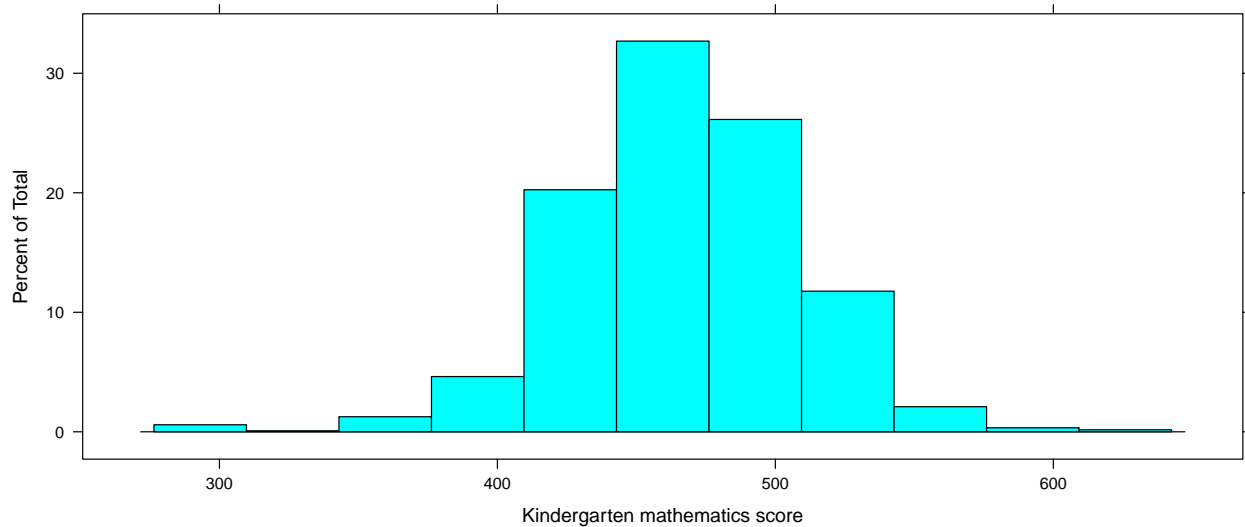


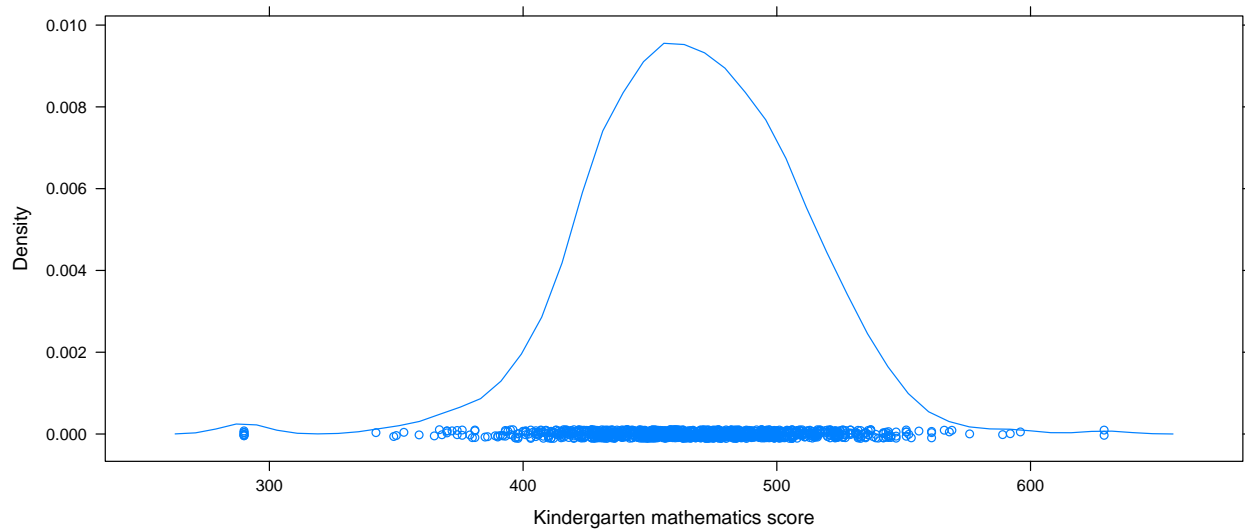
Load the `classroom` data frame that you saved in the previous set of exercises and attach the `lattice` package.

```
> load("classroom.rda")  
> library(lattice)
```

