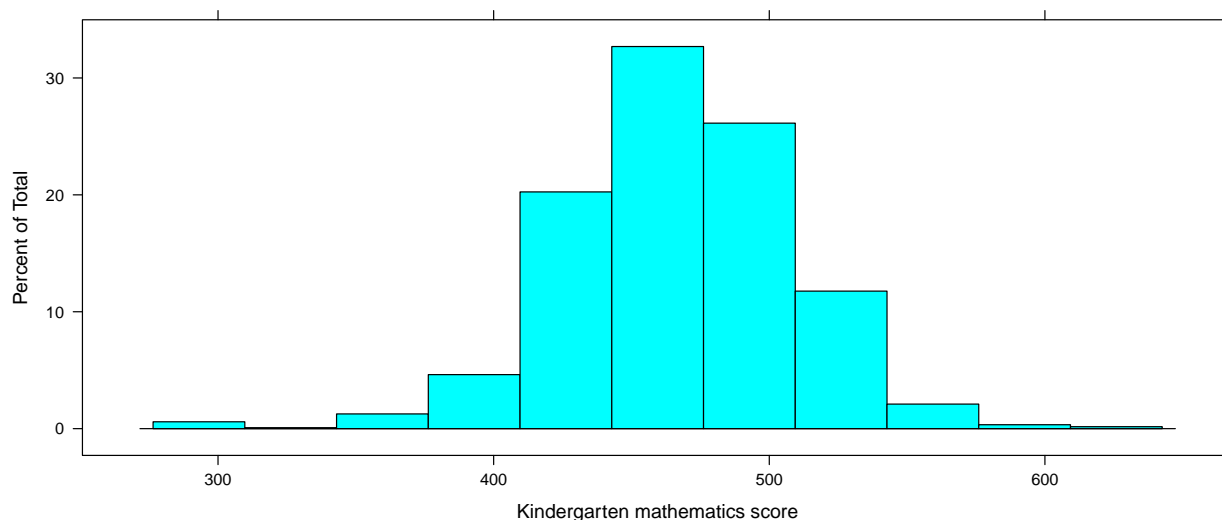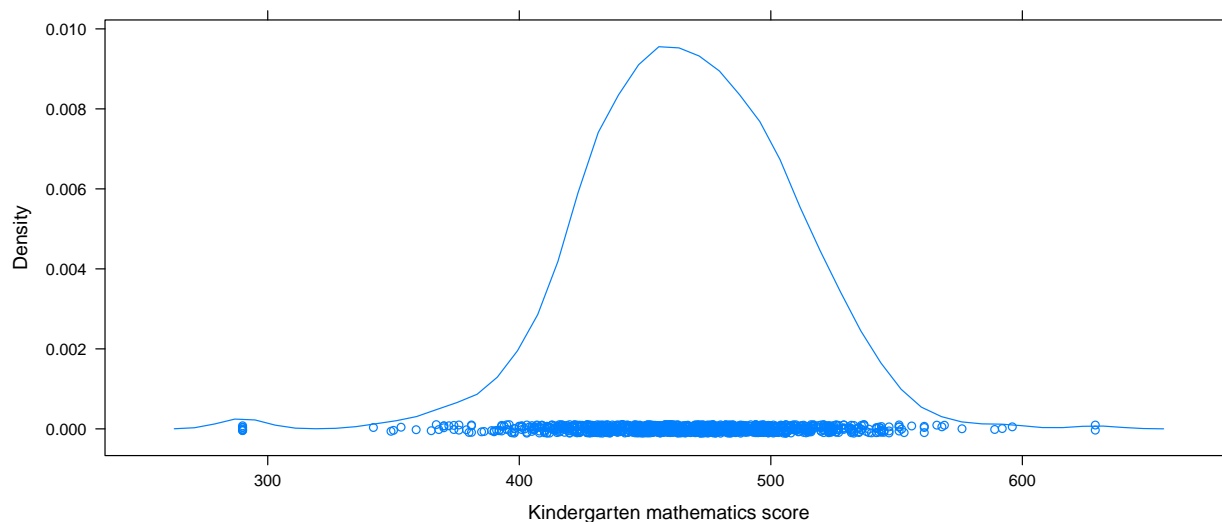Load the `classroom` data frame that you saved in the previous set of exercises and attach the `lattice` package.

