

# Revision Chapter 11

اسم الطالبة:

الصف:

19	أن يتنبأ بأعمال مجموعة أكبر باستخدام نتائج عينة باستخدام (جدول).	4, 5	818
	Predict actions of a large group by using a sample (Table).	4, 5	

The table shows the results of a survey of Hamilton Middle School seventh graders. Use the table to find the following probabilities.

$$total = 17 + 14 + 11 + 6 + 2 = 50$$

Career field	Students
Entertainment	17
Education	14
Medicine	11
public service	6
Sport	2

4. Predict how many students out of 400 will enter the education field.

$$\frac{14}{50} = \frac{x}{400}$$

$$50x = 14 \times 400$$

$$\frac{50x}{50} = \frac{5600}{50}$$

$$\Rightarrow x = 112$$

5. Predict how many students out of 500 will enter the medical field.

$$\frac{11}{50} = \frac{x}{500}$$

$$50x = 11 \times 500$$

$$\frac{50x}{50} = \frac{5500}{50}$$

$$\Rightarrow x = 110$$

19	أن يتنبأ بأعمال مجموعة أكبر باستخدام نتائج عينة باستخدام (جدول).	4, 5	818
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5 Three out of every 10 students ages 6–14 have a magazine subscription. Suppose there are 30 students in Eiman's class. About how many will have a magazine subscription? (Example 2)

$$\frac{3}{10} = \frac{x}{30}$$

$$10x = 3 \times 30$$

$$\frac{10x}{10} = \frac{90}{10}$$

$$\Rightarrow \boxed{x = 9}$$

14. Refer to Exercise 13. Suppose Bilal plays a total of 60 games with his friends over the next month. Predict how many of these games Bilal will win. \_\_\_\_\_

$$\frac{12}{20} = \frac{x}{60}$$

$$20x = 12 \times 60$$

$$\frac{20x}{20} = \frac{720}{20}$$

$$\Rightarrow \boxed{x = 36}$$

20	أن يتنبأ بأفعال مجموعة أكبر باستخدام نتائج عينة باستخدام معلات النسبة.	( مثال 3، 4 )	817
	Predict actions of a large group by using percent equation.	(Example 4, 3)	

### Example

3. A survey found that 85% of people use emoticons on their instant messengers. Predict how many of the 2,450 students at Washington Middle School use emoticons.



$$\frac{85}{100} \times \frac{x}{2450}$$

$$x = 2082.5$$

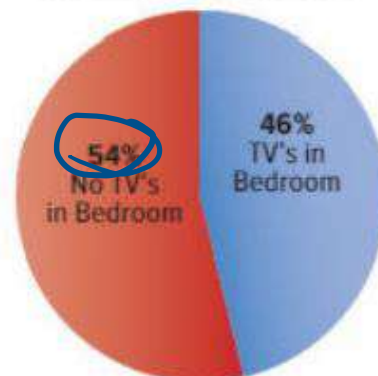
$$100x = 85 \times 2450$$

$$\frac{100x}{100} = \frac{208250}{100}$$

### Example

4. The circle graph shows the results of a survey in which children ages 8 to 12 were asked whether they have a television in their bedroom. Predict how many out of 1,725 students would not have a television in their bedroom.

TV's in the Bedroom



$$\frac{54}{100} \times \frac{x}{1725}$$

$$100x = 54 \times 1725$$

$$\frac{100x}{100} = \frac{93150}{100}$$

$$x = 931.5$$



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	Predict actions of a large group by using percent equation.	(Example 4, 3)	

6. Use the circle graph that shows the results of a poll to which 60,000 teens responded. Predict how many of the approximately 28 million teens in the United States would buy a music CD if they were given AED20. (Examples 3 and 4)

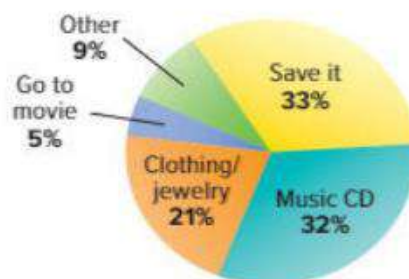
total 28 000 000

$$\frac{32}{100} \times \frac{x}{28\,000\,000}$$

$$\frac{100x}{100} = \frac{32 \times 28\,000\,000}{100}$$

$$x = 8960000$$

How Would You Spend a Gift of AED20?