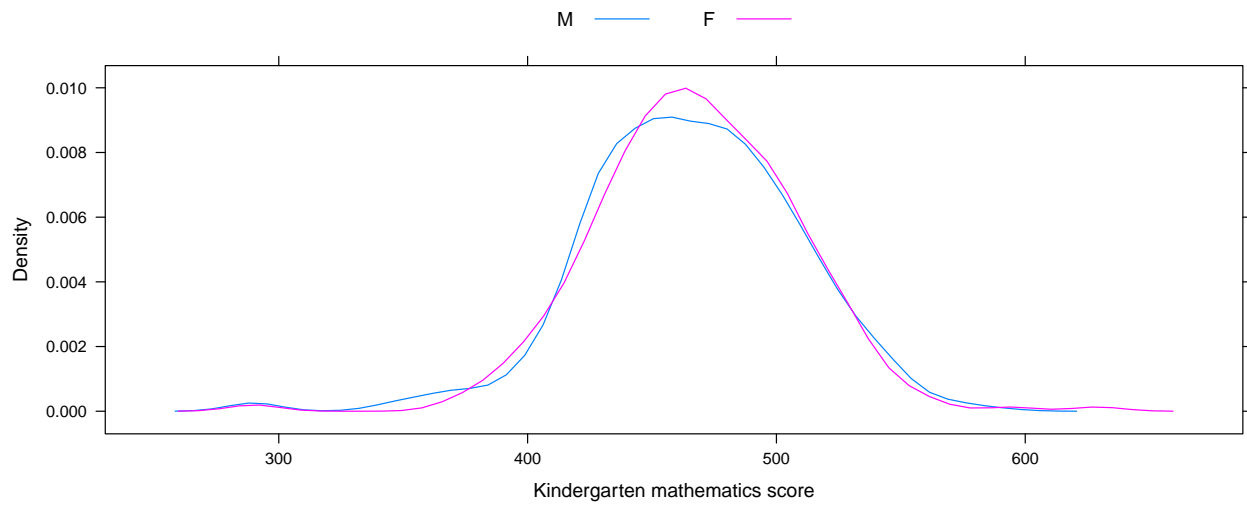
1. Create a histogram of the `mathkind` (mathematics score in kindergarten) variable.



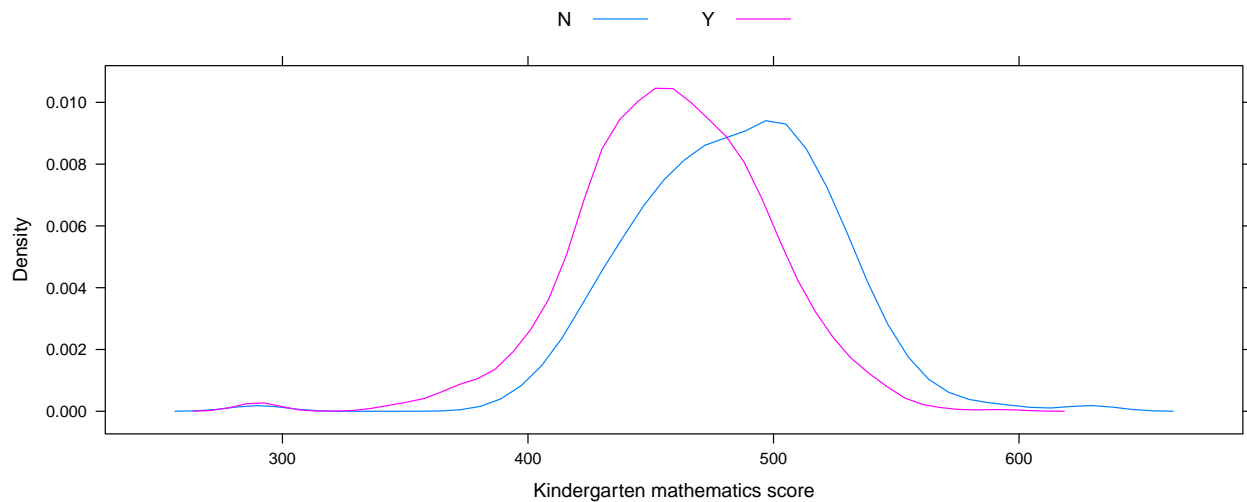
2. Create an empirical density plot of `mathkind`.



