

# AP Statistics Summer Assignment

Hello future students and parents,

Welcome to AP Statistics for the 2018-2019 school year! I want to congratulate you on choosing to take on a difficult and different math course. As you move through this course, you will find out that the most challenging parts of AP Statistics are not the calculations. AP Statistics is a course that is not just about finding numbers but using them and understanding them which may require you to think about math in a different way than you are used to. AP Statistics is also challenging because it is a college level course, so you will need to have a college level work ethic. You should expect to have homework every single night and you will need to study for tests in order to do well.

All students taking this course are expected to take the AP Statistics Exam on May 16<sup>th</sup>, 2019. Much of the course work and material will focus on the AP Statistics Exam, and it will be required for all students. For those of you who are seniors, taking this AP course means that you will not be able to take it easy (at least until May 16<sup>th</sup>).

Your first assignment will be this AP Statistics summer assignment. Because AP Statistics is a densely packed course, it is very difficult to cover all the material thoroughly before May 16<sup>th</sup> and still have time to review for the exam. In order to help get us ahead, you will be learning the first unit worth of material by yourself over the summer. You will have videos and notes to help you, but this should be a good preview of the responsibility you will need to have in this course. If you are confused about anything in your summer packet, look it up! Find more youtube videos, websites, etc that can help you answer your questions. This is the kind of initiative you will need to be willing to take.

Your summer work is **not busy work**, it is review and new content for the AP Exam. If you do not complete the summer packet, you will already be behind on the course, and you will struggle to catch up. This summer packet is **not optional, and not bonus**. If you are going to take this course in the fall, you need to commit to thoroughly completing this summer packet and preparing for the year. We will have a unit test on this material within the first two weeks of school.

If you have questions or concerns throughout the summer, I can be reached at [cmarr@enfieldschools.org](mailto:cmarr@enfieldschools.org) (although please be aware that I will be out of the country for several weeks and may not respond promptly).

Have a great summer!  
Ms. Marr

# AP Statistics Summer Assignment

Part 1: Reading and Vocabulary: You will use a free online Statistical tutoring site and the summer assignment videos that will give you information on variable and data displays. While reviewing the information on the site you will be completing a vocabulary list. Follow the steps below:

1. Go to [www.stat Trek.com](http://www.stat Trek.com)
2. Click on “AP Statistics” then “AP Tutorial”
3. On the left side of the screen is a list of general topics. Under each general topic are a list of subtopics. You will be looking under the major topic “Exploring Data”

You will read the following subtopics to complete the vocabulary list:

Overall Topic- The Basics	
Subtopics:	Variables
	Population Vs. Sample
	Central Tendency
	Variability
	Position
General Topic- Charts and Graphs	
	Patterns in data
	Dotplots
	Histograms
	Stemplots
	Boxplots
	Scatterplots
	Comparing Data Sets

Summer assignment videos:

SUMMER VIDEO ONE:

[https://www.youtube.com/watch?feature=player\\_detailpage&v=XPmTISOdPJs](https://www.youtube.com/watch?feature=player_detailpage&v=XPmTISOdPJs)

SUMMER VIDEO TWO:

[https://www.youtube.com/watch?feature=player\\_detailpage&v=j\\_Y\\_0eh-FCQ](https://www.youtube.com/watch?feature=player_detailpage&v=j_Y_0eh-FCQ)

SUMMER VIDEO THREE:

[https://www.youtube.com/watch?feature=player\\_detailpage&v=fbckNjLK7mw](https://www.youtube.com/watch?feature=player_detailpage&v=fbckNjLK7mw)

SUMMER VIDEO FOUR:

[https://www.youtube.com/watch?feature=player\\_detailpage&v=KzVvo0u\\_-o](https://www.youtube.com/watch?feature=player_detailpage&v=KzVvo0u_-o)

How to create histograms:

<https://youtu.be/5-rePNpHr4k>

How to create a cumulative frequency histogram:

[https://www.youtube.com/watch?v=uOlOolX\\_6aI](https://www.youtube.com/watch?v=uOlOolX_6aI)

2. Practice Problems: After reading all of the material above you should be able to complete the questions in the remaining pages of this packer. You should do so in the spaces provided.