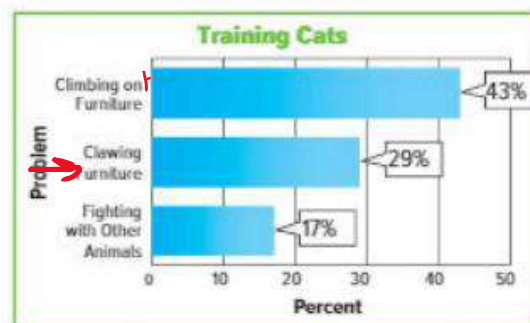


6. Use the graph that shows the percent of cat owners who train their cats in each category. (Examples 3 and 4)

- a. Out of 255 cat owners, predict how many owners trained their cat not to climb on furniture.

$$\frac{43}{100} = \frac{x}{255} \quad \left\{ \begin{array}{l} \frac{100x}{100} = \frac{10\,965}{100} \\ 100x = 43 \times 255 \\ x = 109.65 \end{array} \right.$$

- b. Out of 316 cat owners, predict how many cat owners trained their cat not to claw on furniture.



$$\frac{29}{100} \times \frac{x}{316}$$

$$100x = 29 \times 316$$

$$\frac{100x}{100} = \frac{9164}{100}$$

$$\Rightarrow x = 91.64$$

21	يحدد أنواع العينات وصحتها وهل الإستنتاج سليم.	2, 3, a	825
	Determine whether sampling methods are valid and whether the conclusion is valid.	2, 3, a	

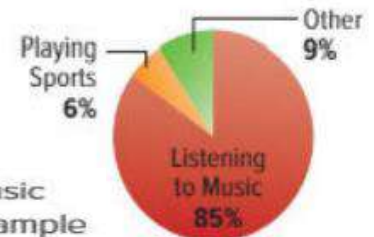
Determine whether each conclusion is valid. Justify your answer.

- 2.** Every tenth person who walks into a department store is surveyed to determine his or her music preference. Out of 150 customers, 70 stated that they prefer rock music. The manager concludes that about half of all customers prefer rock music.

Since the population is every tenth customer of a department store, the sample is an unbiased, systematic random sample. The conclusion is valid.

- 3.** The customers of a music store are surveyed to determine their favorite leisure time activity. The results are shown in the graph. The store manager concludes that most people prefer to listen to music in their leisure time.

Leisure Time Activities



The customers of a music store probably like to listen to music in their leisure time. The sample is a biased, convenience sample since all of the people surveyed are in one specific location. The conclusion is not valid.

- a.** A radio station asks its listeners to indicate their preference for one of two candidates in an upcoming election. Seventy-two percent of the listeners who responded preferred candidate A, so the radio station announced that candidate A would win the election. Is the conclusion valid? Justify your answer.

Voluntary response sample ( biased ).

The conclusion is not valid . The population is restricted to listeners of that radio station.



22	تحديد نوع العينة وما إذا كانت طريقة جمع العينة سليمة..	(مثال 4)، 1، 2	826
	Determine the type of sample and whether the sample collection method is valid..	(Examples 4), 1, 2	



## Example

4. A store sells 3 types of pants: jeans, capris, and cargos. The store workers survey 50 customers at random about their favorite type of pants. The survey responses are indicated at the right. If 450 pairs of pants are ordered, how many should be jeans?