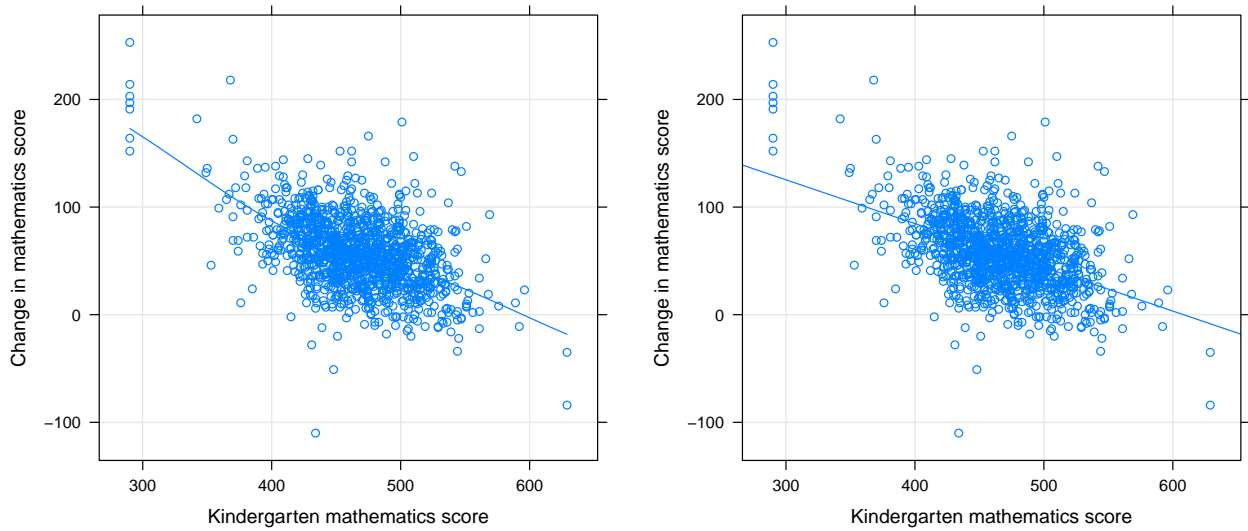
3. Create an empirical density plot of `mathkind` by sex using the optional argument `groups = sex`. It is probably a good idea to suppress the points in the “rug”. Remember to use `auto.key` so you can tell which curve is which.



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



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.



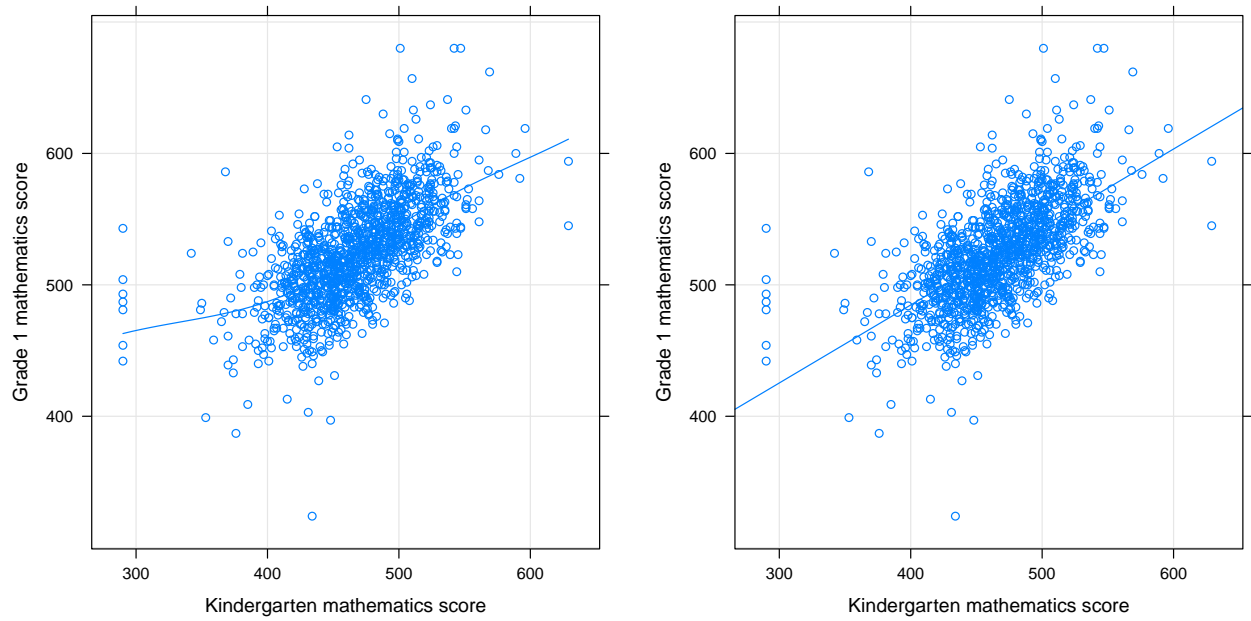
6. The negative correlation between `mathkind` and `mathgain`

