*Chapter 6*

**10.80** The grades in a statistics course for a particular semester were as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade | A | B | C | D | F |
| f | 14 | 18 | 32 | 20 | 16 |

Test the hypothesis, at the 0.05 level of significance, that the distribution of grades is uniform.

**10.81** A die is tossed 180 times with the following results:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| f | 28 | 36 | 36 | 30 | 27 | 23 |

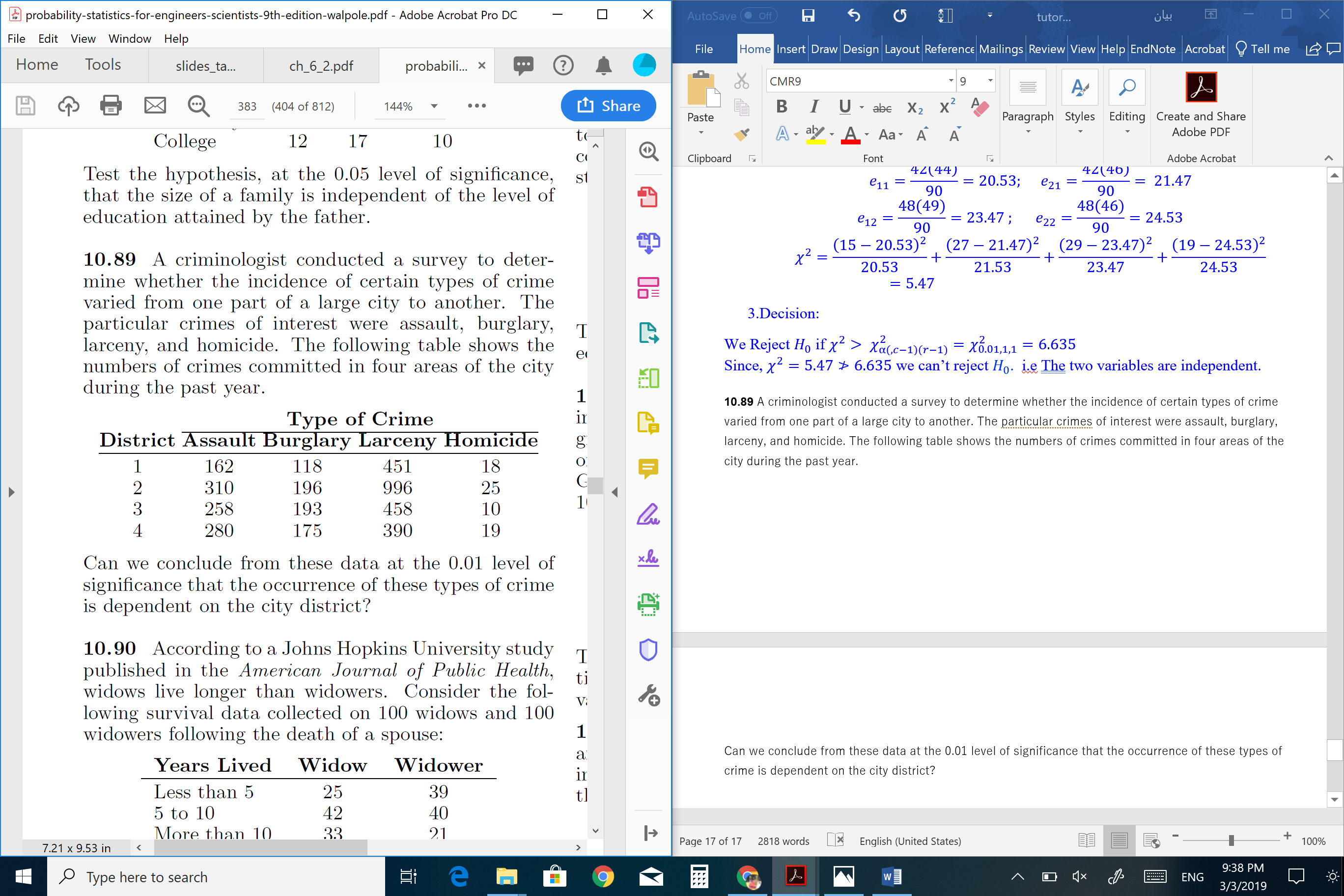
is this a balanced die? Use a 0.01 level of significance.

