

## Welcome MYP 9 Mathematics!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
<b>Monday</b> Date: <u>4/09</u> Topic: <u>10A: Types of data</u>	0 1 2	
<b>Tuesday</b> Date: <u>4/10</u> Topic: <u>Pre- assessment</u>	0 1 2	
<b>Wednesday</b> Date: <u>4/11</u> Topic: <u>10B: Discrete data, stem plots</u>	0 1 2	
<b>Thursday</b> Date: _____ Topic: _____	0 1 2	
<b>Friday</b> Date: _____ Topic: _____	0 1 2	

## Class Plan:

1. Warm-up



2. 10B Discrete Data Displays  
10C Continuous Data Displays



3. Practice

## Warm-up: Create a Stem Plot

### Example 3

### Self Tutor

The weight  $w$  of 17 pineapples was recorded in kilograms. Each measurement was rounded *down* to the nearest 0.1 kg.

0.3, 0.6, 1.2, 1.5, 1.5, 1.7, 1.8, 1.9, 2.1, 2.4,  
2.4, 2.6, 3.0, 3.1, 3.2, 3.9, 4.2

Stem	Leaves
0	3, 6
1	2, 5, 5, 7, 8, 9
2	1, 4, 4, 6
3	0, 1, 2, 9
4	2

Scale:  $3 \frac{1}{2}$

3.2 kg



## Weights of Pineapples

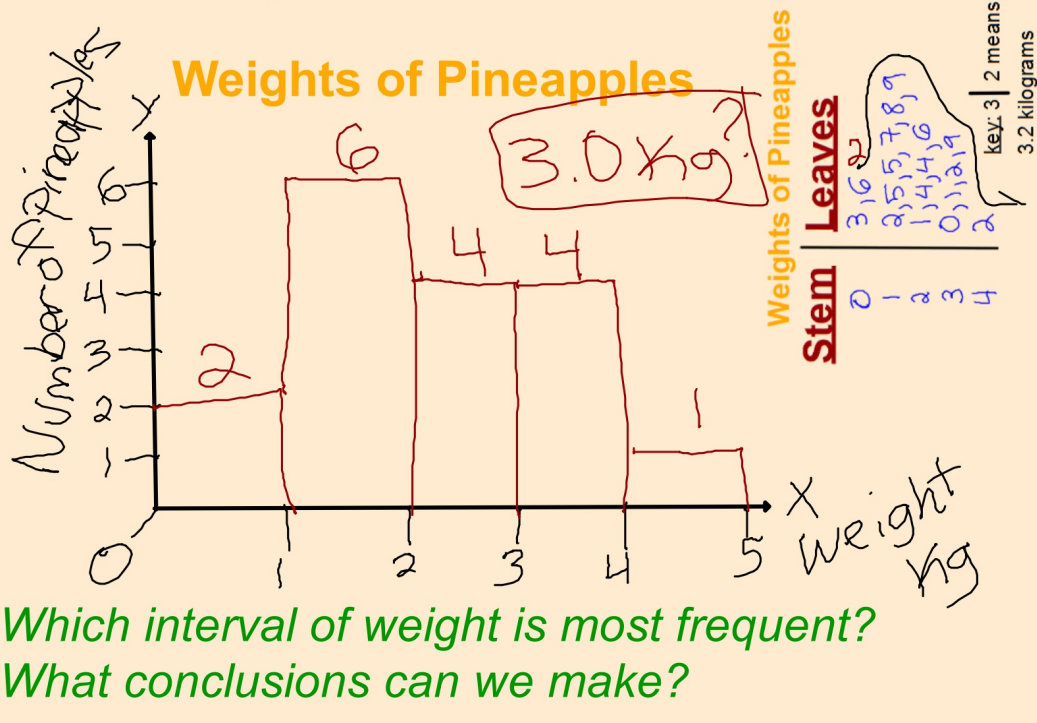
**Stem** | **Leaves**

0	3,6
1	2,5,5,7,8,9
2	1,4,4,6
3	0,1,2,9
4	2



key: 3 | 2 means  
3.2 kilograms

## Use stem plot to create Histogram

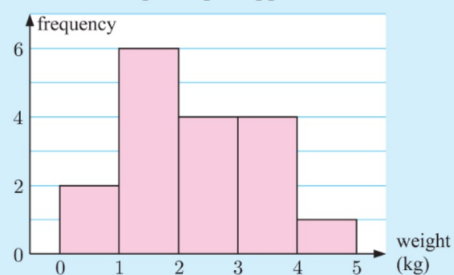


## Weights of Pineapples - SOLUTION

- a The lowest weight recorded was 0.3 kg and the highest was 4.2 kg, so we use class intervals of length 1 kg. The class interval  $1 \leq w < 2$  includes all weights from 1 kg up to, but not including 2 kg.

Weight $w$ (kg)	Frequency
$0 \leq w < 1$	2
$1 \leq w < 2$	6
$2 \leq w < 3$	4
$3 \leq w < 4$	4
$4 \leq w < 5$	1

- b **Weight of pineapples**



- c The modal class is  $1 \leq w < 2$  kg.

## Conclusions

Because the most frequent weight is at least 1 kg, but less than 2 kg, we might conclude that most pineapples are picked when they reach 1 to 2 kgs. If this were a large sample of pineapples, a pineapple we buy at the grocery store could likely be between 1 and 2 kgs.

