week_5_lab

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Question 1

We don't waant to compare all students who are on probation with all students who arae not on probation because the students at the top end of the gpa theshold are different in many aspects than students at the bottom end of the gpa theshold. As such, the underlying assumption that the control and treatment groups are comparable would not hold. If these groups are not comparable, then it is impossible to tell if other factors besides the probation policy are driving differences in outcomes.

Question 2

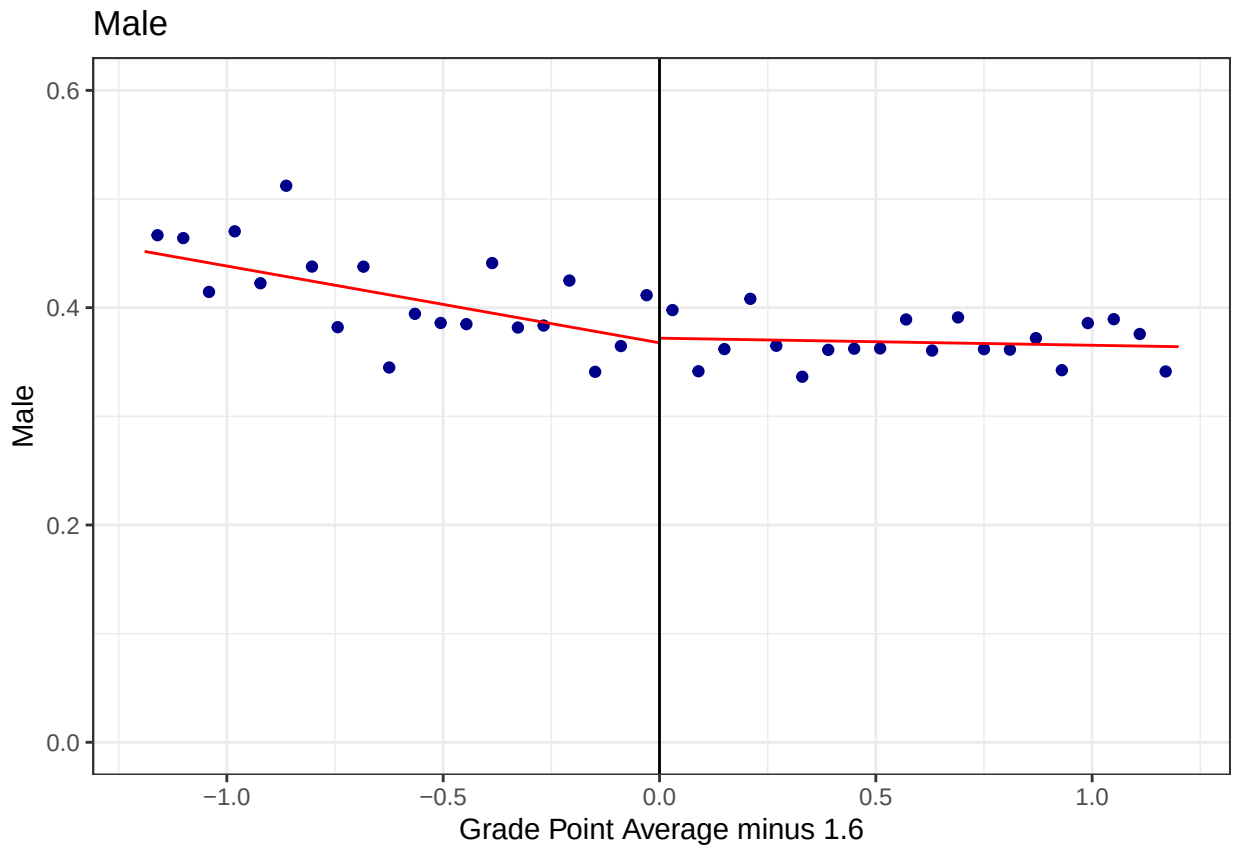
The running variable is gpa average

Question 3

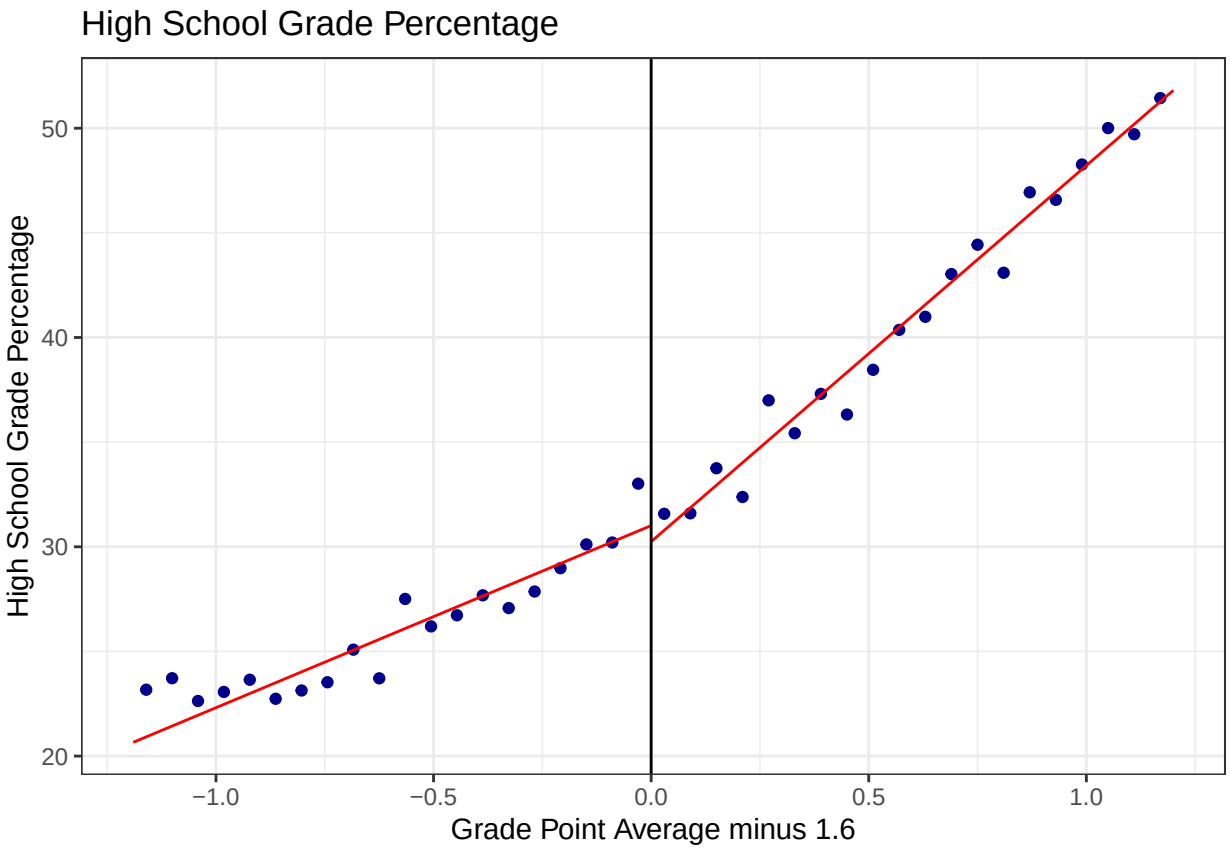
Part a

The graphs below check the smoothness of fraction graduating in 4 years, male, and high school grade precentage. There doesn't appear to be a large break in any of these variables at the GPA threshold, meaning that it doesn't seem like any of these factors are driving the differences in the groups.

```
## [1] "Mass points detected in the running variable."
```

