

Grade 9


Data handling

Collect, organize & summarize data

✧ 1st step in data handling is to pose a question and then go about gathering data to answer the question.

✧ Data can be collected by means of:

- i. Observation
- ii. Interviews
- iii. surveys



Data : Raw, un-processed, unorganized information.

Questionnaires are common means of collecting data

Tools of Data Collection



Think Click Questionnaire

This is a Think Click questionnaire to gather information about the awareness of parents who know what their child's activities are on the internet. To answer the questionnaire, simply tick the boxes relevant to your answers except for question 6.

Question 1. Gender of your child?

Male Female

Question 2. How old is your child?

5-7 8-10 11-13 14+

Question 3. a) Does your child use the internet at home?

Yes No

b) If yes, in which room do they usually use it? Choose one:

Living Room Bedroom Dining Room

Other (Please specify) _____

Question 4. Does your child own a mobile phone with internet access available?

Yes No

Question 5. How often does your child use social networking sites? Choose one:

Every Day More than once a week Once a week

Once a month Less than once a month Never

Question 6. In your opinion, what are your child's five favorite online activities? Please rate them from 1 to 5 where 1 is your child's favorite in the box next to the activity.

Chat Rooms Blogging Music Instant Messenger

File sharing Social Networking Web surfing

Other (Please specify) _____

Question 7. Does your child use the internet for playing games?

Yes No

Question 8. Does your child watch videos on the internet?

Yes No

Thank you for taking the time to fill in this questionnaire.

Exercise!

1. List 5 important characteristics of a good questionnaire.
2. What do you think is most effective way of getting people to complete questionnaires?
3. Now draw up your own questionnaires in order to find out the music preferences of other students in your school.

✧ Different types of numerical data

i. Discrete data

- Whole positive numbers
- e.g. no. of children; number of tins of paint etc.

ii. Continuous data

- e.g. height of a boy; weight of a horse etc.

✧ Categorical data

- e.g. colours of clothes ; types of fruit etc.

✧ Data can be collected from a:

i. Population

- i.e. All the members of a particular group
- e.g. All the workers in a factory

ii. Sample

- i.e. A representation & randomly chosen selection of members of a population
- e.g. A section of workers who are different in terms of sex; race; language; culture; background etc.

Exercise!

1. Identify data collected:

1.1 different makes of cars

1.2 the lengths of caterpillars

1.3 the no of rooms in a house

2. Identify whether the data collected from a population or a sample:

2.1 a census is done in RSA

2.2 a handful of teachers from the each school in the western cape

- Data can be organized using:

1. Tally tables

2. Frequency tables

Favorite Cities

City	Votes
Orlando	/ / /
San Francisco	
New York City	/
Las Vegas	/ /

Type of Pet	Tally	Frequency
Dog	/ /	12
Cat	/	7
Goldfish	/	6
Budgie		3
Hamster		2
Lizard		1
Snake		1
Rabbit		3

3. Stem- and- leaf displays

Reading Stem-and Leaf Displays

Number of Sit-Ups

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

The tens digits are called the stems.

Key: 3 | 6 = 36

Step 1

Make the stem by writing the tens digits from least to greatest.

4
5
6

Step 2

Make the leaves by writing each ones digit in order to the right of its ten digit.

4 8 9
5 4 5 8
6 0 3

Step 3

Draw a line to separate the stems and leaves. Add a title and key.

Title

Stem	Leaf
4	8 9
5	4 5 8
6	0 3

Key: 4 | 8 means 48 inches

Drawing Stem-and Leaf Displays

Exercise!

1. The average no. of times a family goes on holiday per year was recorded:

2; 0 ; 1 ; 2 ; 2 1 ; 5 ; 4 ; 1 ; 3 ; 1 ; 0 ; 4 ; 2 ; 1

1.1 draw a tally table

1.2 draw a frequency table

1.3 what % of the respondents went on holiday once a year?