```
> load("classroom.rda")
> library(lattice)
```
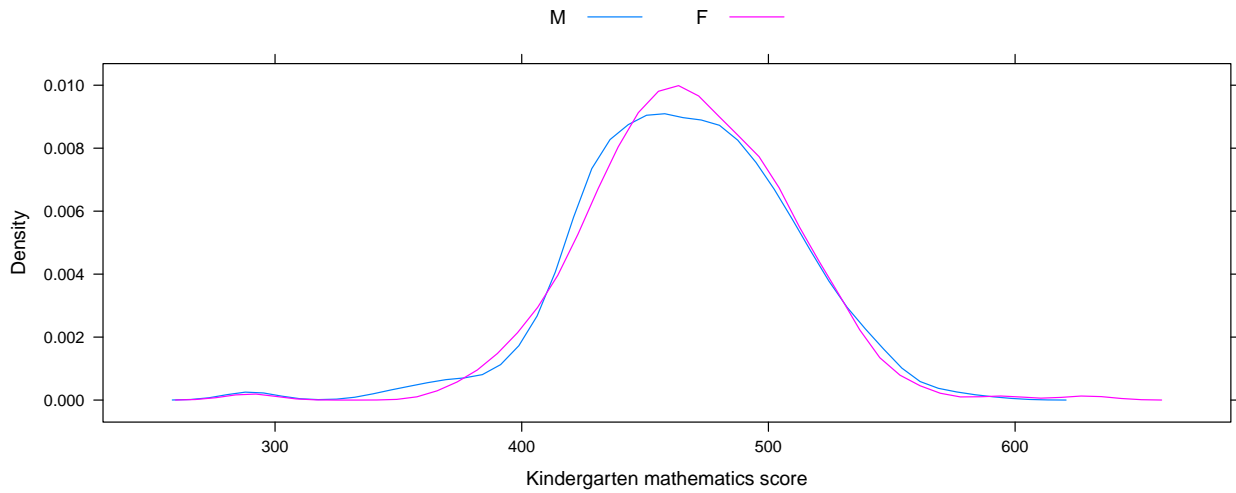
1. Create a histogram of the `mathkind` (mathematics score in kindergarten) variable.