Type	Number
Jeans	25
Capris	15
Cargos	10

First, determine whether the sample method is valid. The sample is a simple random sample since customers were randomly selected. Thus, the sample method is valid.

$$\frac{25}{50} = \frac{x}{450} \quad \left\{ \quad \frac{50x}{50} = \frac{11250}{50} \right.$$

$$50x = 25 \times 450$$

$$x = 225$$

1. Husam is trying to decide which of three golf courses is the best. He randomly surveyed people at a sports store and recorded the results in the table. Is the sample method valid? If so, suppose Husam surveyed 150 more people. How many people would be expected to vote for Rolling Meadows? (Example 4)

Course	Number
Whispering Trail	10
Tall Pines	8
Rolling Meadows	7

This is a simple random sample. So, the sample is valid;

42 people.

$$\frac{7}{25} = \frac{x}{150}$$

$$25x = 7 \times 150$$

$$\left\{ \quad x = 42 \right.$$

$$\frac{25x}{25} = \frac{1050}{25}$$

2. To find how much money the average American family spends to cool their home, 100 Alaskan families are surveyed at random. Of the families, 85 said that they spend less than AED75 per month on cooling. The researcher concluded that the average American family spends less than AED75 on cooling per month. Is the conclusion valid? Explain. (Examples 1-3)

The conclusion is not valid. This is a biased, convenience sample, since people in other states would spend much more than those in Alaska.



22	تحديد نوع العينة وما إذا كانت طريقة جمع العينة سليمة.	(مثال 4)، 1، 2	826
	Determine the type of sample and whether the sample collection method is valid..	(Examples 4), 1, 2	

Determine whether each conclusion is valid. Justify your answer.

(Examples 1-3)

1. To evaluate the quality of their product, a manufacturer of cell phones checks every 50th phone off the assembly line. Out of 200 phones tested, 4 are defective. The manager concludes that about 2% of the cell phones produced will be defective.



The conclusion is valid. This is an unbiased systematic random sample.

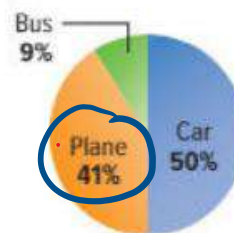
2. To determine whether the students will attend an arts festival at the school, Hassan surveys his friends in the art club. All of Hassan's friends plan to attend. So, Hassan assumes that all the students at his school will also attend.

The conclusion is not valid. This is a biased convenience sample, since only art club members were surveyed.

3. A random sample of people at a mall shows that 22 prefer to take a family trip by car, 18 prefer to travel by plane, and 4 prefer to travel by bus. Is the sample method valid? If so, how many people out of 500 would you expect to say they prefer to travel by plane? (Example 4)

This is a simple random sample. So, the sample is valid; about 205 people.

Preferred Ways to Travel



$$\frac{41}{100} = \frac{x}{500}$$

$$100x = 41 \times 500$$

$$100x = \frac{20500}{100}$$

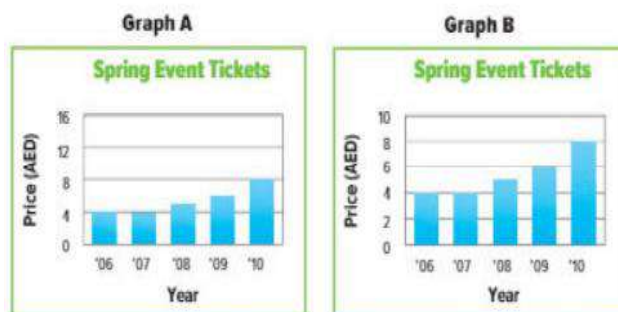
$$\Rightarrow x = 205$$

إعداد المعلمة: سعاد عاتف عبدالحفيظ



24	تحديد أي التمثيلات البانية تمثل القيم بشكل معين للتأثير على الشخص الذي يتابعها. Determine which graphs represent values in a particular way to influence the person following them.	مثال 1 ، a (Example 1) , a	836
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## 1. Explain how the graphs differ.



The graphs show the same data. However, the graphs differ in that Graph A uses an interval of 4, and Graph B uses an interval of 2.