Exercise!

2.1 Draw a stem-and-leaf plot to organize the data below:

14 ; 29 ; 10 ; 7 ; 33 ; 68 ; 52 ; 22 ; 19 ; 12 ; 19 ; 12 ;
61 ; 34 ; 28 ; 24 ; 29 ; 50 ; 5 ; 12 ; 30 ; 47 ;

2.2 which stem has the most leaves?

✧ Data can be collected & summarized using **Measures of Central Tendency:**

i. Means

- Also known as the “average”

- Mean $\bar{x} = \frac{\text{sum of data values (Ex)}}{\text{total no.of data values(n)}}$

ii. Median

- Middle value in an organized data set & randomly chosen selection of members of a population

iii. Mode

- Data value which occurs most frequently

✧ Data can be collected & summarized using **Measures of Central Tendency:**

i. Mean

- Also known as the “average”

- Mean $\bar{x} = \frac{\text{sum of data values (Ex)}}{\text{total no.of data values (n)}}$

ii. Median

- Middle value in an organized data set & randomly chosen selection of members of a population

iii. Mode

- Data value which occurs most frequently

Mean, Median & Mode Toads

Example: Given the following data set ,
determine the measures of central tendency:

16 ; 24 ; 3 ; 21 ; 20 ; 12 ; 18 ; 17 ; 21 ; 15

*** Mean:**

$$\bar{x} = \frac{\sum x}{n}$$

$$= \frac{167}{10}$$

$$= 16.7$$

*** Median:** ascending order

3 ; 12 ; 15 ; 16 ; 17 ; 18 ; 20 ; 21 ; 21 ; 24

$$\therefore \text{Median} = \frac{17+18}{2} = 17.5$$

*** Mode = 21**

✧ Data can be collected using
Measures of dispersion

Range

= Highest data value- lowest data value

✧ **Outliers** are data values that do not fit in with the other values

- i.e. either are bigger or smaller than others

Example: Given the following data set ,
determine the measures of dispersion
and any outliers.

16 ; 24 ; 3 ; 21 ; 20 ; 12 ; 18 ; 17 ; 21 ; 15

$$\begin{aligned} * \text{Range} &= 24 - 3 \\ &= 21 \end{aligned}$$

$$* \text{Outlier} = 3$$

Exercise!

Given :67 ; 92 ; 99 ; 31 ; 68 ; 45 ; 12 ; 60; 73 ; 88
52 ; 79 ; 62 ; 68 ; 46 ; 61 ; 78 ; 80 ; 36 ; 83.

Determine:

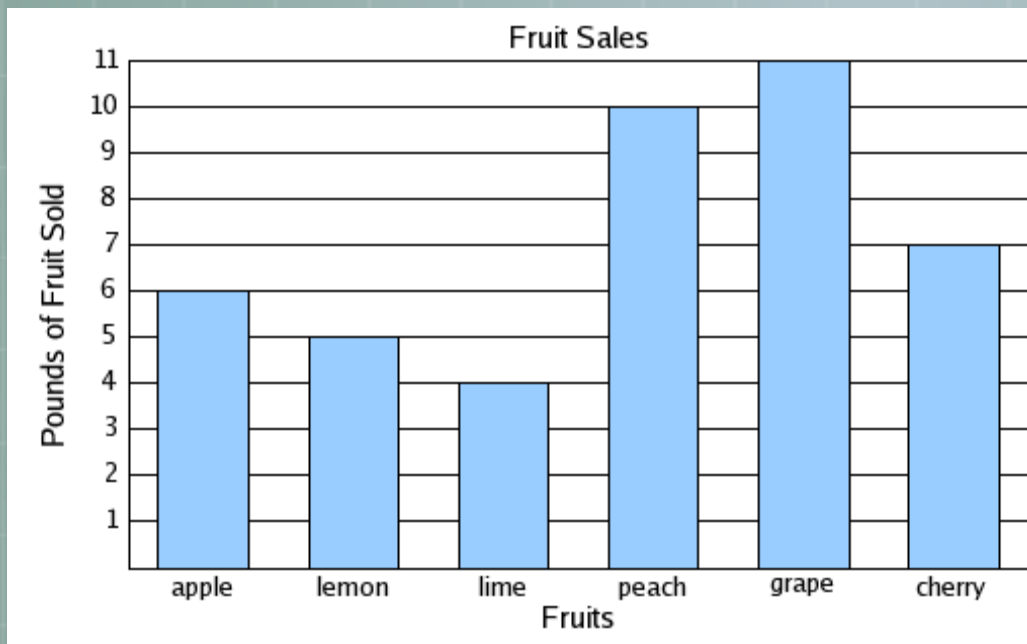
1. Mode
2. Range
3. Median
4. Outliers
5. Mean