**B****DISCRETE NUMERICAL DATA**

If the data has many different data values, we can display the data in groups using a **stem-and-leaf plot** or **stem plot**. The stem plot displays the frequency of data in each group, but retains the actual data values.

28 47 39 23 17 33  
 35 26 49 35 9 36  
 43 44 38 27 32 51  
 31 11 26 42 24 30

For the data shown, we can construct an unordered or an ordered stem plot.

**Unordered stem plot**

Stem	Leaf
0	9
1	7 1
2	8 3 6 7 6 4
3	9 3 5 5 6 8 2 1 0
4	7 9 3 4 2
5	1

Scale: 5 | 1 = 51

**Ordered stem plot**

Stem	Leaf
0	9
1	1 7
2	3 4 6 6 7 8
3	0 1 2 3 5 5 6 8 9
4	2 3 4 7 9
5	1

Scale: 5 | 1 = 51

In the ordered stem plot, the data are given in ascending order.



**Example 1**

The scores for a test out of 50 were recorded for 36 students.

25, 36, 38, 49, 23, 46, 47, 15, 28, 38, 34, 9, 30,  
 24, 27, 27, 42, 16, 28, 31, 24, 46, 25, 31, 37, 35,  
 32, 39, 43, 40, 50, 47, 29, 36, 35, 33

- a Display the data using a stem-and-leaf plot.
- b What percentage of students scored 40 or more marks?

- a The stems will be 0, 1, 2, 3, 4, 5 to account for numbers from 0 to 50.

**Unordered stem plot**

<i>Stem</i>	<i>Leaf</i>
0	9
1	5 6
2	5 3 8 4 7 7 8 4 5 9
3	6 8 8 4 0 1 1 7 5 2 9 6 5 3
4	9 6 7 2 6 3 0 7
5	0

*Scale:* 2 | 4 = 24 marks

**Ordered stem plot**

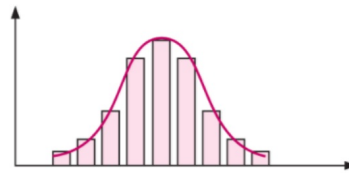
<i>Stem</i>	<i>Leaf</i>
0	9
1	5 6
2	3 4 4 5 5 7 7 8 8 9
3	0 1 1 2 3 4 5 5 6 6 7 8 8 9
4	0 2 3 6 6 7 7 9
5	0

- b 9 students scored 40 or more marks.  
 $\therefore$  the percentage of students scoring 40 or more marks =  $\frac{9}{36} \times 100\% = 25\%$ .