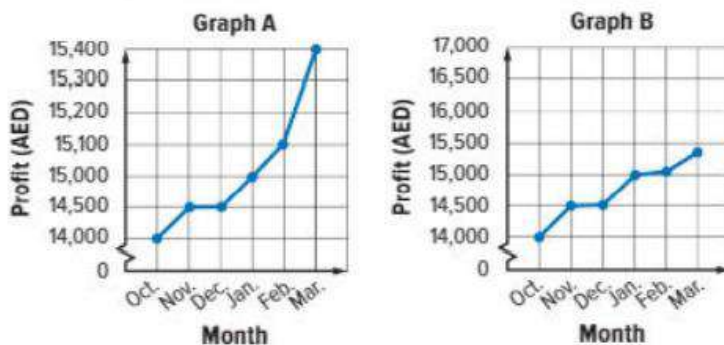
**Which graph appears to show a sharper increase in price?**

Graph B makes it appear that the prices increased more rapidly even though the price increase is the same.

**Which graph might the Student Council use to show that while ticket prices have risen, the increase is not significant? Why?**

They might use Graph A. The scale used on the vertical axis of this graph makes the increase appear less significant.

- a. The line graphs show monthly profits of a company from October to March. Which graph suggests that the business is extremely profitable? Is this a valid conclusion? Explain.



Both graphs show a profit, in graph A the increase profits are exaggerated due to the intervals of both 15100 AED and 15400 AED

23	أي المقاييس التالية هو مقياس مُضلل لوصف البيانات؟ Which of the following measures is misleading to describe data?	(مثال 2) ، b (Examples 2) , b	837
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### Example

2. An amusement park boasts that the average height of their roller coasters is 51 meters Explain how this might be misleading.

Mean  $\frac{32 + 40 + 35 + 110 + 38}{5} = \frac{255}{5}$   
= 170

Median 32, 35, 38, 40, 110

Mode none

The average used by the park was the mean. This measure is much greater than most of the heights listed because of the coaster that is 110 meters. So, it is misleading to use this measure to attract visitors.

A more appropriate measure to describe the data is the median, 38 meters, which is closer to the height of most of the coasters.

Park Roller Coaster Heights	
Coaster	Height (m)
Viper	32
Monster	40
Red Zip	35
Tornado	110
Riptide	38

- b. Find the mean, median, and mode of the sofa prices shown in the table. Which measurement might be misleading in describing the average cost of a sofa? Explain.

b. **mean: AED1,290;**  
**median: AED1,400;**  
**mode: AED1,400;**  
**Sample answer:**  
**The mean would be misleading because the value of the mean is lower than most of the data.**

Sofa Prices	
Sofa Style	Cost
leather	AED1,700
reclining	AED1,400
DIY assembly	AED350
sectional	AED1,600
micro-fiber	AED1,400

23	أي المقاييس التالية هو مقياس مُضلل لوصف البيانات؟ Which of the following measures is misleading to describe data?	(مثال 2) ، b (Examples 2) , b	837
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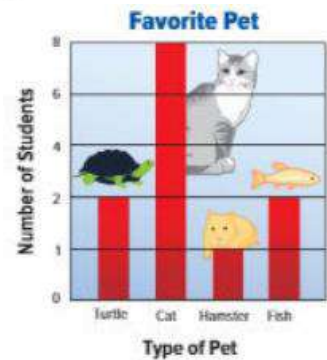
1. The graph suggests that Cy Young had three times as many wins as Jim Galvin. Is this a valid conclusion? Explain. (Example 1)

The bar shows Cy Young had three times as Jim Galvin .  
Jim Galvin win 350 points but Cy Young 511 points .  
So the conclusion not valid ( not true)



2. The graph at the right shows the results of a survey to determine students' favorite pets. Why is the graph misleading? (Example 1)

The vertical axis not consistent .  
It starts at 0 , then goes by 1 to become 2 , then jumps to 4 .  
The intervals on the vertical axis inconsistent .







