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.)

```
require(mosaic)
require(mosaicData)
```

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

```
head(CPS85)
```

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

```
names(CPS85)
```

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

```
nrow(CPS85)
```

6. Calculate the mean wage of all the people.

```
mean(~ wage, data=CPS85)
```

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

```
sd(~ wage, data=CPS85)
```

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

```
mean(wage ~ 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.

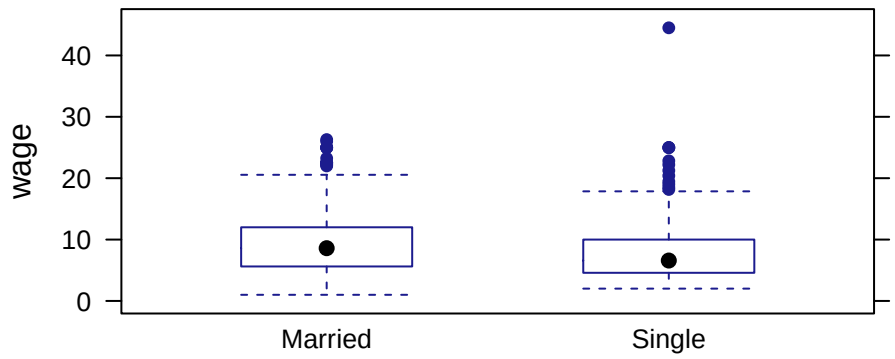
```
CPS85 <- mutate(CPS85, fraction=exper/age)
CPS85 <- CPS85 %>% mutate(fraction = exper/age)
```

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

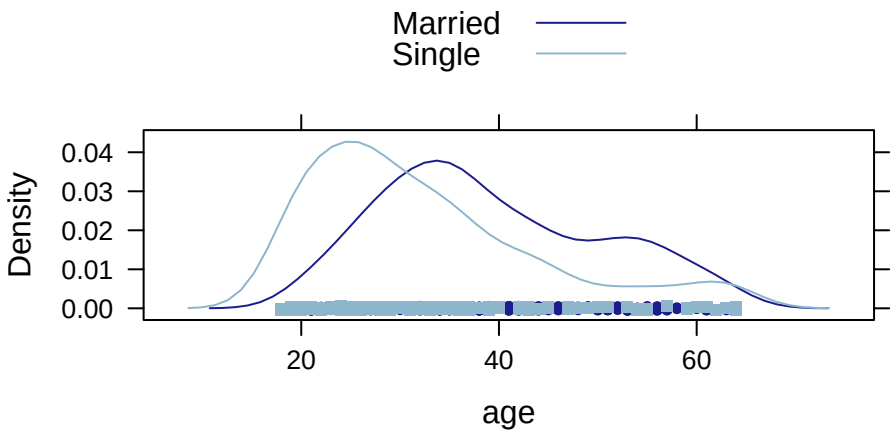
```
bwplot(~wage, data=CPS85)
```

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)
```