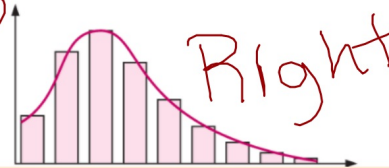


## DESCRIBING THE DISTRIBUTION OF THE DATA SET

Many data sets show **symmetry** or **partial symmetry** about the centre of the distribution. We can see this by drawing a curve over the graph of the data. For example, if we place a curve over the column graph opposite, we see that the curve is symmetric. We say we have a **symmetrical distribution** of data.



The distribution alongside is said to be **positively skewed** since it is 'stretched' on the right or positive side of the centre.

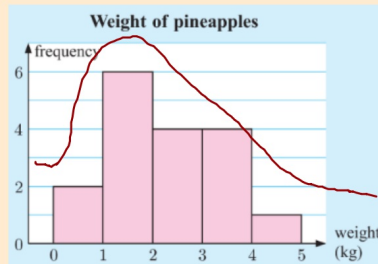


### Weights of Pineapples

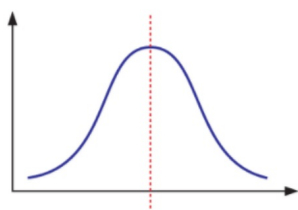
#### Stem | Leaves

0	3, 6
1	2, 5, 5, 7, 8, 9
2	1, 4, 4, 6
3	0, 1, 2, 9
4	2

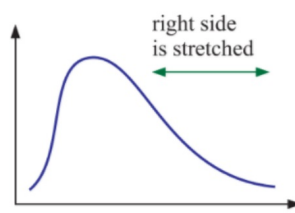
key: 3 | 2 means  
3.2 kilograms



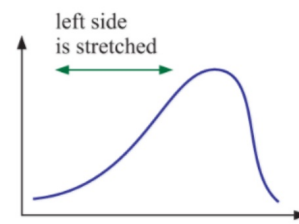
So we have:



symmetrical distribution



positively skewed distribution



negatively skewed distribution

### DISCUSSION

As a class, list variables which you would expect to have:

- a symmetric distribution
- a positively skewed distribution.
- a negatively skewed distribution

**C****CONTINUOUS NUMERICAL DATA**

Continuous data has many values, so we use intervals with upper and lower bounds

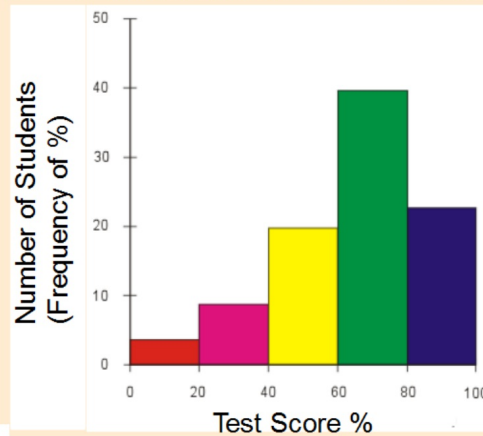
No Gaps

(unlike column graph)  
for its continuous nature

x-axis: Measured scale

y-axis: Frequency

IB SL Mathematics Unit 6 Test



The **modal class** is the class with the highest frequency.  
More of the data lies in this class than in any other class.

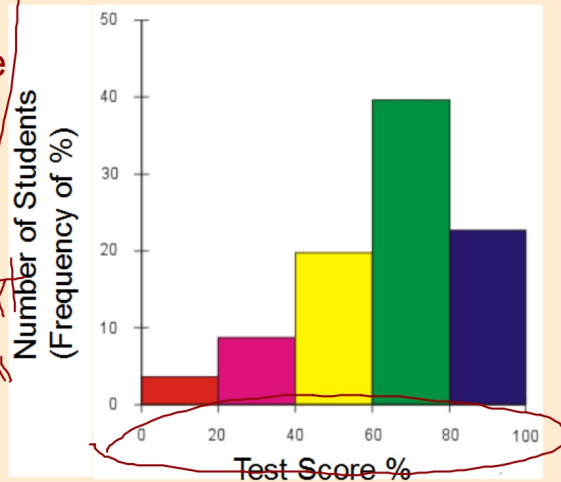
# Histograms: Continuous scales, no gaps between bins/buckets/"class".