2. Create an empirical density plot of `mathkind`.

3. Create an empirical density plot of `mathkind` by sex using the optional argument `groups = sex`. It is probably a good idea to suppress the points in the "rug". Remember to use `auto.key` so you can tell which curve is which.

Lattice graphics

M ——— F ———

Kindergarten mathematics score

4. Create an empirical density plot of `mathkind` with one curve for minority students and one for non-minority students.

N ——— Y ———

Kindergarten mathematics score
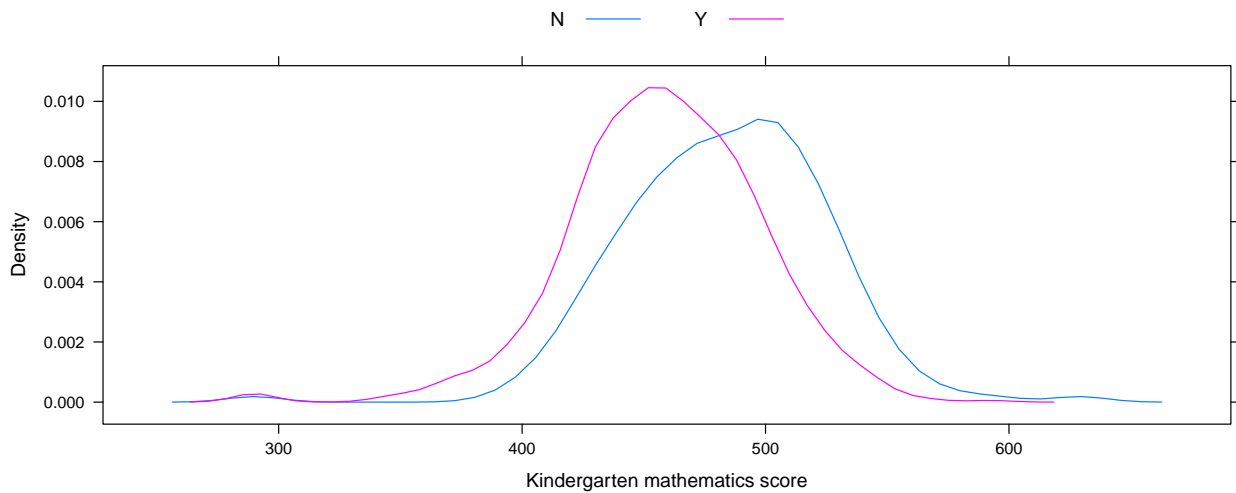
5. Create a scatter-plot of the `mathgain` versus the kindergarten score. Add a reference grid and a scatterplot smoother curve with the optional argument `type = c("g", "p", "smooth")`. Repeat this plot using `"r"` instead of `"smooth"` to add a reference (or "regression") line.

Lattice graphics
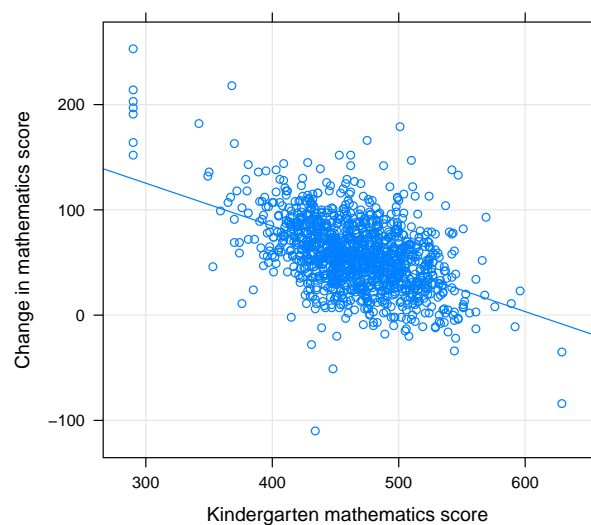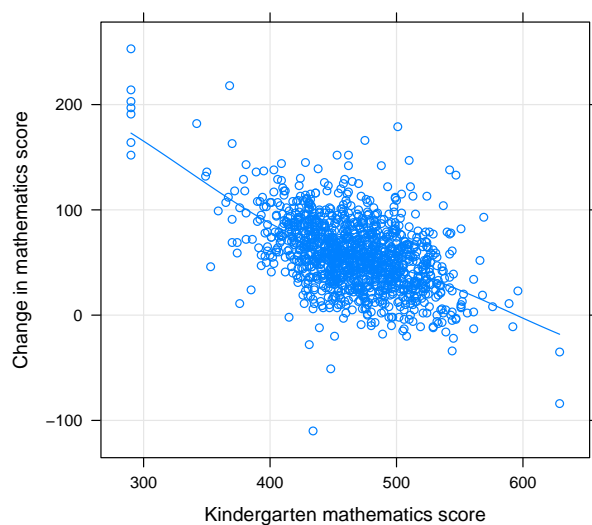
6. The negative correlation between `mathkind` and `mathgain`

```
> with(classroom, cor(mathkind, mathgain))
[1] -0.4870136
```

is not surprising because `mathgain` is the grade 1 score minus the kindergarten score. Create a new variable `math1` which is the sum of `mathkind` and `mathgain`

```
> classroom <- within(classroom, math1 <- mathkind + mathgain)
> with(classroom, cor(mathkind, math1))
[1] 0.6311802
```

and plot `math1` versus `mathkind`. The version shown below uses the optional argument `aspect="iso"` to ensure that a unit change on the x axis corresponds to a unit change on the y axis.