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

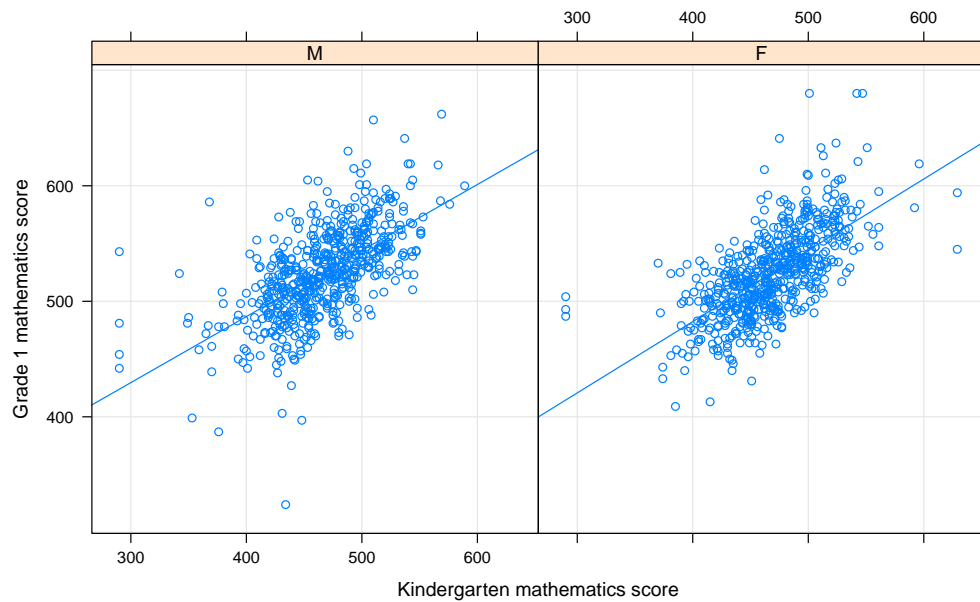
is not surprising because `mathgain` is the grade 1 score minus the kindergarten score. Create a new variable `math1` which is the sum of `mathkind` and `mathgain`

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

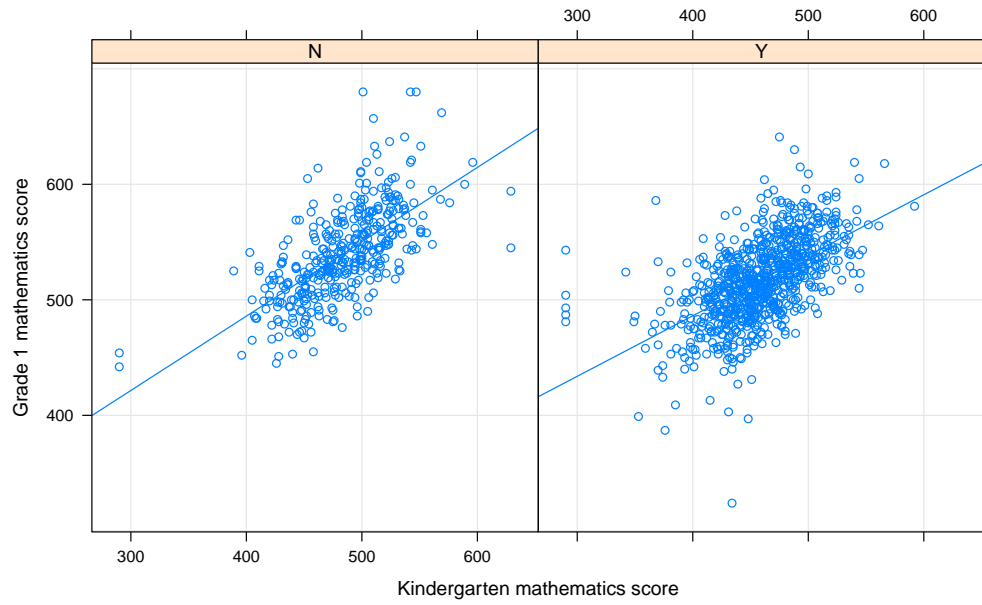
and plot `math1` versus `mathkind`. The version shown below uses the optional argument `aspect="iso"` to ensure that a unit change on the x axis corresponds to a unit change on the y axis.