Vocabulary List: Please define each of the following terms from the information on the stattrek website and/or the summer videos. When asked provide a UNIQUE example or sketch of the word... One NOT given on the website or in the video and not the one your friends use.

1. Descriptive Statistics:

2. Inferential Statistics:

3. Categorical Variables -

Example:

4. Quantitative Variables -

Example:

5. Discrete Variables -

6. Continuous -

7. Univariate Data -

8. Bivariate Data -

9. Population -

Example:

10. Sample -

Example:

11. Median -

12. Mean -

Formula:

13. Outlier -

14. Parameter -

15. Statistic –

16. Census -

17. Range -

18. Standard Score (z-score) -

Formula:

19. Center –

20. Spread –

21. Variance -

Formula:

22. Standard Deviation –

Formula:

23. Symmetry –

Sketch:

24. Unimodal -

Sketch:

25. Bimodal -

Sketch:

26. Skewness -

Sketch Skewed left:

Sketch Skewed right:

27. Uniform -

Sketch

28. Gaps -

Sketch:

29. Outliers -

Sketch:

30. Dot plots –

31. Bar chart –

32. Histogram –

33. Difference between bar chart and histogram –

34. Stemplots -

35. Boxplots -

36. Quartiles -

37. Range -

38. Interquartile Range -

39. Four ways to describe data sets -

40. Types of graphs that can be used for comparing data -

## Part 2: Practice Problems

### 1. Categorical or Quantitative:

Determine if the variables listed below are quantitative/numerical or categorical/qualitative.

- a. Amount of money earned last week: \_\_\_\_\_
- b. Arm span: \_\_\_\_\_
- c. Birthdate: \_\_\_\_\_
- d. Dominant hand reaction time: \_\_\_\_\_
- e. Favorite sport: \_\_\_\_\_
- f. Height: \_\_\_\_\_
- g. Hours slept per night: \_\_\_\_\_
- h. Language spoken at home: \_\_\_\_\_
- i. Foot length: \_\_\_\_\_
- j. Zip code: \_\_\_\_\_
- k. State of residence: \_\_\_\_\_
- l. Travel method to school: \_\_\_\_\_
- m. Travel time to school: \_\_\_\_\_
- n. Grade: \_\_\_\_\_

### 2. Summary Statistics

- a. Determine the given statistics from the data below on the number of homeruns Mark McGuire hit in each season from 1982-2001.