**10.87** A random sample of 90 adults is classified according to gender and the number of hours of television watched during a week:

|  |  |  |
| --- | --- | --- |
|  | Gender | |
|  | Male | Female |
| Over 25 hours | 15 | 29 |
| Under 25 hours | 27 | 19 |

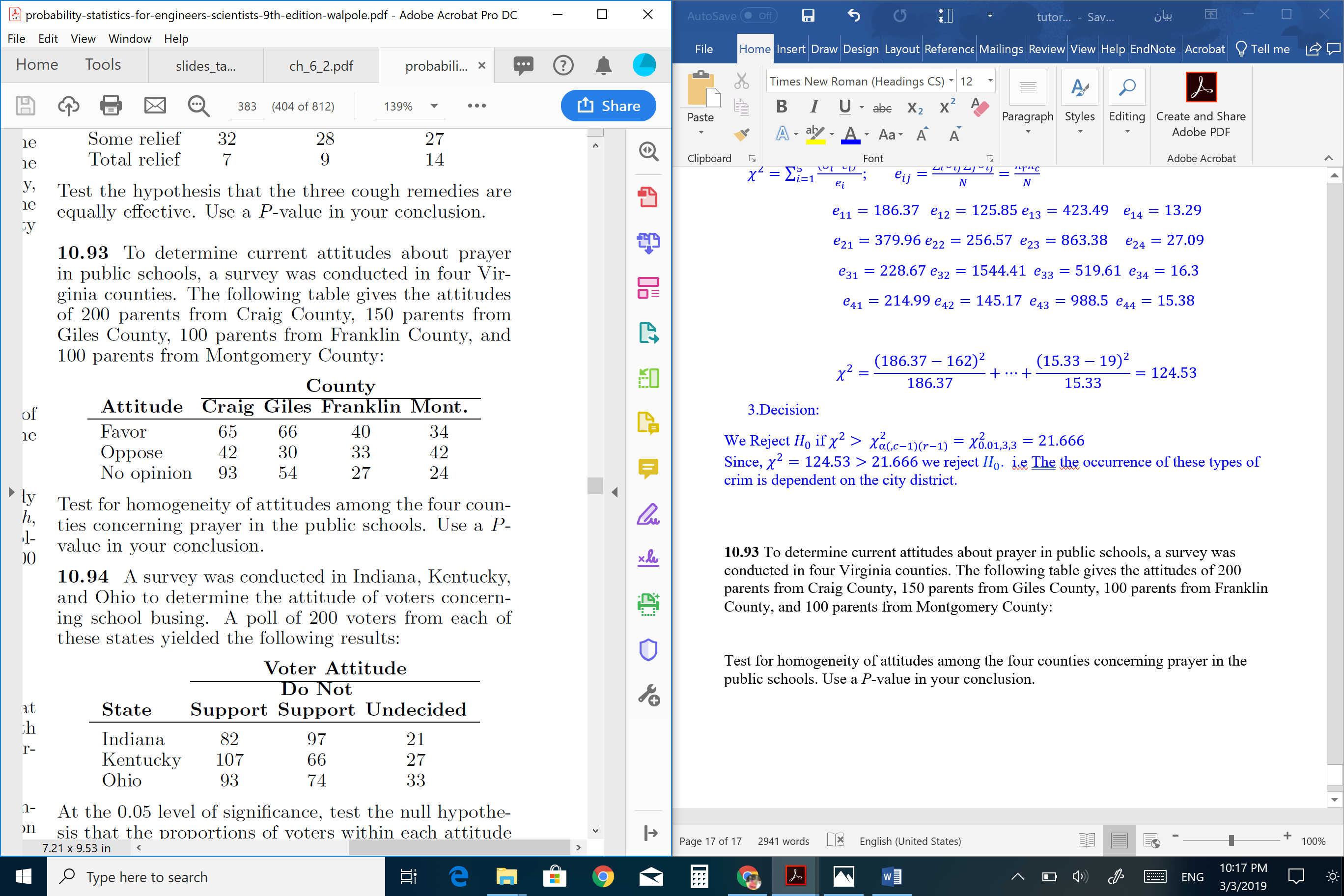
Use a 0.01 level of significance and test the hypothesis that the time spent watching television is independent of whether the viewer is male or female.

**10.89** A criminologist conducted a survey to determine whether the incidence of certain types of crime varied from one part of a large city to another. The particular crimes of interest were assault, burglary, larceny, and homicide. The following table shows the numbers of crimes committed in four areas of the city during the past year.