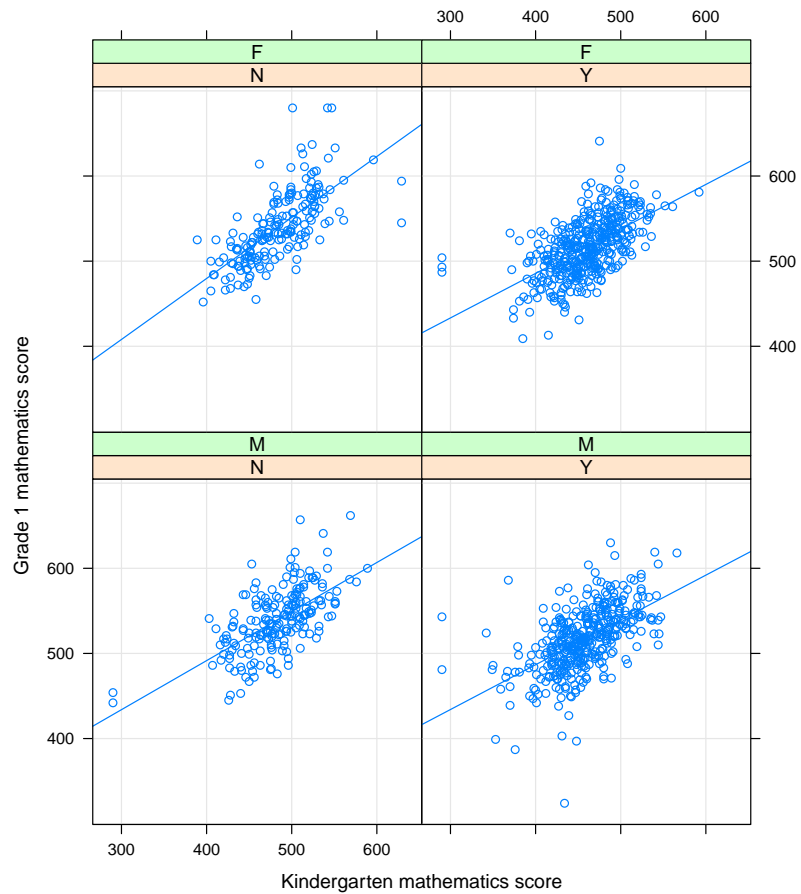
7. Create a multi-panel scatterplot of `math1` versus `mathkind` with separate panels for males and females.



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



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

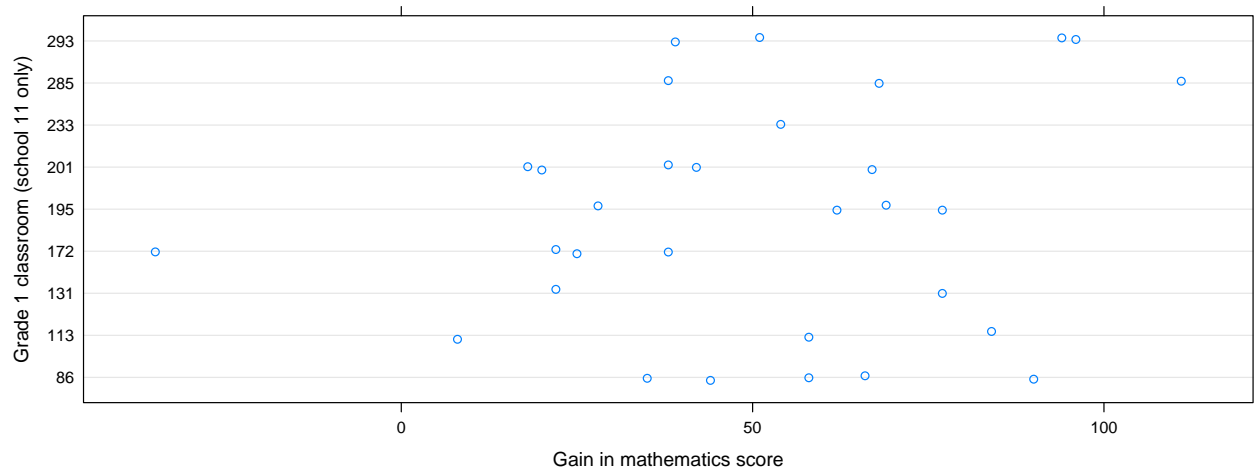


10. Consider only the students in school 11. The study includes students from nine different classrooms in that school.

```
> 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.