70	52	22	49	3	32	58	39
39	65	42	29	9	32	9	33

Mean	
Standard Deviation	
Minimum	
Maximum	
Median	
Q1	
Q3	
Range	
IQR	

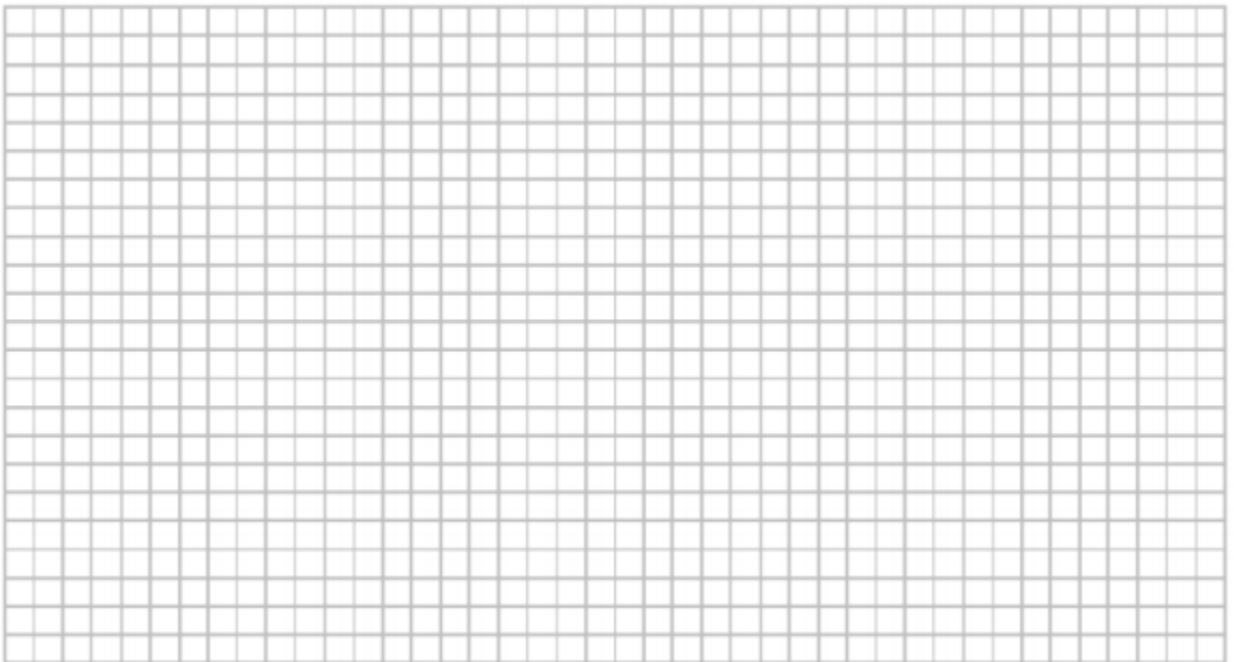
- b. Using the 1.5 IQR Rule, determine if there are any outliers in this data



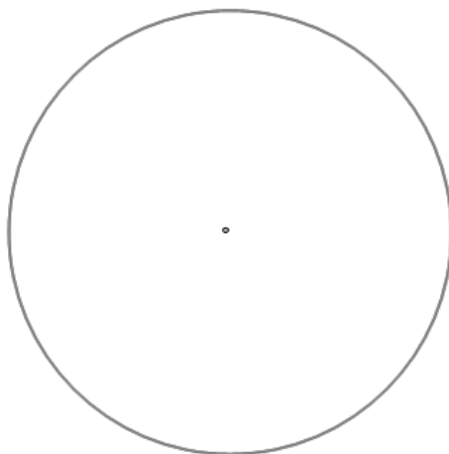
### 3. Accidental Deaths

In 1997, there were 92,353 deaths from accidents in the United States. Among these were 42,340 deaths from motor vehicle accidents, 11,858 from falls, 10,163 from poisoning, 4051 from drowning, and 3601 from fires. The rest were listed as “other” causes.

- a. Find the percent of accidental deaths from each of these causes, rounded to the nearest percent.
- b. What percent of accidental deaths were from “other” causes?
- c. Neatly create a well-labeled **bar graph** of the distribution of causes of accidental deaths. Be sure to include an “other causes” bar.



- d. Create a pie chart for the accidental death percentages.

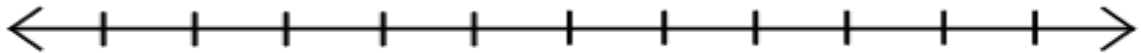


4. It's A Twista!

The data below gives the number of hurricanes that happened each year from 1944 through 200 as reported by *Science* magazine.