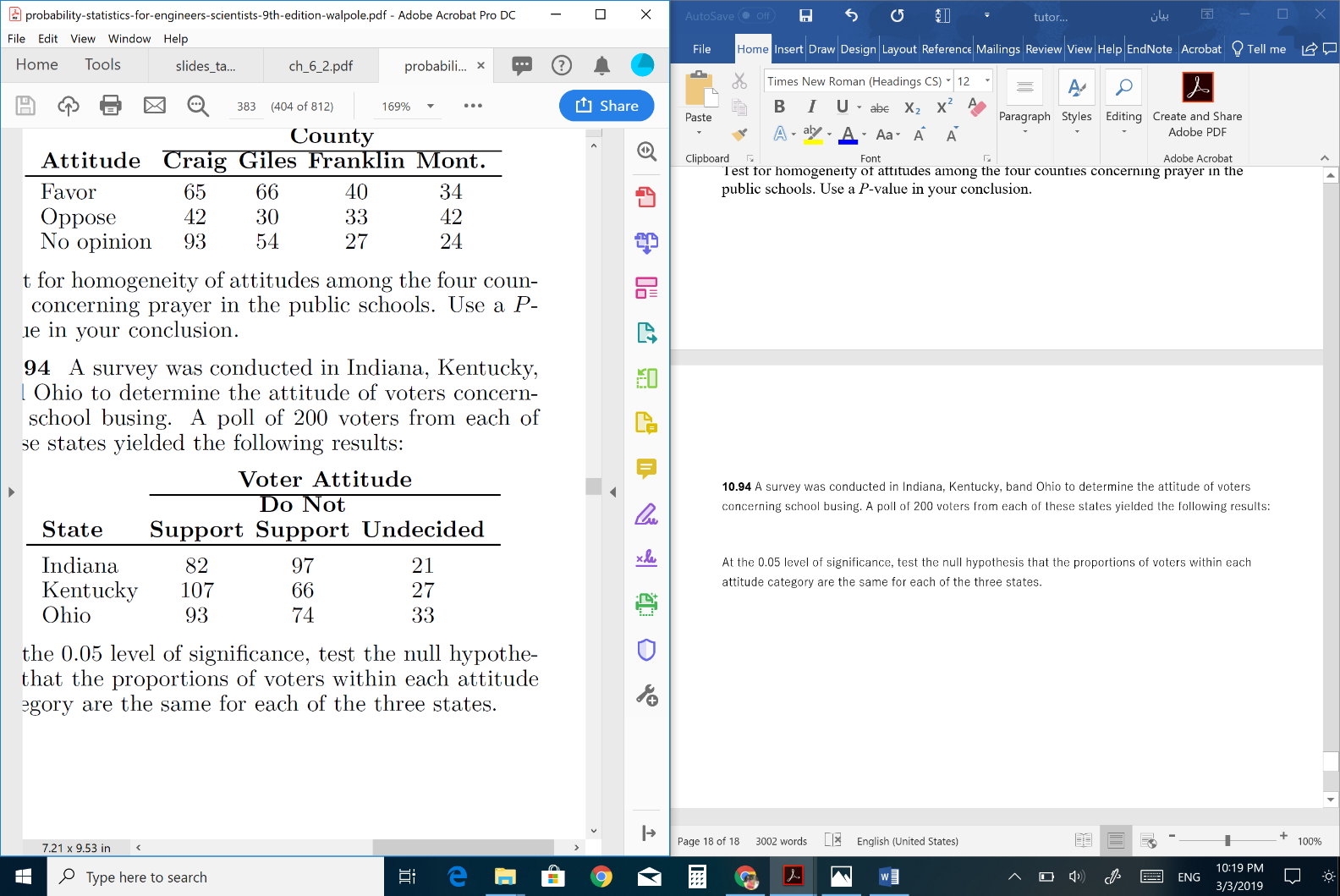
Can we conclude from these data at the 0.01 level of significance that the occurrence of these types of crime is dependent on the city district?

**10.93** To determine current attitudes about prayer in public schools, a survey was conducted in four Virginia counties. The following table gives the attitudes of 200 parents from Craig County, 150 parents from Giles County, 100 parents from Franklin County, and 100 parents from Montgomery County:



Test for homogeneity of attitudes among the four counties concerning prayer in the public schools. Use a *P-*value in your conclusion.