23	أي المقاييس التالية هو مقياس فضّل لوصف البيانات؟	(مثال 2) ، b	837
	Which of the following measures is misleading to describe data?	(Examples 2) , b	

3. The table lists the five largest land vehicle tunnels in the United States. Write a convincing argument for which measure of center you would use to emphasize the average length of the tunnels. (Example 2)

**Sample answer: The mean is 2591 and the median is 2,682. Since the median is greater than the mean, use the median to emphasize the average length.**

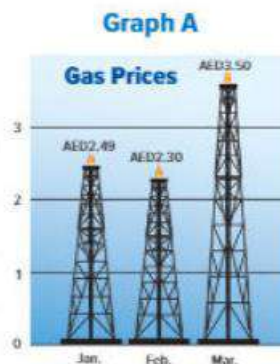
$$\text{mean} = \frac{3990 + 2688 + 2682 + 1822 + 1776}{5} = 2591.6$$

$$\text{median} \Rightarrow 1776, 1822, \boxed{2682}, 2688, 3990$$

U.S. Vehicle Tunnels	Length (ft)
Anton Anderson Memorial	3,990
E. Johnson Memorial	2,688
Eisenhower Memorial	2,682
Allegheny	1,822
Liberty Tubes	1,776

- Which graph could be used to indicate a greater increase in monthly gas prices? Explain. (Example 1)

**Graph B; Sample answer: The ratio of the area of the gas pumps in the graph on the right are not proportional to the cost of gas.**



For Exercises 2 and 3, use the table. (Example 2)

2. Find the mean, median, and mode of the data. Which measure might be misleading in describing the average annual number of visitors who visit these sights? Explain.

**5,580,000; 4,600,000; 4,600,000; The mean because the value of the mean is much higher in value than most of the data.**

Annual Sight-Seeing Visitors	
Sight	Visitors
Cape Cod	4,600,000
Grand Canyon	4,500,000
Lincoln Memorial	4,000,000
Castle Clinton	4,600,000
Smoky Mountains	10,200,000

- Which measure would be best if you wanted a value close to the most number of visitors? Explain.

**The median or the mode because they are much closer in value to most of the data.**

$$\text{mean} = \frac{4000000 + 4600000 + 4500000 + 4600000 + 10200000}{5} = 5580000$$

$$\text{median } 4000000, 4500000, \boxed{4600000}, 4600000, 10200000$$

median

إعداد المعلمة: سعاد عاطف عبدالحفيظ

25	أي مقياس التمرکز هو الأنسب للمقارنة بين مجموعتين من البيانات الممثلة بالنقاط المجمعة .	مثال (2,3) b, c	851, 852
	Which center measures is most appropriate to compare two data sets using line plots.	Examples (2,3) b, c	

### Example

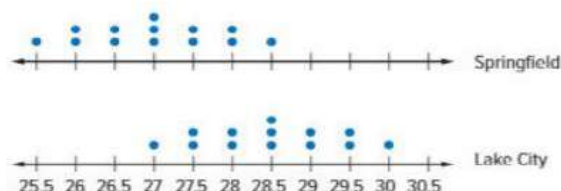
2. The double dot plot below shows the daily high temperatures for two cities for thirteen days. Compare the centers and variations of the two populations. Write an inference you can draw about the two populations.

Both dot plots are symmetric. Use the mean to compare the centers and use the mean absolute deviation, rounded to the nearest tenth, to compare the variations.

	Springfield	Lake City
Mean	27	28.5
Mean Absolute Deviation	0.8	0.8

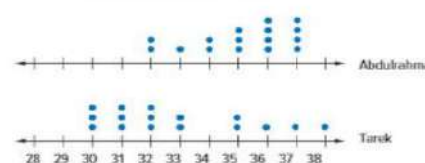
While both cities have the same variation, or spread of data about each of their means, Lake City has a greater mean temperature than Springfield.

Daily High Temperatures (°C)



- b. The double dot plot shows the number of new E-mails in each of Abdulrahman's and Tarek's inboxes for sixteen days. Compare the centers and variations of the two populations. Write an inference you can draw about the two populations.

Number of E-mails in Inbox



Both double dot boxes are not symmetric , so we use median and IQR .