Lattice graphics
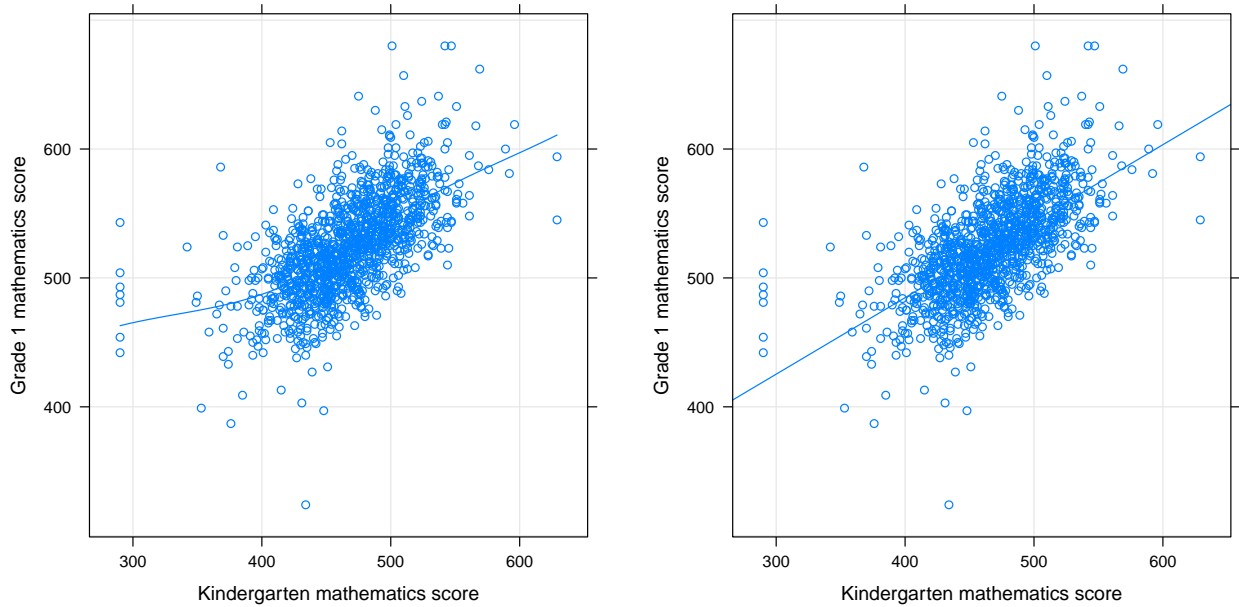
7. Create a multi-panel scatterplot of `math1` versus `mathkind` with separate panels for males and females.
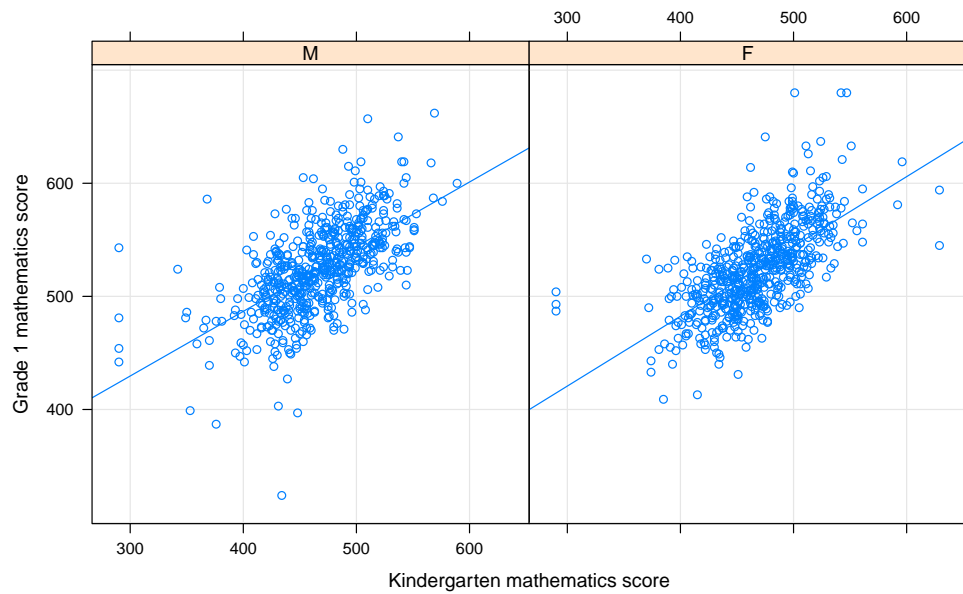
8. Create a multi-panel scatterplot of `math1` versus `mathkind` with separate panels for minority and non-minority students.