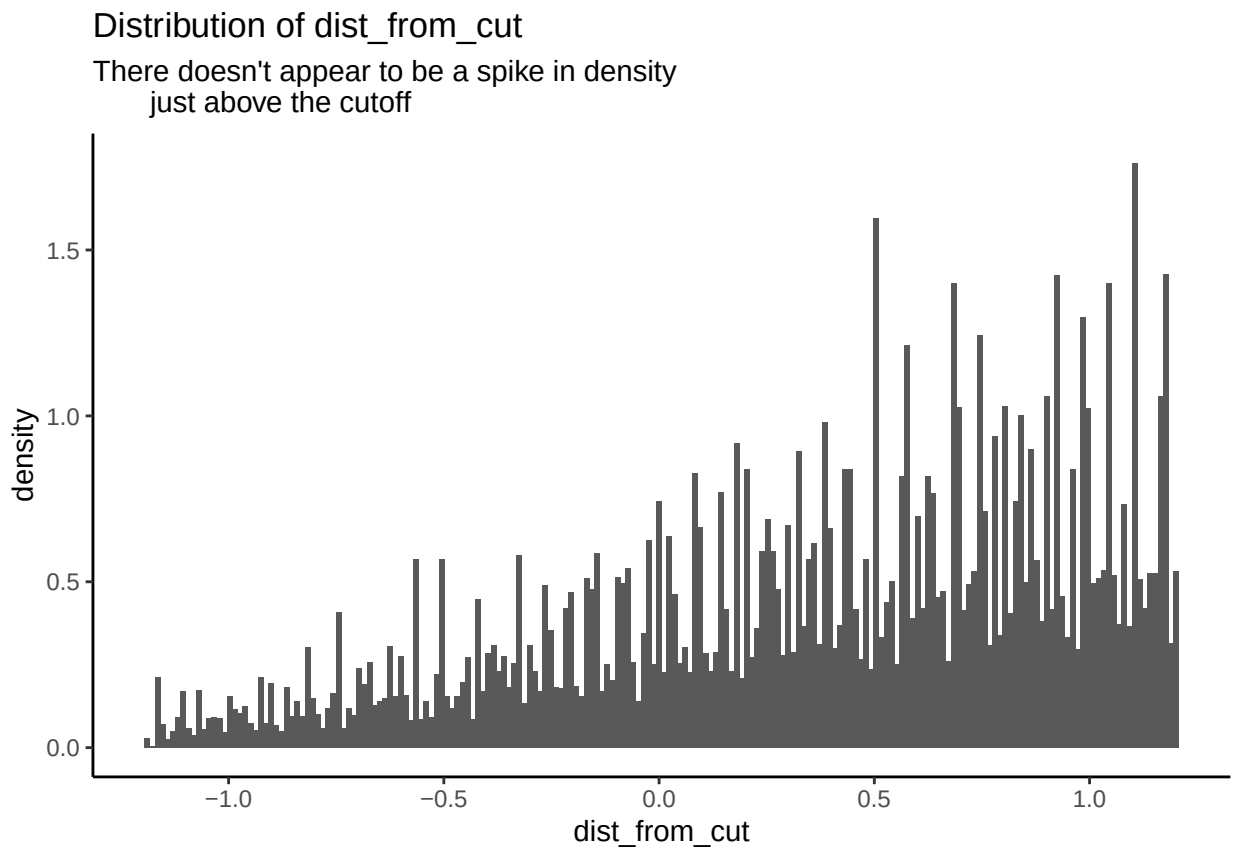



```
## [1] "Mass points detected in the running variable."
```