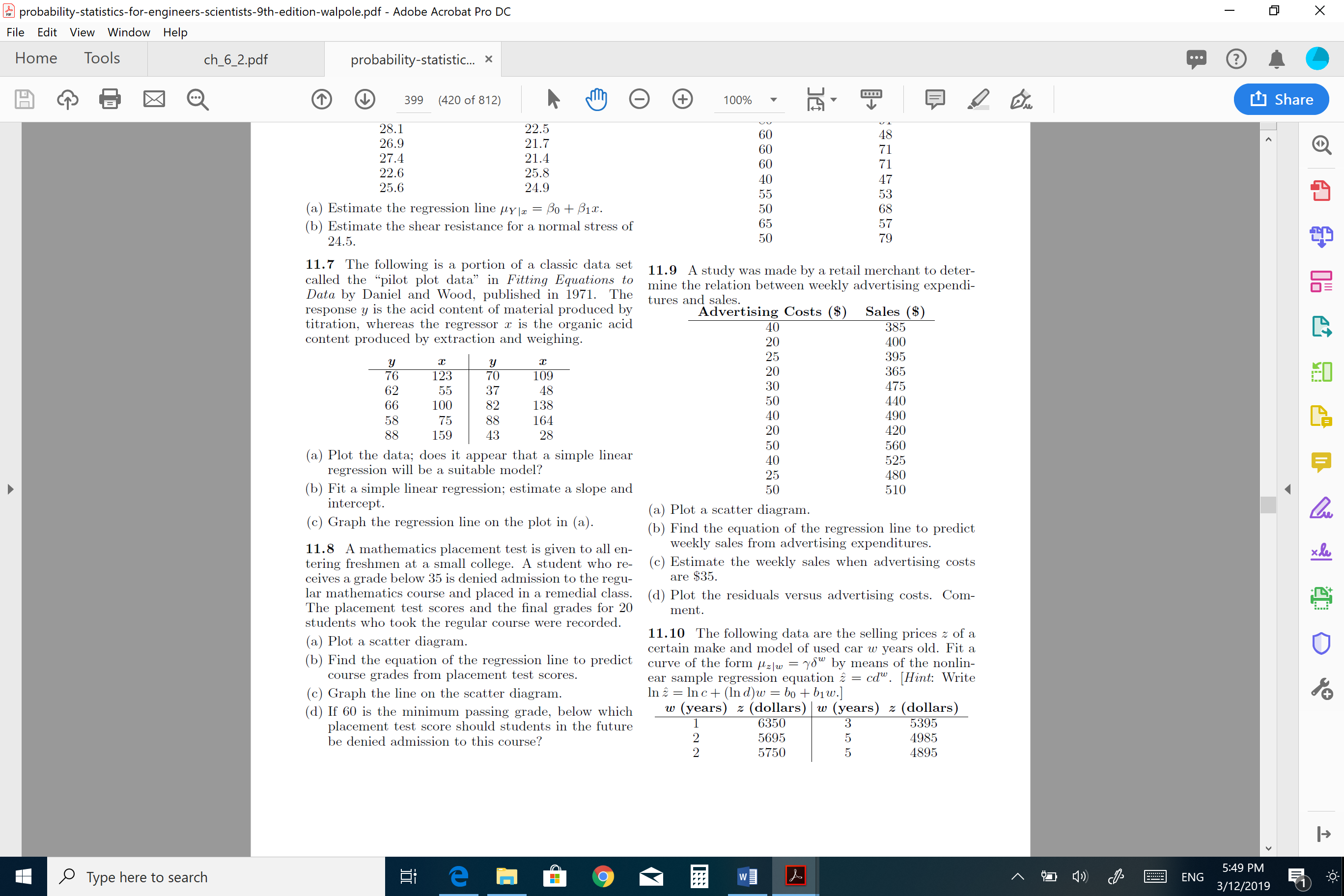
**10.94** A survey was conducted in Indiana, Kentucky, band Ohio to determine the attitude of voters concerning school busing. A poll of 200 voters from each of these states yielded the following results:



At the **0.05** level of significance, test the null hypothesis that the proportions of voters within each attitude category are the same for each of the three states.

**11.7** The following is a portion of a classic data set called the “pilot plot data” in Fitting Equations to Data by Daniel and Wood, published in 1971. The response y is the acid content of material produced by

titration, whereas the regressor x is the organic acid content produced by extraction and weighing.

