -23.8070175 -12.8070175   2.1929825 -21.8070175
[211]  -0.8070175  -6.8070175   3.1929825  -9.8070175   4.1929825 -11.8070175  -1.8070175
[218]   2.1929825 -25.8070175  -9.8070175  -4.8070175  10.1929825   2.1929825  -6.8070175
[225]   0.1929825   2.1929825   5.1929825  -4.8070175   1.1929825 -18.8070175 -13.8070175
[232]   2.1929825   6.1929825 -25.8070175  -8.8070175 -26.8070175 -14.8070175  30.1929825
[239]  -1.8070175   2.1929825 -25.8070175   1.1929825   3.1929825  15.1929825  -7.8070175
[246]  -1.8070175  -2.8070175  -0.8070175  28.1929825  -4.8070175  -0.8070175   3.1929825
[253]  23.1929825  -9.8070175  -8.8070175  -0.8070175 -14.8070175  -2.8070175   3.1929825
[260] -16.8070175  -7.8070175  -8.8070175 -19.8070175 -27.8070175   2.1929825 -27.8070175
[267]  -6.8070175  18.1929825 -19.8070175   3.1929825   1.1929825  -8.8070175  -2.8070175
[274]  23.1929825  17.1929825  25.1929825   2.1929825 -14.8070175   2.1929825   2.1929825
[281]  26.1929825 -16.8070175 -16.8070175   8.1929825  -4.8070175  11.1929825  32.1929825
```

```
[302] -25.8070175 -23.8070175   4.1929825  15.1929825  33.1929825  19.1929825 -17.8070175
[309] -16.8070175  -6.8070175 -27.8070175  24.1929825  32.1929825  30.1929825 -14.8070175
[316]  -6.8070175   2.1929825 -20.8070175   2.1929825  20.1929825   9.1929825 -22.8070175
[323]   0.1929825 -18.8070175  11.1929825  -1.8070175 -27.8070175  25.1929825 -12.8070175
[330]  -0.8070175 -27.8070175 -13.8070175  33.1929825 -16.8070175  26.1929825 -26.8070175
[337] -27.8070175  -6.8070175  29.1929825   1.1929825  -8.8070175  29.1929825  29.1929825
[344]  -9.8070175 -11.8070175 -20.8070175 -21.8070175  20.1929825 -15.8070175 -19.8070175
[351] -10.8070175 -25.8070175 -18.8070175  -7.8070175   2.1929825  -1.8070175  13.1929825
[358]   1.1929825  -1.8070175   0.1929825 -19.8070175  32.1929825  -1.8070175   4.1929825
[365] -23.8070175  27.1929825 -15.8070175 -26.8070175   3.1929825 -16.8070175  35.1929825
[372]  23.1929825  -3.8070175 -26.8070175   3.1929825   1.1929825 -28.8070175  -1.8070175
[379]  15.1929825  -5.8070175  24.1929825 -27.8070175  26.1929825 -20.8070175  28.1929825
[386]  -5.8070175  -0.8070175   2.1929825   2.1929825 -23.8070175  27.1929825   6.1929825
[393] -23.8070175   4.1929825  24.1929825   3.1929825   3.1929825  20.1929825  27.1929825
```

