Stem-and-leaf plots

Tuesday, 5 February 2019   7:36 pm

⭐ By the end of the lesson I would hope that you have the knowledge and understanding for the following points:
- Know what a stem-and-leaf plot is
- Know how to draw a stem-and-leaf plot
- Know how to read data from a stem-and-leaf plot
- Know how to find the mean, median, mode and range from a stem-and-leaf plot
- Know what a back to back stem-and-leaf plot is

RECAP:

In previous lessons we have been learning how to describe data in different ways.
We have looked at how we classify data and how we can use graphs to help us show the data in different ways.
Last lesson we looked at line graphs, which was an awesome way to describe continuous numerical data.
This lesson we are going to look at stem-and-leaf plots … which are awesome!

Think of a tree:
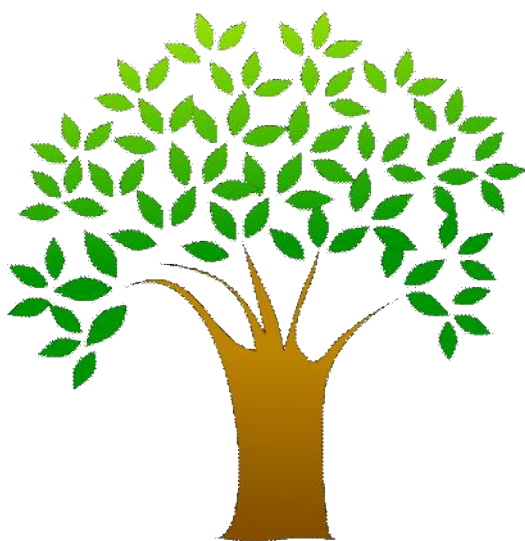
A tree has branches and leaves.
From the branches come the leaves.

The idea that lots of leaves come from one branch (or stem) is the basis of how we can add data to a stem and leaf.

Turning numbers into an awesome diagram

Example:
Taken from the Cambridge Essentials Textbook Series

Represent this set of data as a stem-and-leaf plot:
~~23~~, ~~10~~, ~~36~~, ~~25~~, ~~31~~, ~~34~~, ~~34~~, ~~27~~, ~~36~~, ~~37~~, ~~16~~, ~~33~~

10
31

2.3

2 | 3

Unsorted stem-and-leaf diagram ⇐
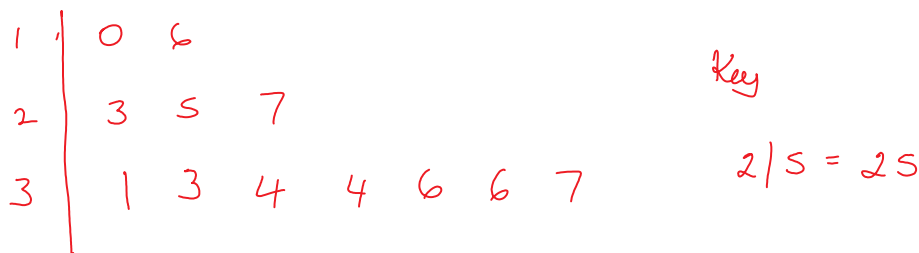
```
1 | 0  6
2 | 3  5  7
3 | 6̸ X 4̸ A̸ 6 7 ̸8
```

Key
2 | 3 = 23

Sorted stem-and-leaf diagram
It is always important to ensure the stem-and-leaf diagram has the data sorted.
This will help when we are asked to find the mean, median, mode and range.

<div style="color:red">

1 | 0 6

2 | 3 5 7

3 | 1 3 4 4 6 6 7

Key

2|5 = 25

103   105   123   140

1 2 3|4

16|3
10|5
12|3
14|0

</div>

The most important part of doing the above, is making sure you have a **KEY**.
Without the key, the stem-and-leaf diagram makes no sense.

For example, look at the following stem-and-leaf diagram.
What do each of the numbers stand for?

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

<div style="color:red">

10 | 3 5

11 |

12 | 3

13 |

14 | 0

</div>

As there is no key, then we don't know if the numbers are 13, 16, 16, 20, 20 etc
Or they might be 1.3, 1.6, 1.6, 1.6 etc

Reading a Stem-and-leaf diagram

Remember: A stem-and-leaf diagram is just another way of us showing a list of numbers in a different
way. We can use the stem-and-leaf diagram to help is answer questions about the data.

Example:
Taken from the Cambridge Essentials Textbook Series

Average daily temperatures are shown for some different countries.

Interpreting a stem-and-leaf plot

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

2|5 means 25

<div style="color:red">

13 16 16 20 26 21 | 22 25 28
26 28 29 30 32

</div>

a Write out the temperatures as a list.
b How many countries' temperatures are represented? 14
c What are the minimum and maximum temperatures? Min = 13°   Max 32°
d What is the range of temperatures recorded?
e What is the median temperature recorded? Range = 32 - 13

d What is the range of temperatures recorded?

e What is the median temperature recorded?

Min = 13   Max 32°

Range = 32 - 13

= 19°

$$Median = \frac{22 + 25}{2}$$

$$= \frac{47}{2} \quad = 23.5°$$

Things to remember

Stem-and-leaf plots only work for numerical data. We cannot put categories in a stem-and-leaf plot.
The number on the left of the line is called the **stem** and the numbers are called the **leaves.**
A key MUST be shown for each stem-and-leaf plot.
Outliers can be identified by looking at the stem-and-leaf plot.

Remember: The whole course builds on the learning which has happened before.

Outliers: A value which sits outside the rest of the data and is obviously separate.
Note: In Year 10 we show you a nifty way to calculate which are the outliers. You don't need to know how to do this yet.

2
3
4
5
6
7
8
9 (1)

Barry: Trying to trick us

Remember: that Maths is a BIG FAT TRICK.
What do you think the following shows?
Example extracted from *Cambridge Essentials Textbook Series*

Girls	Stem	Boys
	10	
	11	
6 3 1	12	
8 4 3 2	13	8
7 6 5 4 0	14	3 4 7 9
6 4 1	15	0 1 2 4 6
2 0	16	2 3 6 8
3	17	

14|7 means 147cm

138 cm   168

121   173

Doing things backwards

What we do in Mathematics forwards we need to know how to do backwards.
We need to understand the mathematics and not just regurgitate it!

Look at the following stem-and-leaf diagram.
Some of the numbers have been replaced with letters.
We need to find the values the letters might take.
Some of them are quite tricky!

2 | 4 5 a 6 7 9

Stem	Leaf
1	5
2	4 5 *a* 6 7 9
3	*b* 0 1 5
4	2 8 *c*
5	*d*

3|1 means 31

$a = 5$ or 6

$b = 0$

$c = 8$ or 9

$d = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9$