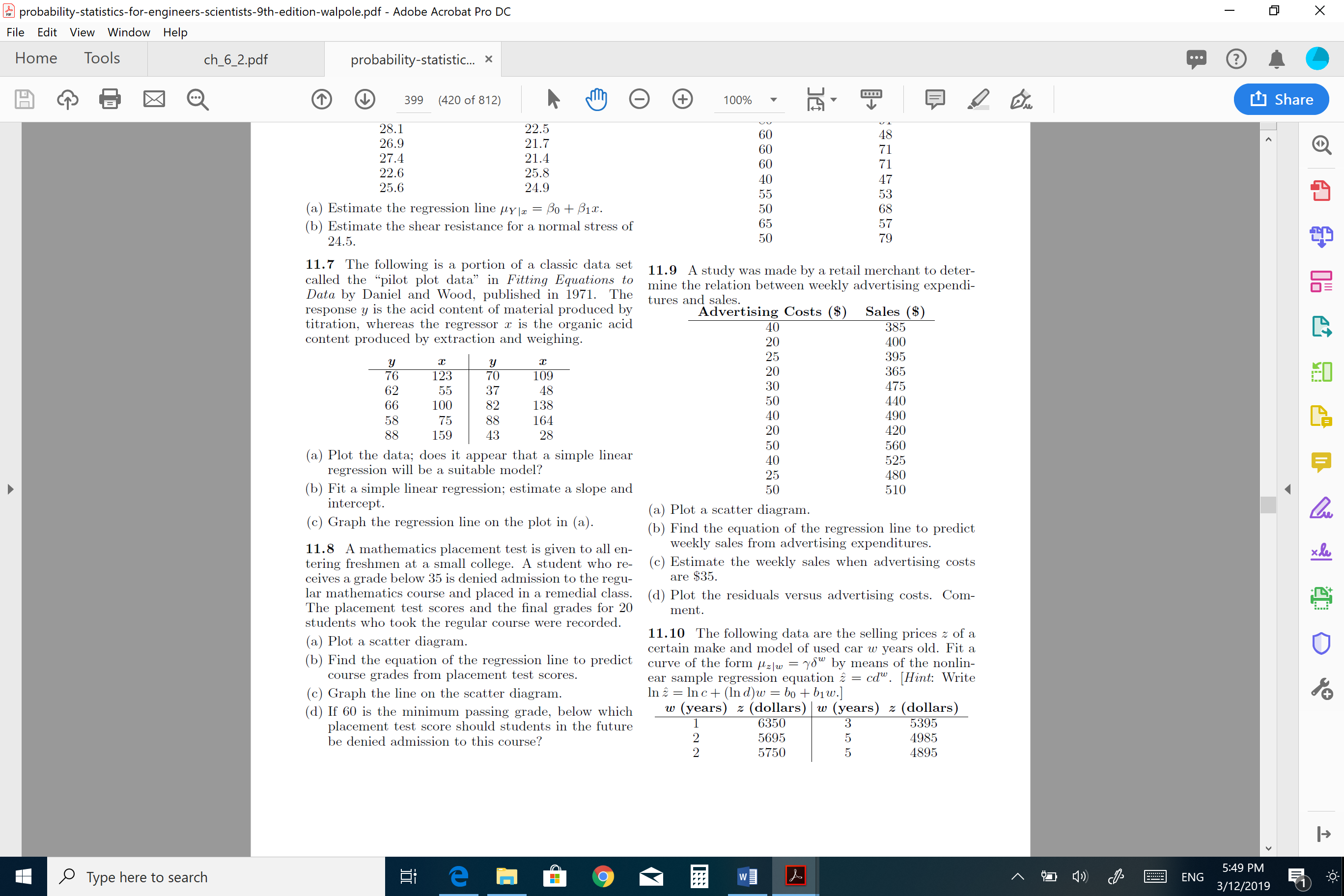


(a) Plot the data; does it appear that a simple linear regression will be a suitable model?

(b) Fit a simple linear regression; estimate a slope and intercept.

(c) Graph the regression line on the plot in (a).

**11.9** A study was made by a retail merchant to determine the relation between weekly advertising expenditures and sales.