Represent, Interpret, Analyze & Report data

Drawing Bar Graphs

✧ Data can be represented using:

1. Bar graphs & Double bar graphs



**Spaces
between
bars**

- Used for discrete or categorical data

Reading Double Bar Graphs

Exercise!

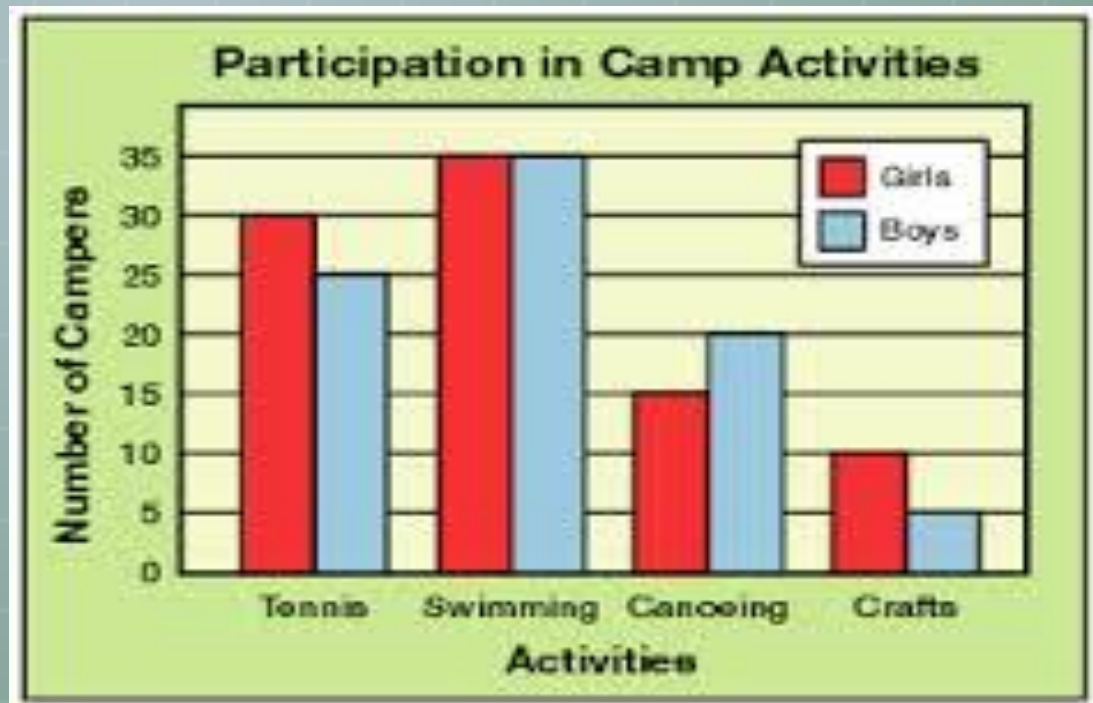
Draw a bar graph to illustrate the no. of plants sold at a nursery in a month:

