Homework 1

Math 243

Due June 25th at 11:59 PM

Textbook Exercises

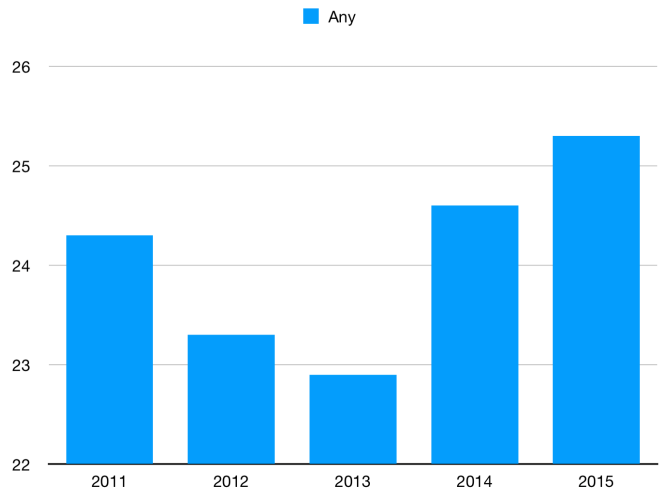
Chapter 1: 23, 25, 28, 31, 36, 38

Chapter 2: 26, 31, 33, 38, 39, 41

Exercise 1: Below is a table giving the percentage of high school students who used certain forms of tobacco within the past 30 days of being surveyed.

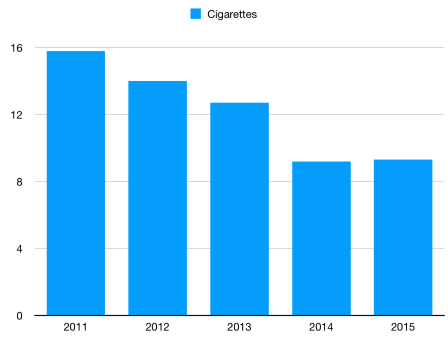
Product	**2011**	**2012**	**2013**	**2014**	**2015**
Any	24.3	23.3	22.9	24.6	25.3
Cigarettes	15.8	14.0	12.7	9.2	9.3
Cigars	12.6	11.6	11.9	8.2	8.6
Pipes	4.5	4.0	4.1	1.5	1.0
Smokeless tobacco	7.3	6.4	5.7	5.5	6.0
E-cigarettes	1.5	2.8	4.5	13.4	16.0

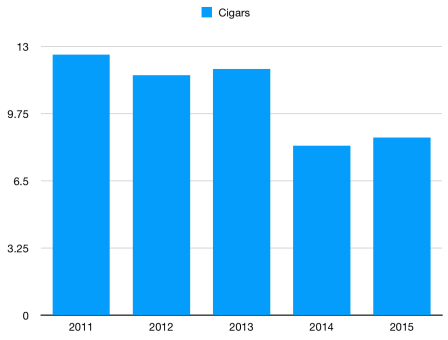
a) Draw a bar chart of the use of any tobacco product between 2011 and 2015. Describe the pattern of change.

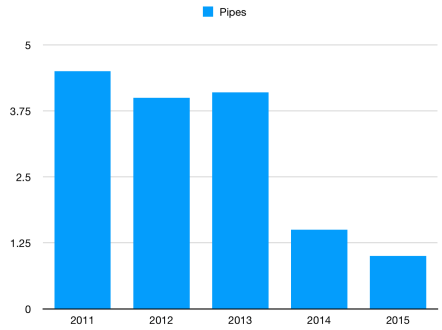


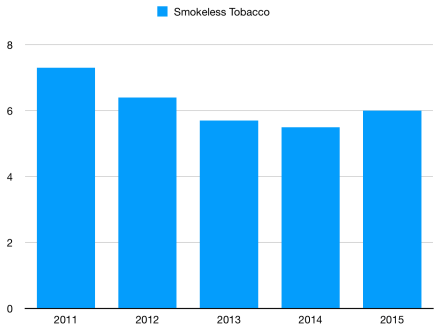
Overall tobacco use seems to have slowly declined until 2014, at which point it spiked.

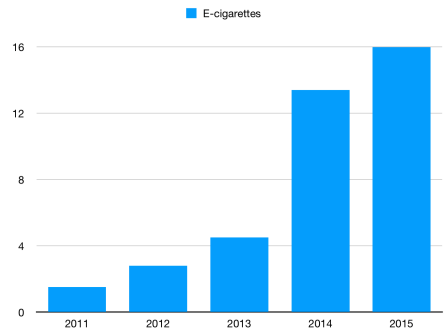
b) Draw bar charts of the use of each individual product between 2011 and 2015.











c) Summarize the overall trends that you see in parts a) and b).

While traditional tobacco use has slowly declined, e-cigarettes have seen a massive increase in use. This is possibly the reason for overall tobacco use to have begun to decline before spiking.

d) Why doesn't it make sense to use pie charts for the previous parts?

Since the tobacco categories are not mutually exclusive, we can't partition one year's total into distinct categories, so a pie chart wouldn't work.

Exercise 2:

a) Create a list of seven numbers such that the minimum is 2, the maximum is 10, the median is 7, the first quartile is 3, and the third quartile is 9.

We're forced to specify 5 of the seven numbers: 2, 3, 7, 9, and 10. The remaining two numbers must fall between 3 and 7, and 7 and 9, respectively, in order for these five to be the five specified quantities. Therefore, one possible set is 2, 3, 5, 7, 8, 9, 10.

b) Characterize all such lists — that is, state the conditions any such list must satisfy. Which of the seven numbers are free to vary, and how can they vary?

Formally, we can have any list $2, 3, x, 7, y, 9, 10$, where $3 \leq x \leq 7$ and $7 \leq y \leq 9$, but that exact language probably won't appear — any equivalent description in words is fine.