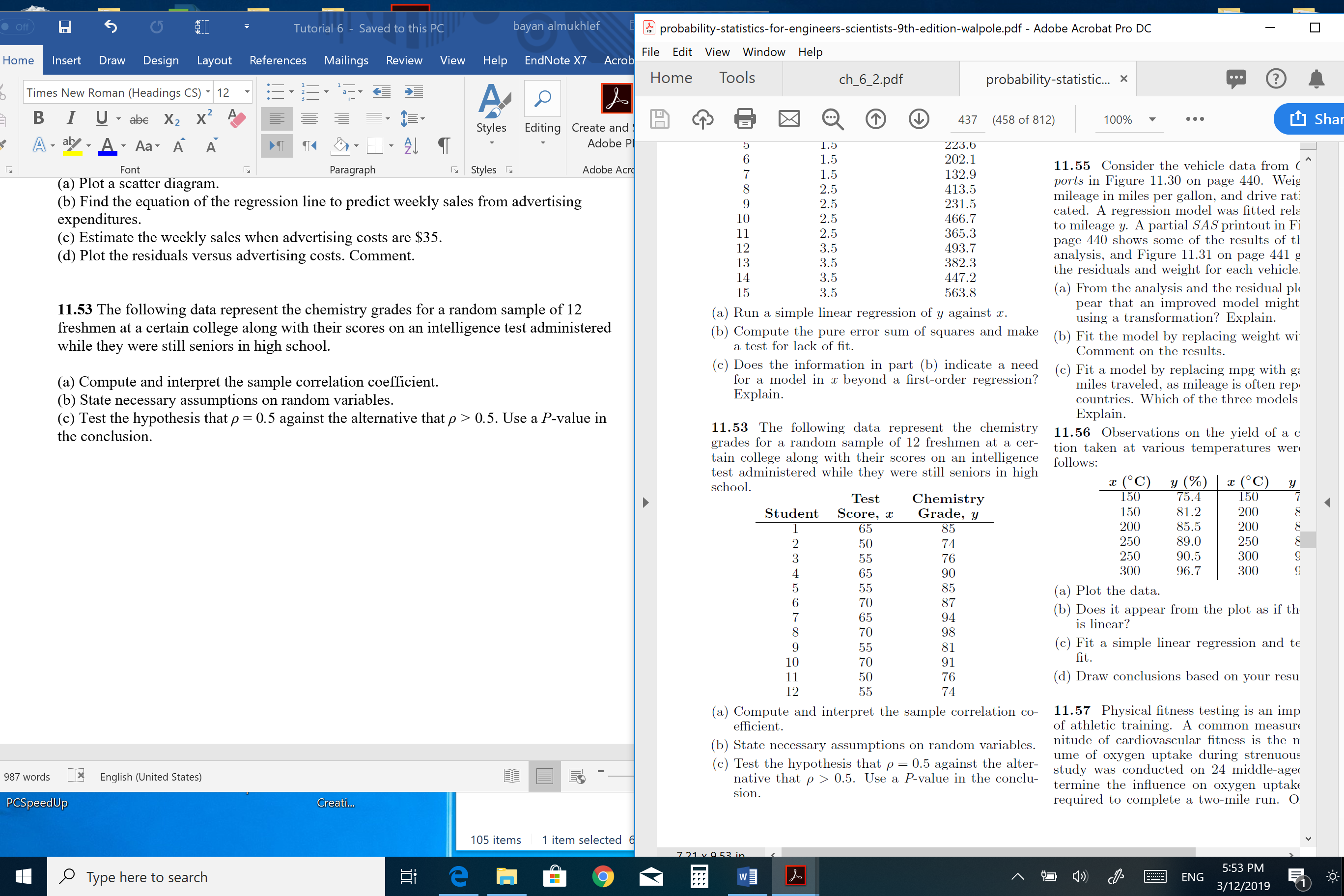
(a) Plot a scatter diagram.

(b) Find the equation of the regression line to predict weekly sales from advertising expenditures.

(c) Estimate the weekly sales when advertising costs are $35.

(d) Plot the residuals versus advertising costs. Comment.

**11.53** The following data represent the chemistry grades for a random sample of 12 freshmen at a certain college along with their scores on an intelligence test administered while they were still seniors in high school.



(a) Compute and interpret the sample correlation coefficient.

(b) State necessary assumptions on random variables.

(c) Test the hypothesis that *ρ* = 0*.*5 against the alternative that *ρ >* 0*.*5. Use a *P*-value in the conclusion.