Lattice graphics
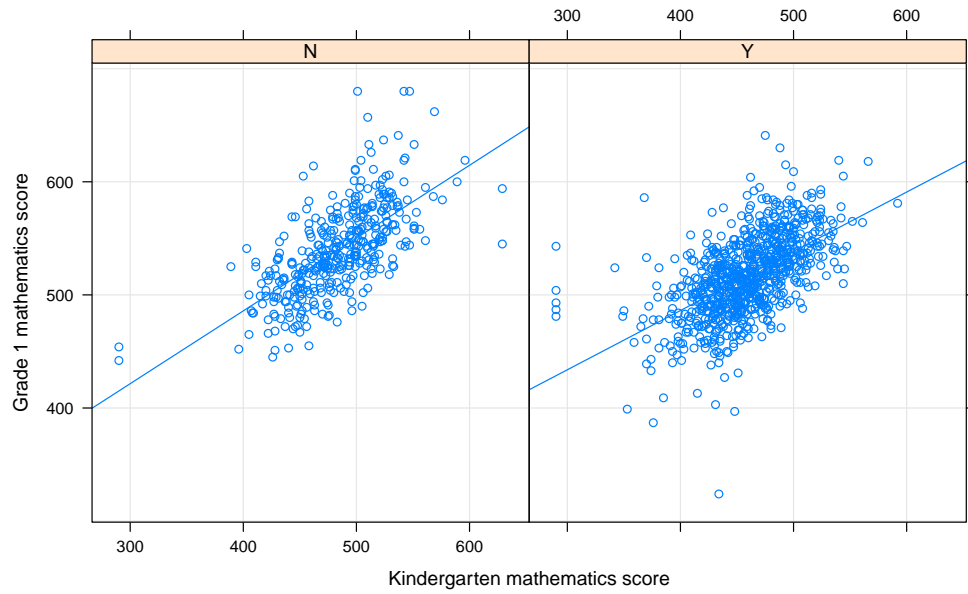
9. Create a multi-panel scatterplot of `math1` versus `mathkind` classified according to `sex` and `minority`
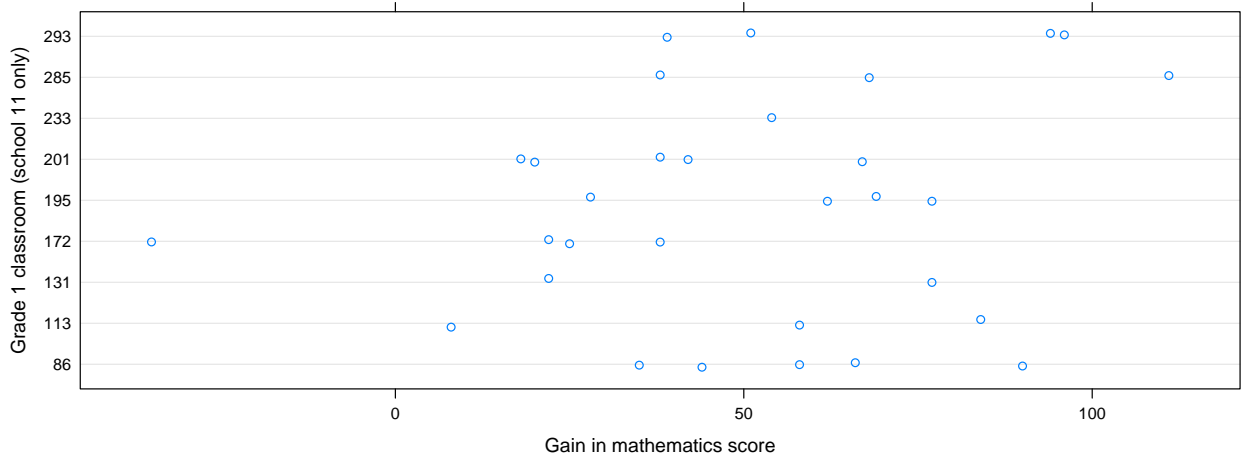