3	2	1	4	3	7	2	3	3	2	5	2	2
4	2	2	6	0	2	5	1	3	1	0	3	2
1	0	1	2	3	2	1	2	2	2	3	1	1
1	3	0	1	3	2	1	2	1	1	0	5	6
1	3	5	3									

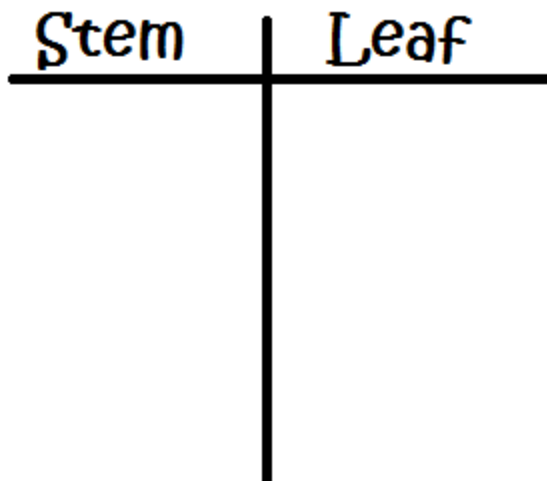
- a. Make a dotplot to display these data. Make sure you include appropriate labels, title, and scale.



5. A marketing consultant observed 50 consecutive shoppers at a supermarket. One variable of interest was how much each shopper spent in the store. Here are the data (round to the nearest dollar), arranged in increasing order:

3	9	13	15	17	18	19	20	21	23
25	26	28	28	32	36	39	43	45	47
50	55	61	83	86					

- a. Make a stemplot using tens of dollars as the stem and dollars as the leaves.



6. Where do older people live?

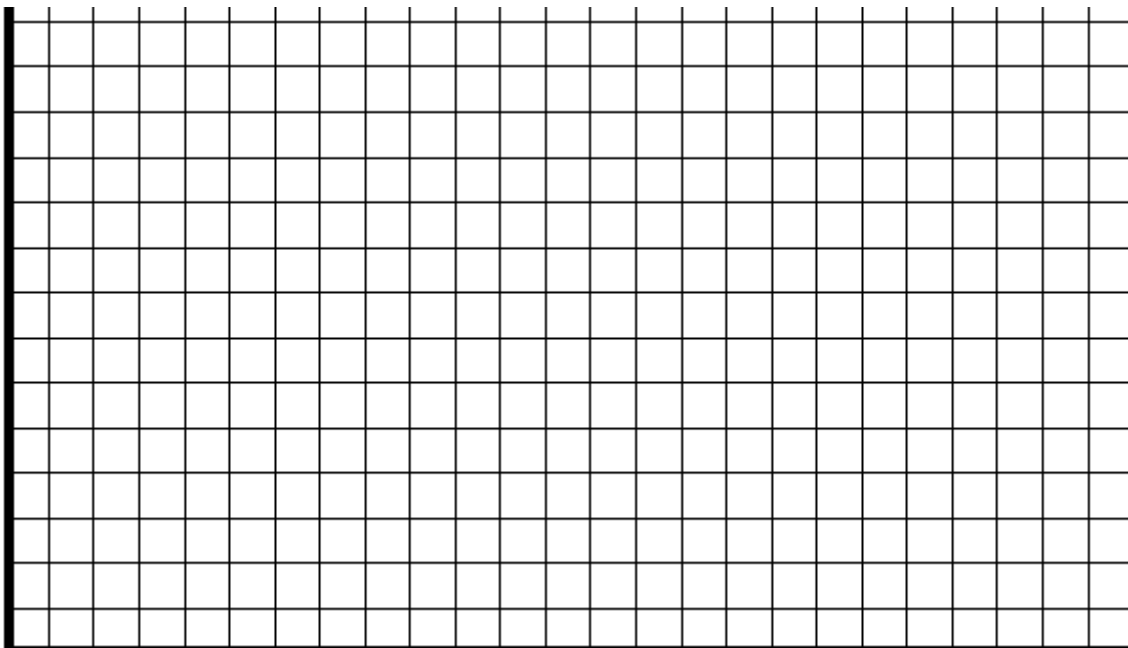
This table gives the percentage of residents aged 65 or older in each of the 50 states.