IB SL Mathematics Unit 6 Test

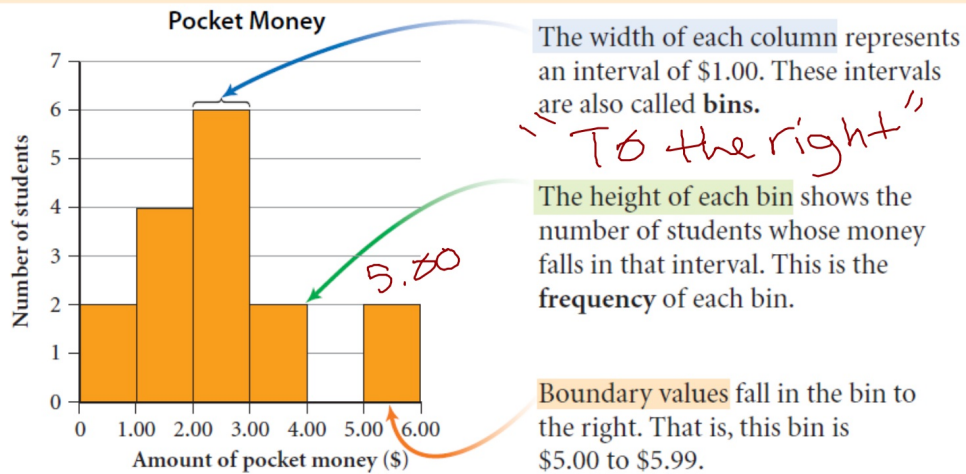
x-axis: Data value scale  
y-axis: Frequency

Use the data context

"Number of \_\_\_\_\_"



## Histogram Example: Sample of 16 students and how much \$ they have in their pockets.



**Be mindful of the boundary values!**

## Who is a better basketball player?



Points from  
20 games



### LeBron James

0, 0, 32, 27, 36, 18, 41, 34, 26, 17, 24, 32,  
18, 34, 0, 32, 18, 34, 0, 33

### Stephan Curry

20, 28, 0, 42, 19, 42, 24, 29, 32, 21, 27,  
17, 23, 28, 25, 29, 0, 26, 23, 24

Examine NBA stars James vs. Curry

- 1) **Choose** LeBron James or Stephen Curry
- 2) **Create** stem plot, and **organize** a histogram.
- 3) **Write** an analysis and conclusion to **defend** why your chosen player is the best!
- 4) **State** any limitations to your analysis.

(Scale)

Done? Build **defense** & begin exercises

**Example:** Points scored over 20 random games.

0, 0, 32, 27, 36, 18, 41, 34, 26, 17,  
24, 32, 18, 34, 0, 32, 18, 34, 0, 33

**Do:** Create a stem and leaf plot



**LeBron James**  
#23 SF 6' 8", 250 lbs - Cleveland Cavaliers  
Born Dec 30, 1984 in Akron, OH (Age: 32)  
Drafted 2003: 1st Rnd, 1st by CLE  
College None  
Experience 13 years

3/16-4/16

[http://www.espn.com/nba/player/gamelog/\\_/id/1966/lebron-james](http://www.espn.com/nba/player/gamelog/_/id/1966/lebron-james)