Month	No. of plants sold
January	52
February	63
March	50
April	51
May	47
June	38

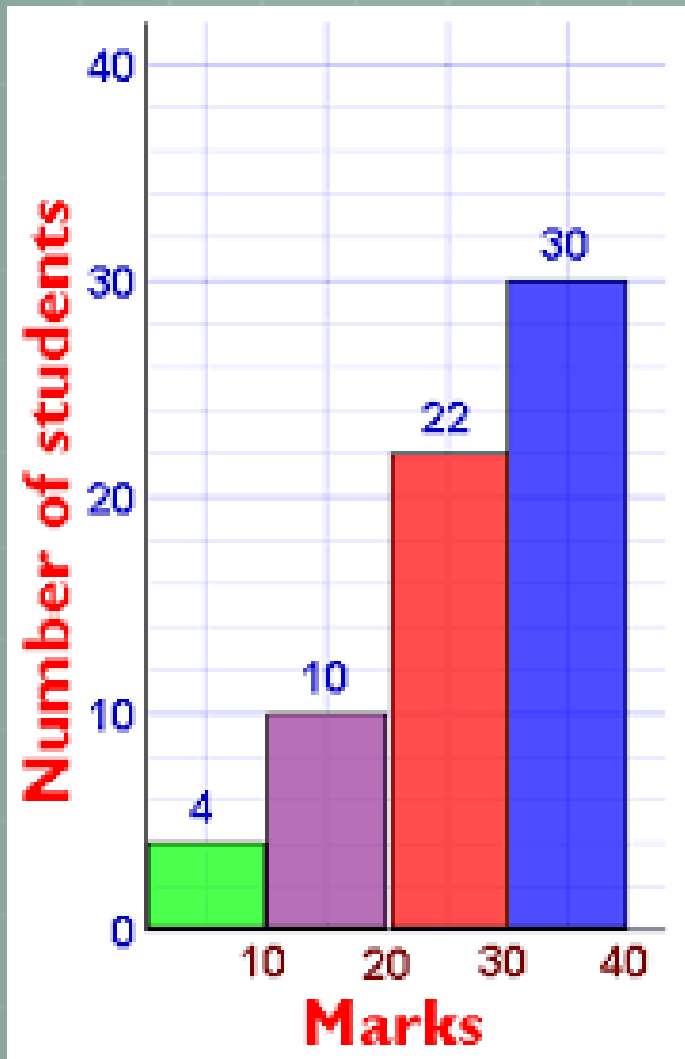
Exercise!

Given the graph below, determine:

1. How many girls canoed?
2. Which activity had an equal number of boys and girls?
3. Which activity had the least no. of boys?
4. How many participants were there in total?



2. Histograms



- **NO Spaces between bars**
- **Used for continuous data**

Working with Histograms

Exercise!

Draw a histogram of the mass of cows in a farmer's barn:

Mass (m) in kg	Frequency
$600 < m \leq 650$	2
$650 < m \leq 700$	9
$700 < m \leq 750$	16
$750 < m \leq 800$	12
$800 < m \leq 850$	1
Total	40

Exercise!