32 32 33 34 34 35 35 35 36 36 36 36 37 37 37 37 Abdulrhman  
30 30 30 31 31 31 32 32 33 33 35 35 36 37 38 Tarek

median	$(35 + 36) \div 2 = 35.5$	$(32+32) \div 2 = 32$
IQR	Q1 = 34 , Q3=36.5 IQR= 36.5 - 34 = 2.5	Q1= 31 , Q3 = 35 IQR= 35 - 31 = 4

There is a greater spread of new emails for Tarek . But Abdurhman center is larger .So you would expect more email for Abdurhman .

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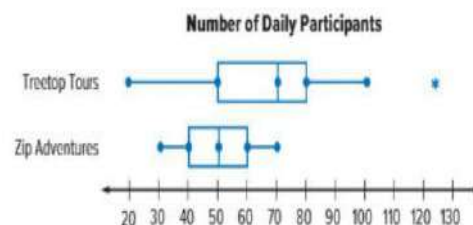
### Example

3. The double box plot shows the daily participants for two zip line companies for one month. Compare the centers and variations of the two populations. Which company has the greater number of daily participants?

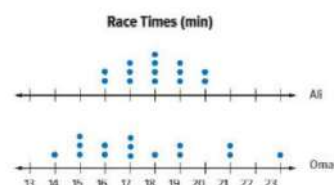
The distribution for Zip Adventures is symmetric, while the distribution for Treetop Tours is not symmetric. Use the median and the interquartile range to compare the populations.

	Treetop Tours	Zip Adventures
Median	70	50
Interquartile Range	30	20

Overall, Treetop Tours has a greater number of daily participants. However, Treetop Tours also has a greater variation, so it is more difficult to predict how many participants they may have each day. Zip Adventures has a greater consistency in their distribution.



c. The double dot plot shows Ali's and Omar's race times for a five-kilometer race. Compare the centers and variations of the two populations. Which runner is more likely to run a faster race?



Only one set of data is symmetric , so we use median and IQR .

16 16 17 17 17 18 18 18 19 19 19 20 20 Ali

14 15 15 15 16 16 17 17 18 19 19 21 21 23 Omar

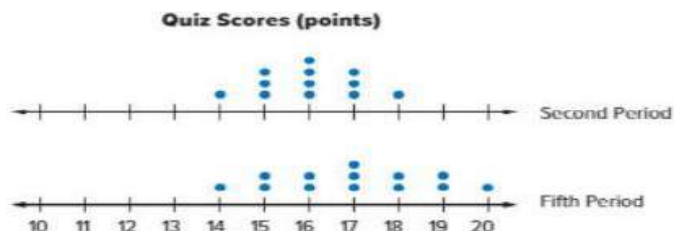
median	$(18 + 18) \div 2 = 18$	17
IQR	Q1 = 17 , Q3 = 19 IQR = $19 - 17 = 2$	Q1 = 15 , Q3 = 19 IQR = $19 - 15 = 4$

Typically, The median of Omar is greater than Ali . But Omar IQR = 4 is greater than Ali so Omar runs faster a race .



25	أي مقياس التركز هو الأنسب للمقارنة بين مجموعتين من البيانات الممثلة بالنقاط المجمعة .	مثال (2,3) b, c	851, 852
	Which center measures is most appropriate to compare two data sets using line plots.	Examples (2,3) b, c	

1. The double dot plot at the right shows the quiz scores out of 20 points for two different class periods. Compare the centers and variations of the two populations. Round to the nearest tenth. Write an inference you can draw about the two populations. (Examples 1 and 2)



Both set of data are symmetric , so we use mean and mean absolute deviation .