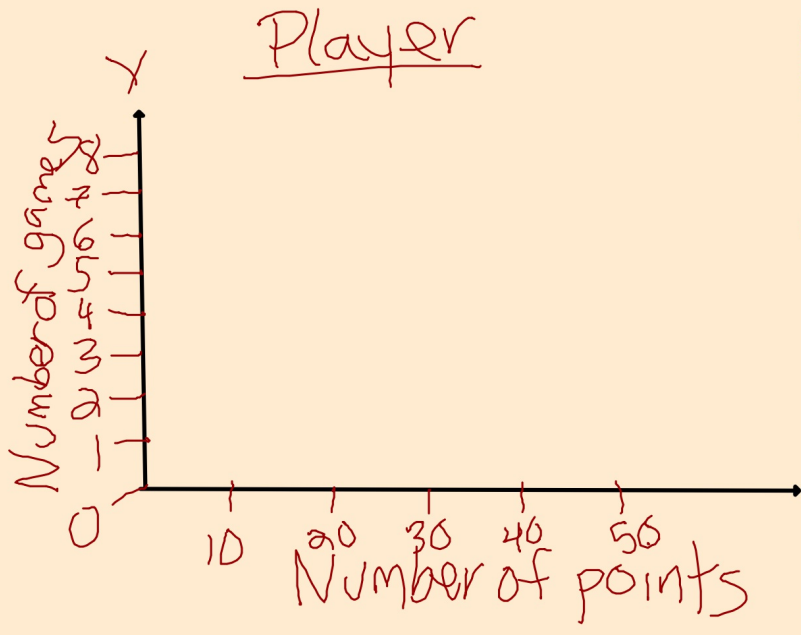
Below are the points scored by Lebron James (basketball player) over the last 20 games.

~~0, 0, 32, 27, 36, 18, 41, 34, 26, 17, 24, 32, 18, 34, 0, 32, 18, 34, 0, 33~~

STEM	LEAVES	
0	0000	<b>KEY?</b> 4 1 means 41 points
1	7888	
2	467	
3	22234446	
4	1	



Below are the points scored by  
Lebron James (basketball  
player) 20 games.



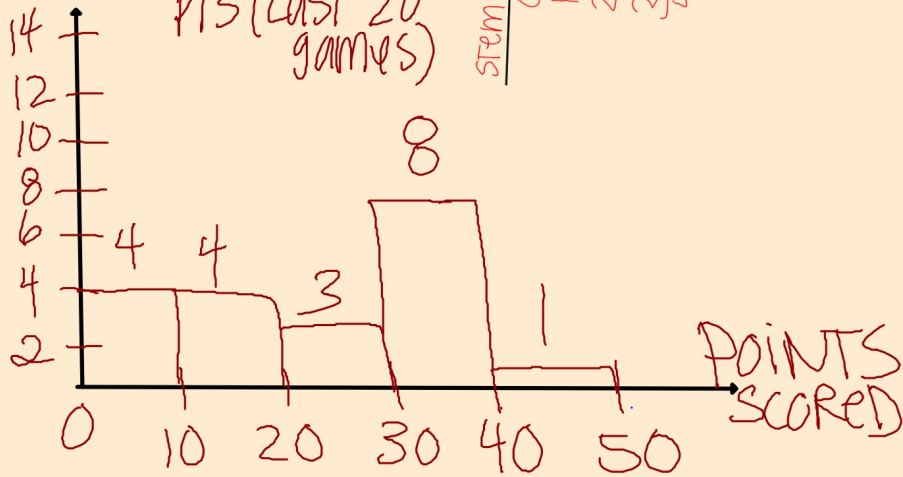
STEM	LEAVES
0	0000
1	7888
2	467
3	2234446
4	1

**KEY?**  
 4 | means 41 points  
 4 | means 41 points

Below are the points scored by  
(basketball player) over the last

FREQUENCY  
(# of games)

LEBRON'S  
PTS (LAST 20  
games)



Stem	Leaves
0	0000
1	7888
2	467
3	22234476
4	1

KE

4 | 1 n

4 | 1 20

**Example:** Points scored over 20 games.

20, 28, 0 , 42, 19, 42, 24, 29, 32, 21,  
27, 17, 23, 28, 25, 29, 0, 26, 23, 24



**Stephen Curry**  
#30 PG 6' 3", 190 lbs Golden State Warriors  
Born Mar 14, 1988 in Akron, OH (Age: 29)  
Drafted 2009: 1st Rnd, 7th by GS  
College Davidson  
Experience 7 years

2016-17 Season			
PPG	APG	MPG	PER
25.3	6.6	4.5	24.74
Career			
22.8	6.8	4.4	

Go to: Stephen Curry

3/16-4/16

Below are the points scored by Stephan Curry (basketball player) over 20 games.