State	Percent	State	Percent	State	Percent
Alabama	13.1	Louisiana	11.5	Ohio	13.4
Alaska	5.5	Maine	14.1	Oklahoma	13.4
Arizona	13.2	Maryland	11.5	Oregon	13.2
Arkansas	14.3	Massachusetts	14.0	Pennsylvania	15.9
California	11.1	Michigan	12.5	Rhode Island	15.6
Colorado	10.1	Minnesota	12.3	South Carolina	12.2
Connecticut	14.3	Mississippi	12.2	South Dakota	14.3
Delaware	13.0	Missouri	13.7	Tennessee	12.5
Florida	18.3	Montana	13.3	Texas	10.1
Georgia	9.9	Nebraska	13.8	Utah	8.8
Hawaii	13.3	Nevada	11.5	Vermont	12.3
Idaho	11.3	New Hampshire	12.0	Virginia	11.3
Illinois	12.4	New Jersey	13.6	Washington	11.5
Indiana	12.5	New Mexico	11.4	West Virginia	15.2
Iowa	15.1	New York	13.3	Wisconsin	13.2
Kansas	13.5	North Carolina	12.5	Wyoming	11.5
Kentucky	12.5	North Dakota	14.4		

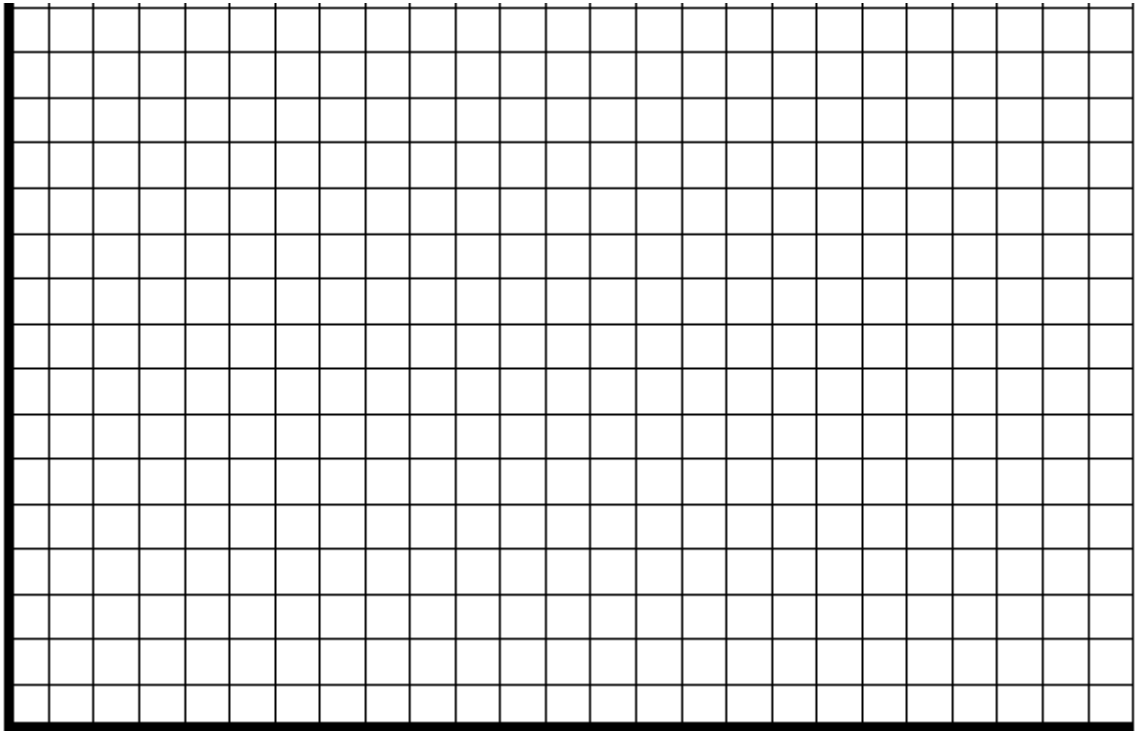
- a. Finish the chart of bin widths, then fill in the frequency, relative frequency, and cumulative frequency table columns.