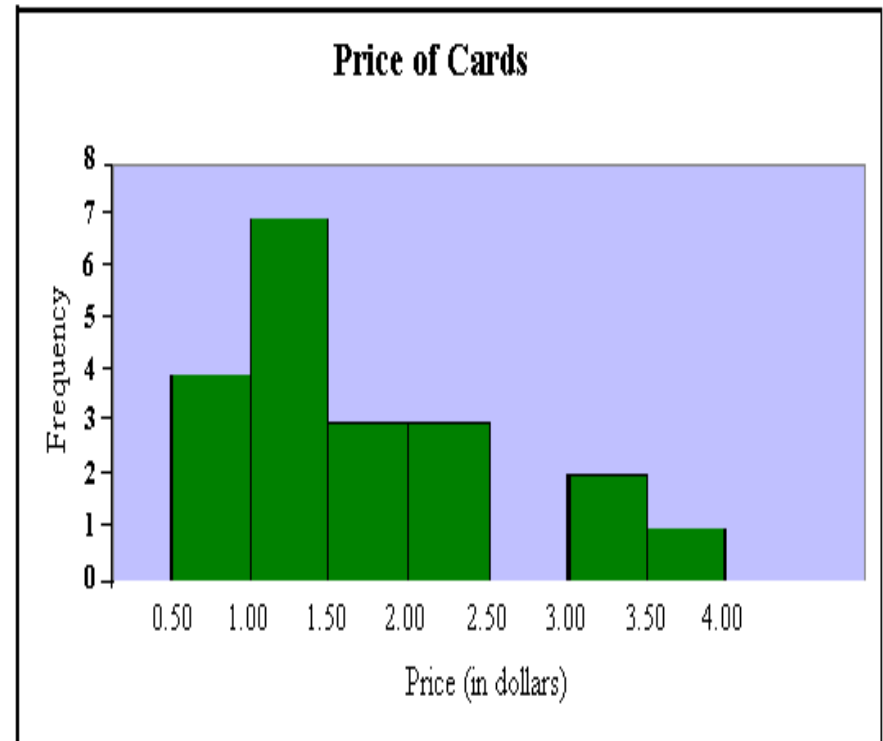
Given the graph below, determine:

1. What is the modal class?

2. How many decks of cards were priced?

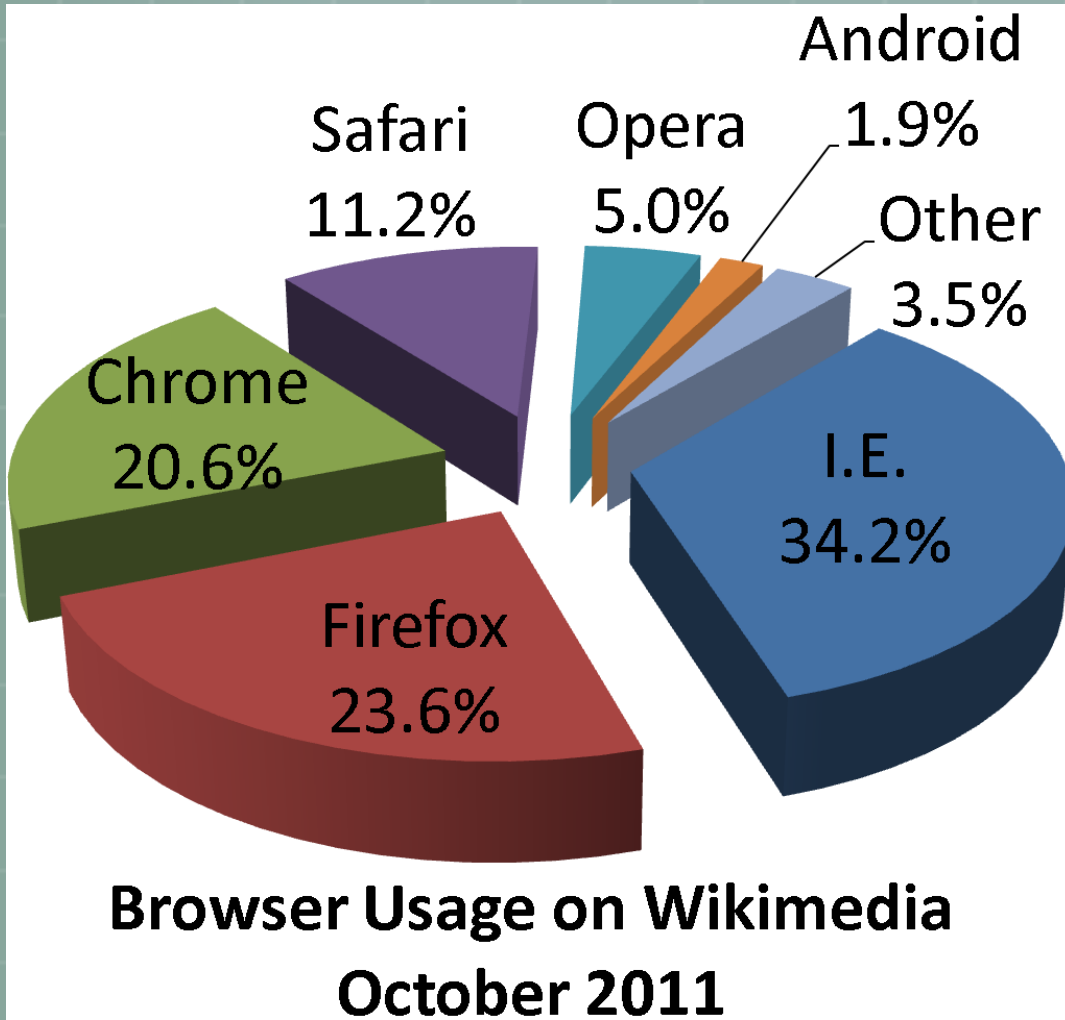
1. How many decks of cards cost between \$1.50 - \$ 2.50?