~~20, 28, 0, 42, 19, 42, 24, 29, 32, 21,~~  
~~27, 17, 23, 28, 25, 29, 0, 26, 23, 24~~

<u>Stem</u>	<u>Leaves</u>
0	0,0
1	7,9
2	0,1,3,3,4,4,5,6,7,8,8,9,9
3	2
4	2,2

Key  
3|2 means  
32 points

Below are the points scored by Stephan Curry over 20 games.

Stem	Leaves
0	0,0
1	7,9
2	0,1,3,3,4,4,5,6,7,8,8,9,9
3	2
4	2,2

Key  
3|2 means 32 points

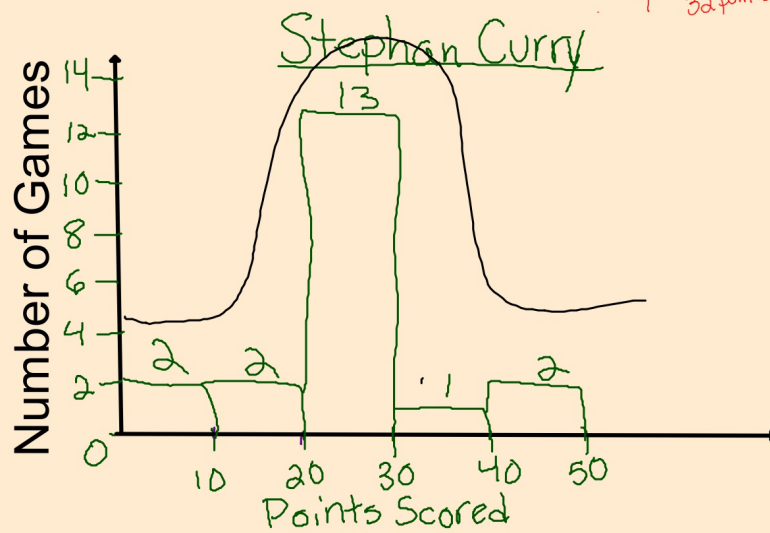
Number of Games



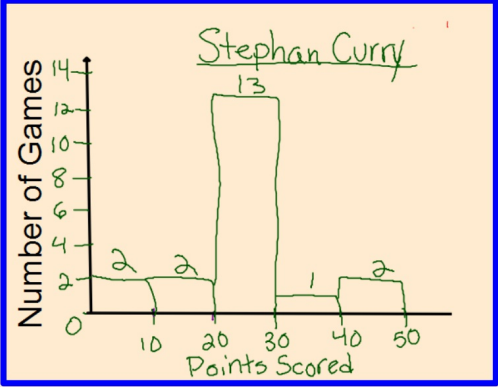
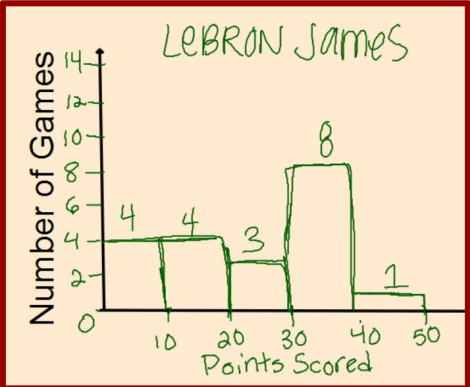
Below are the points scored by Stephan Curry over 20 games.

Stem	Leaves
0	0,0
1	7,9
2	0,1,3,3,4,4,5,6,7,8,8,9,9
3	2
4	2,2

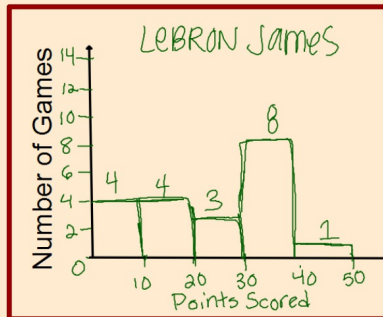
Key  
3|2 means 32 points



# Who is a better player...?



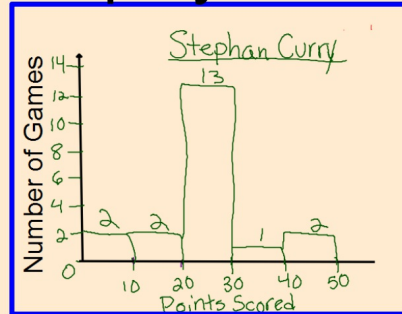
## Who is a better player...?