Bin Widths	Frequency	Relative Frequency	Cumulative Frequency
4 to <6			
6 to <8			
8 to <10			

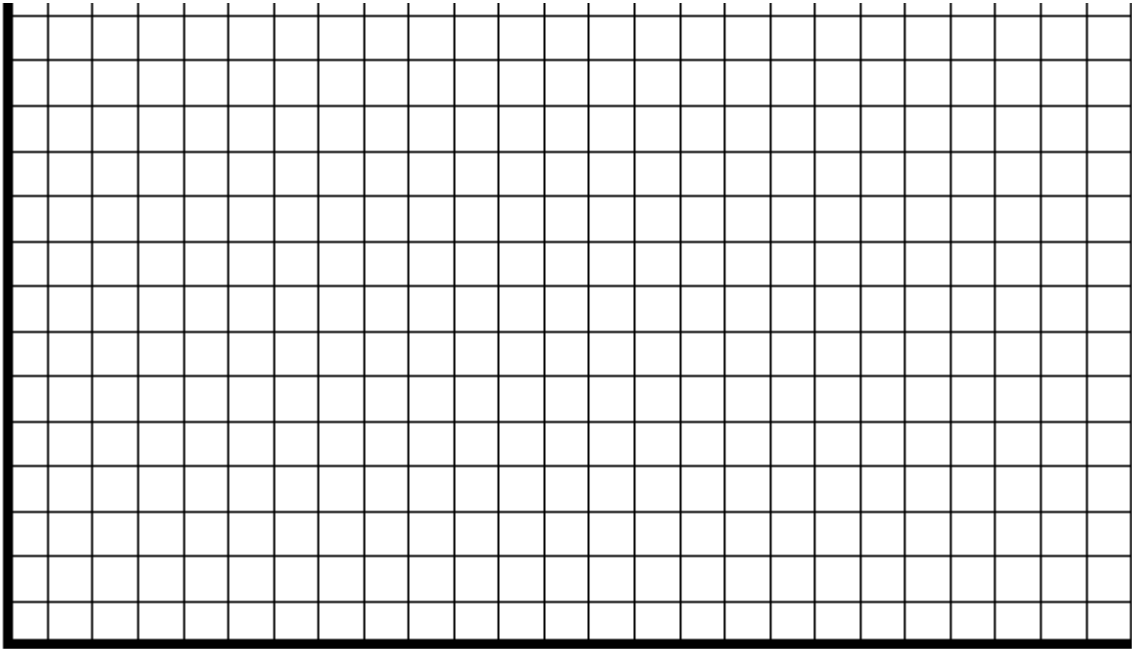
Frequency Histogram



Relative Frequency Histogram



Cumulative Frequency Histogram



7. SSHA

Here are the scores on the Survey of Study Habits and Attitudes (SSHA) for 18 second-year college students:

154      109      137      115      152      140      154      178      101      103      126      137      165  
165      129      200      148

And for 20 first-year college students:

108      140      114      91      180      115      126      92      169      146      109      132      75  
88      113      151      70      115      187      104

- a. Put the data values in order for each year. Compute numerical summaries for each year.