Lattice graphics
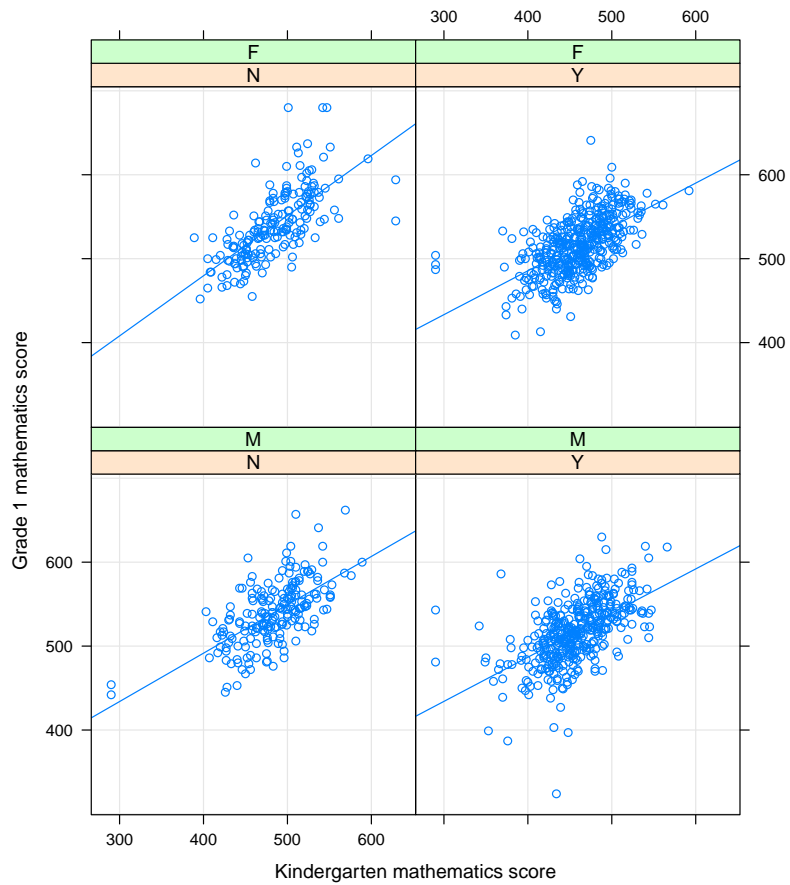
10. Consider only the students in school 11. The study includes students from nine different class-
    rooms in that school.

```
> xtabs(~classid, classroom, schoolid == 11, drop = TRUE)
classid
 86 113 131 172 195 201 233 285 293
  5   3   2   4   4   5   1   3   4
```

Create a dot-plot of the `mathgain` by classroom for students in school 11 only.

Repeat the plot reordering the classrooms according to increasing mean gain and joining the classroom averages.

Lattice graphics