### Mean

$$\text{Second Period} = \frac{14+15+15+16+16+16+16+17+17+17+18}{12}$$

$$= \frac{192}{12} = 16$$

$$\text{Fifth Period} = \frac{14+15+15+16+16+17+17+17+18+18+19+19+20}{13}$$

$$= \frac{221}{13} = 17$$

### Mean absolute deviation

$$\text{Second Period} = \frac{2+1+1+1+0+1+1+1+2}{12}$$

$$= \frac{10}{12} = 0.8$$

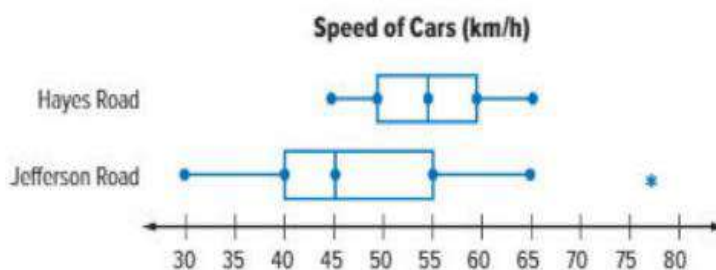
$$\text{Fifth Period} = \frac{3+2+2+1+1+0+1+1+2+2+3}{13}$$

$$= \frac{18}{13} = 1.4$$

In second period the mean is 16 and the mean absolute deviation is 0.8 . In fifth period the mean is 17 and the absolute mean deviation is 1.4 .

In fifth period more variation , so more spread .

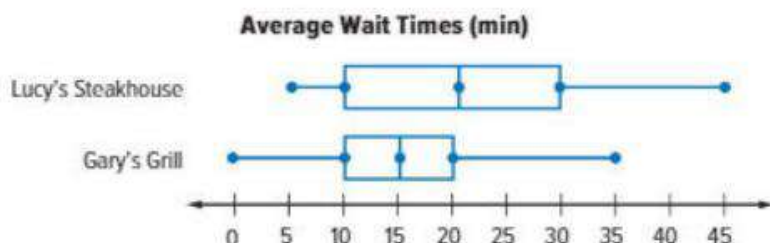
2. The double box plot shows the speeds of cars recorded on two different roads in Hamilton County. Compare the centers and variations of the two populations. On which road are the speeds greater? (Examples 3 and 4)



- Hayes is symmetric and Jefferson is not symmetric.
- Hayes  $\Rightarrow Q_2 = 55$  ,  $IQR = 60 - 50 = 10$
- Jefferson  $\Rightarrow Q_2 = 45$  ,  $IQR = 55 - 40 = 15$
- Hayes has more center but less variation.

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	Which center measures is most appropriate to compare two data sets using line plots.	Examples (2,3) b, c	

Obaid randomly asked customers at two different restaurants how long they waited for a table before they were seated. The double box plot shows the results. Compare their centers and variations. Write an inference you can draw about the two populations. (Examples 1 and 2)



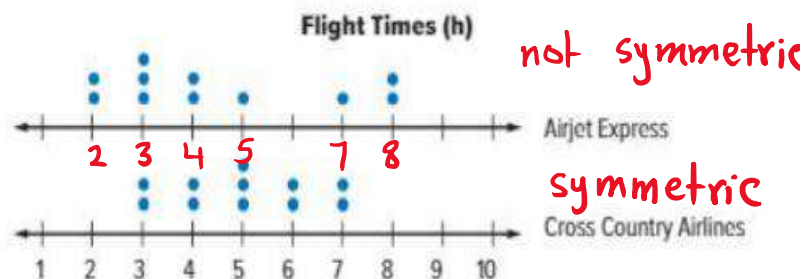
Lucy → Both are not symmetric

$$Q_2 = 20, IQR = Q_3 - Q_1 = 30 - 10 = 20$$

$$Gary \rightarrow Q_2 = 15, IQR = Q_3 - Q_1 = 20 - 10 = 10$$

Customers will wait more time in Lucy's Steakhouse.

2. The double dot plot shows the times, in hours, for flights of two different airlines flying out of the same airport. Compare the centers and variations of the two populations. Which airline's flights had shorter flight times? (Examples 3 and 4)



not symmetric

symmetric

$$Q_2 = 4, IQR = Q_3 - Q_1 = 7 - 3 = 4$$

$$Q_2 = 5, IQR = Q_3 - Q_1 = 6 - 4 = 2$$