Second Year		First Year	
Mean		Mean	
Minimum		Minimum	
Q1		Q1	
Median		Median	
Q3		Q3	
Maximum		Maximum	
Range		Range	
IQR		IQR	

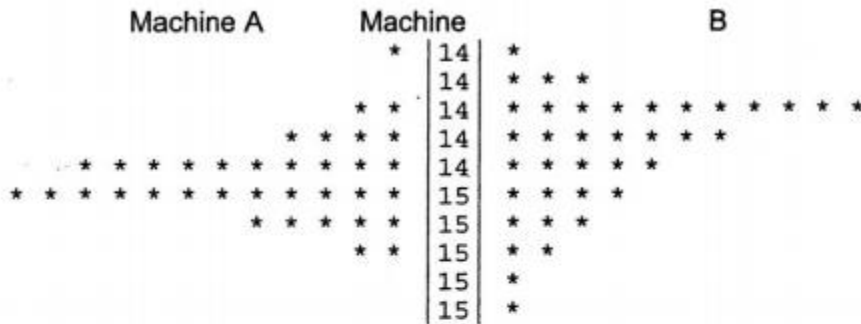
- b. Using the minimum, Q1, Median, Q3, and Maximum from each year, make parallel boxplots to compare the distributions.



Part 3: AP Open Ended Questions

1.

SugarBitz candies are packaged in 15 oz. snack-size bags. The back-to-back plot below displays the weights (in ounces) of two samples of SugarBitz bags filled by different filling machines. The weights ranged from 14.1 oz. to 15.9 oz.



(a) Compare the distributions of weights of bags packaged by the two machines.

(b) The company wishes to be as consistent as possible when packing its snack bags. Which machine would be *least* likely to produce snack bags of SugarBitz that have a consistent weight? Explain.

(c) Suppose the company filled its bags using the machine you chose in part (b). Which measure of center, mean or median, would be closer to the advertised 15oz.? Explain why you chose this measure.

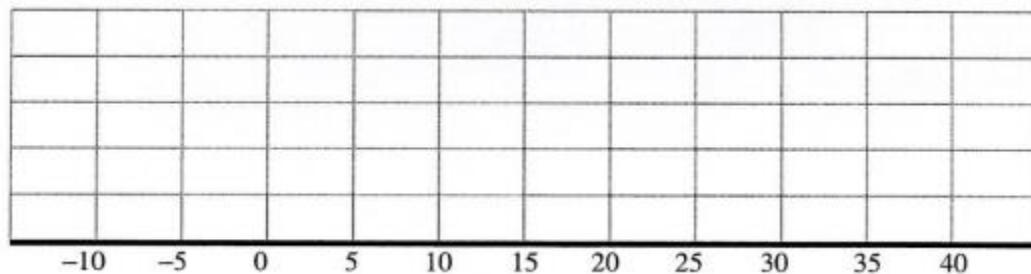
2. A consumer advocate conducted a test of two population gasoline additives, A and B. There are claims that the use of either of these additives will increase gasoline mileage in cars. A random sample of 30 cars was selected. Each car was filled with gasoline and the cars were run under the same driving conditions until the gas tanks were empty. The distance traveled was recorded for each car.

Additive A was randomly assigned to 15 of the cars and additive B was randomly assigned to the other 15 cars. The gas tank of each car was filled with gasoline and the assigned additive. The cars were again run under the same driving conditions until the tanks were empty. The distance traveled was recorded and the difference in the distance with the additive minus the distance without the additive for each car was calculated.

The following table summarizes the calculated differences. note that negative values indicate less distance was traveled with the additive than without the additive.

Additive	Values Below $Q_1$	$Q_1$	Median	$Q_3$	Values Above $Q_3$
A	-10, -8, -2	1	3	4	5, 7, 9
B	-5, -3, -3	-2	1	25	35, 37, 40

- a. On the grid below, display parallel boxplots (showing outliers, if any) of the differences of the two additives.



- b. Two ways that the effectiveness of a gasoline additive can be evaluated are by looking at either
- The proportion of cars that have increased gas mileage when the additive is used in those cars.
  - or
  - the mean increase in gas mileage when the additive is used in those cars.
- i. Which additive, A or B, would you recommend if the goal is to increase gas mileage in the highest proportion of cars? Explain your choice.
- ii. Which additive, A or B, would you recommend if the goal is to have the highest mean increase in gas mileage? Explain your choice.