1. Given numerical objects named \( x \) and \( y \), calculate this quantity: \( \sqrt{x^2 + y} \)

\[
\sqrt{x^2 + y}
\]

2. Load the mosaic and mosaicData packages. (We will be using the CPS85 data set from mosaicData for our subsequent examples.)

\[
\begin{align*}
\text{require(mosaic)} \\
\text{require(mosaicData)}
\end{align*}
\]

3. Display the first few rows of the CPS85 data frame.

\[
\text{head(CPS85)}
\]

4. Display the names of the variables from the data frame.

\[
\text{names(CPS85)}
\]

5. Calculate (not count by hand!) the number of cases in the data frame.

\[
\text{nrow(CPS85)}
\]

6. Calculate the mean wage of all the people.

\[
\text{mean(\sim wage, data=CPS85)}
\]

7. Calculate the standard deviation of wage for all cases.

\[
\text{sd(\sim wage, data=CPS85)}
\]

8. Calculate the mean wage separately for married and unmarried people.

\[
\text{mean(wage \sim married, data=CPS85)}
\]

9. Create a new variable, fraction, in the data frame that holds the ratio of the person’s “experience” to their age.

\[
\text{CPS85 <- mutate(CPS85, fraction=exper/age)} \\
\text{CPS85 <- CPS85 %>% mutate(fraction = exper/age)}
\]

10. Make a box-and-whisker plot of all the people’s CPS85.

\[
\text{bwplot(\sim wage, data=CPS85)}
\]
11. Make a box-and-whisker plot of the people’s wage, but broken down by marital status.

```
bwplot(wage ~ married, data=CPS85)
```

12. Make this plot:

```
densityplot(~ age, groups=married, auto.key=TRUE, data=CPS85)
```

What is different when the command `densityplot(~ age | married, data=CPS85)` is run?

13. Calculate (not count by hand!) the number of people by marital status.

```
tally(~ married, data=CPS85)
```

14. Calculate (not count by hand!) the number of people by marital status and sex simultaneously.

```
tally(~ married + sex, data=CPS85)
```