-Lebron had 8 games with pts 0-20

-Lebron had 3 games with pts 20-30

-Lebron had 8 games with pts 30-40



-Stephan had 4 games with pts 0-20

-Stephan had 13 games with pts 20-30

-Stephan had 1 games with pts 30-40



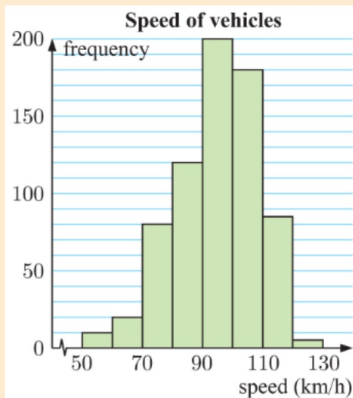
### Limitations:


- Only the last 20 games
- LeBron has been rested more games recently than Stephen
- Points aren't the only determination of a good player (assists, rebounds, steals, etc.)
- James and Curry have different positions & on different **teams!**

*Different heights & years playin*

## Exercise 10 C : Continuous Data, Page 197

The speeds of vehicles travelling along a section of highway were recorded and displayed in the frequency histogram below.



The  in the horizontal axis indicates a break in the values.



- How many vehicles were included in this survey?
- What percentage of vehicles were travelling at speeds between 100 and 110 km/h?
- What percentage of vehicles were travelling at speeds less than 80 km/h?
- The owners of the vehicles travelling at 110 km/h or more were fined \$252 each. What amount was collected in fines?

## Exercise 10 C : Continuous Data, Page 197

**2**

<i>Height <math>h</math> (cm)</i>	<i>Frequency</i>
$170 \leq h < 175$	1
$175 \leq h < 180$	8
$180 \leq h < 185$	9
$185 \leq h < 190$	11
$190 \leq h < 195$	9
$195 \leq h < 200$	3
$200 \leq h < 205$	3

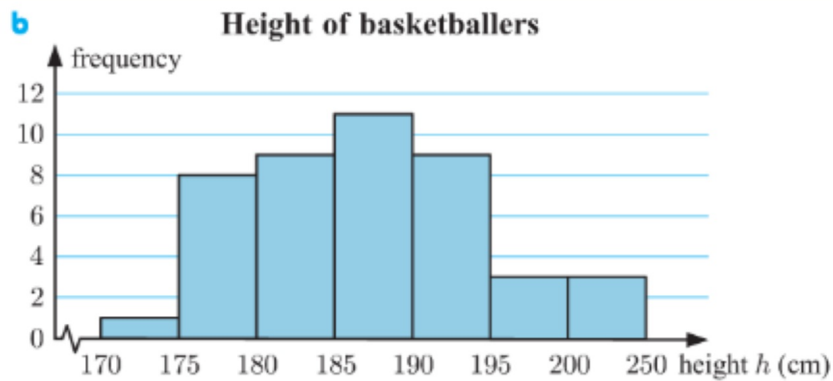
A frequency table for the height  $h$  of the players in a basketball squad, is given alongside.

- a** Explain why *height* is a continuous variable.
- b** Construct a frequency histogram for the data.
- c** What is the modal class? Explain what this means.
- d** Describe the distribution of the data.

## 10 C Solutions:

### EXERCISE 10C

- 1 a 700 vehicles      b  $\approx 25.7\%$       c  $\approx 15.7\%$   
d \$22 680
- 2 a Height can take any value within each class.



- c  $185 \leq h < 190$  cm. This class has the highest frequency.  
d approximately symmetric