```r
age_diff <- my_list - rep(mean(my_list), times=length(my_list))
age_diff
# using the original list minus the list with 399 mean value
```

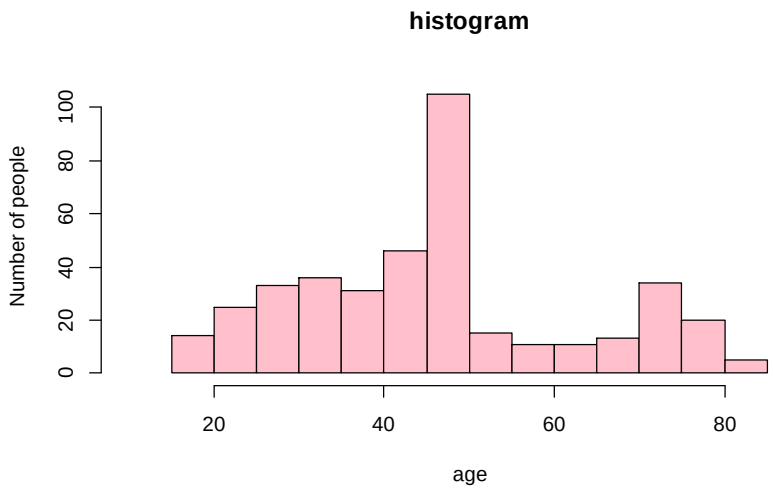
Question 8. What is the average “difference between each age and the mean age”?

Output: `-1.623275e-15`

```r
mean(age_diff)
# find the mean of age differences
```

Question 9. Visualize the raw data as we did in class: (a) histogram, (b) density plot, (c) boxplot + stripchart

Output:



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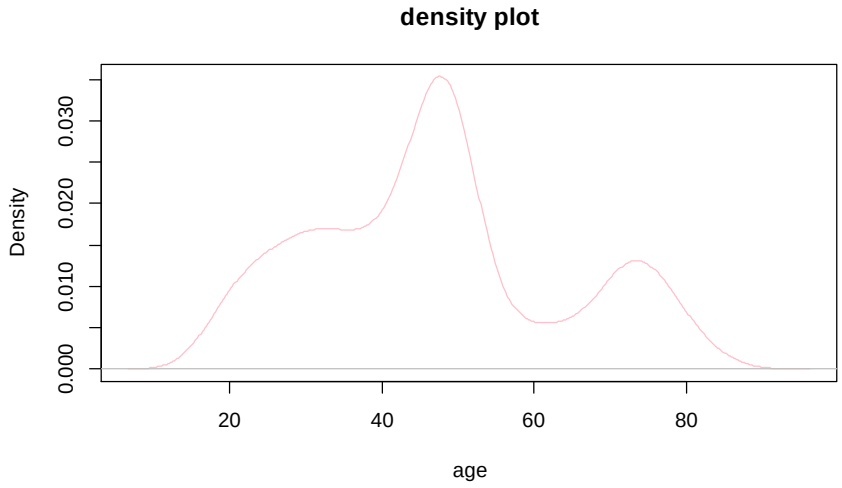

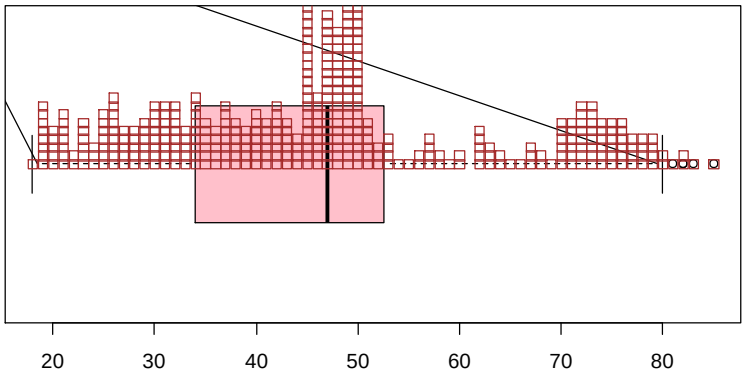

```
hist(my_list, xlim=c(10, 90), ylim=c(0,110), col="pink",
main="histogram", xlab="age", ylab="Number of people")
# showing the histogram with 5-years range groups and pink plot
plot(density(my_list), col="pink", main="density plot",
xlab="age", ylab="Density")
# showing density plot with pink layout
boxplot(my_list, horizontal=TRUE, col="pink")
stripchart(my_list, method="stack", add=TRUE, col="brown")
# showing box plot of the data and we use add=TRUE to overlay the
stripchart on it.
```