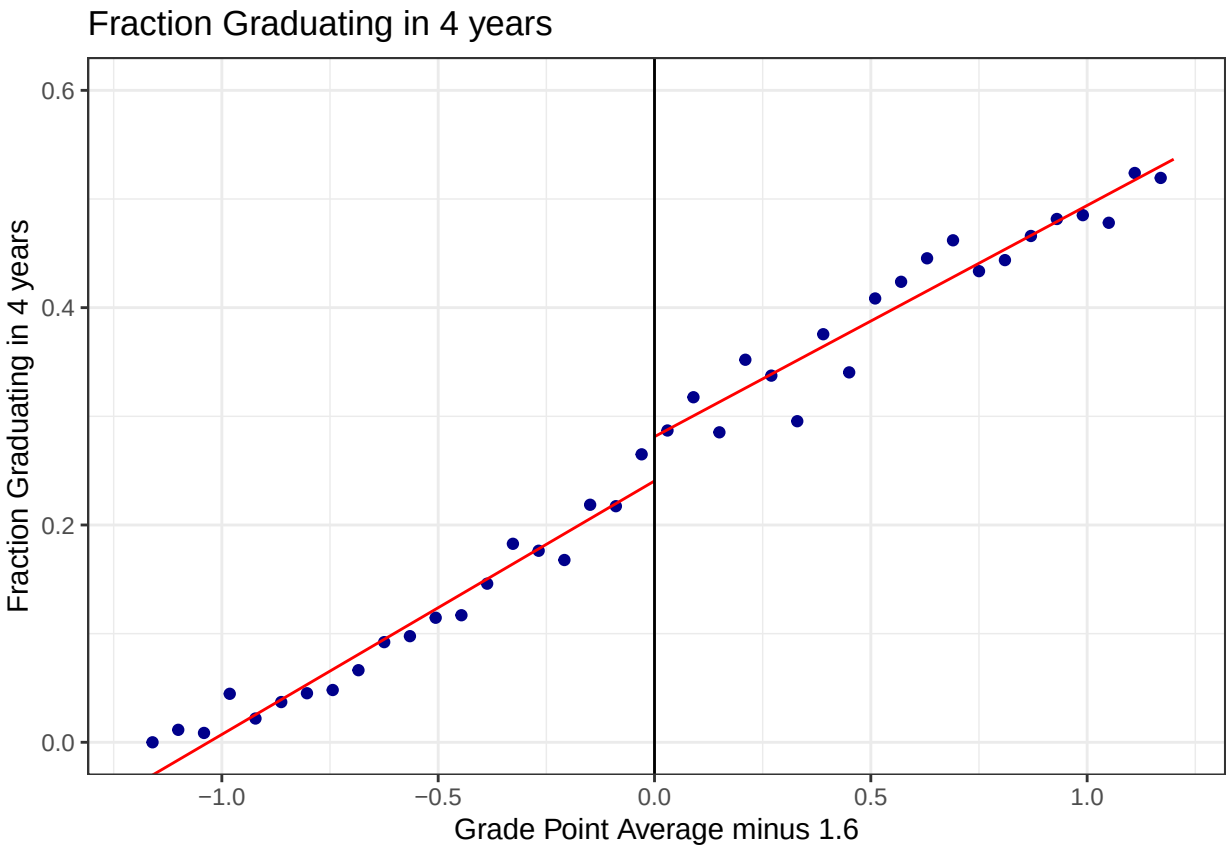
Part b

There doesn't appear to be a spike in the density of observations just above the GPA theshold.



Question 4

```
## [1] "Mass points detected in the running variable."
```



Question 5

a) 0.24058

b) 0.281278

c) The difference between b and a, or the predicted effect = 0.040698

Question 6

```
##
## t test of coefficients:
##
##                 Estimate Std. Error t value  Pr(>|t|)
## (Intercept)    0.2404832  0.0099183 24.2465 < 2.2e-16 ***
## T              0.0407903  0.0132494  3.0786  0.002083 **
## dist_from_cut  0.2332585  0.0139726 16.6940 < 2.2e-16 ***
## interaction   -0.0204812  0.0185736 -1.1027  0.270169
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The coefficient for T equals the answer in 5c.

Question 7

The standard error for the coefficient = .013. Because .0407 +/- 1.96*.013 does not include 0, we can conclude that the effect is statistically significant at the 95% confidence level.

Question 8

Because the effect of the T coeffient is positive and statistically significant, we can see that kids who received probation are graduating at a slower rate than kids who did not receive probation. As such, we can conclude the school's probation policy was effective in a sense that is punished kids below the threshold. However, it was not effective at improving their academic outcomes when measured with graduation rates. With this being said, the effect (.04) is very small, so while we can claim that it is statistically significant, in my opinion, it does not seem substantively significant and is certainly not deterministic of any one student's academic outcomes. Additionally, there isn't really a way to tell if there is manipulation in the running variable, because there are lots of spikes in the histogram in question 3. Also, this analysis focuses on people right at the gpa theshold. While it is the case that the policy has a small effect for those kids, it is possible that the policy could be really effective for kids at the lower end of the GPA spectrum.