4. Why do you think there are “gaps” in the histogram?



3. Pie Charts

Drawing Pie Charts



Each sector represents a fraction or % of the whole

• Size of sector = fraction of whole ×

360°

Reading Pie Charts

Exercise!

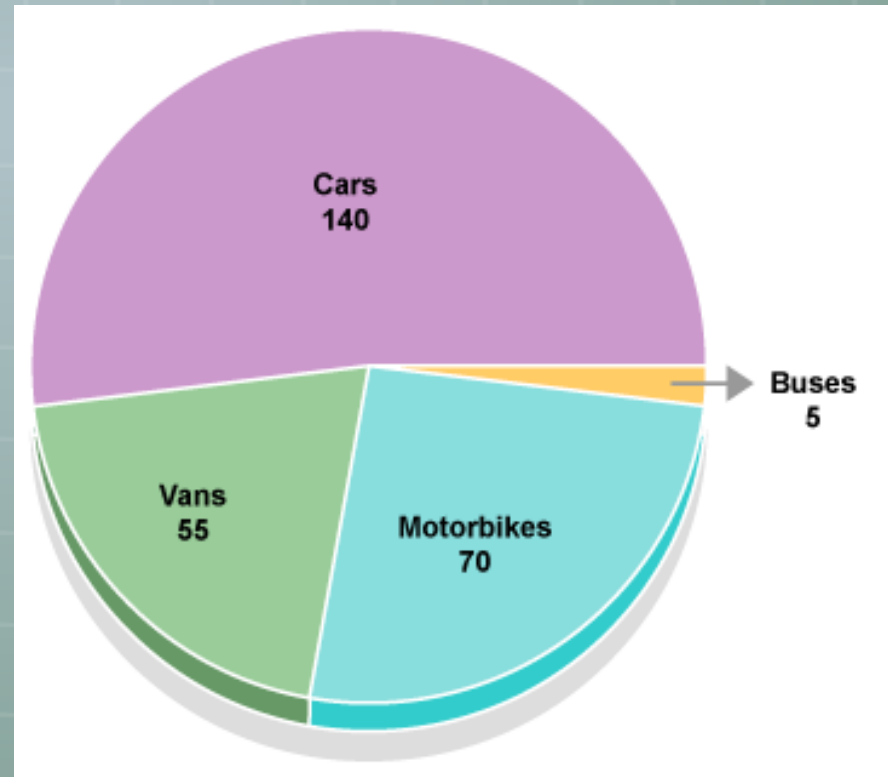
Draw a pie chart of all the items most often bought by woman in a department store; given the choice of 5 categories:

Clothing	44%
Underwear	12%
Shoes	26%
Accessories	8%
Make-up	10%

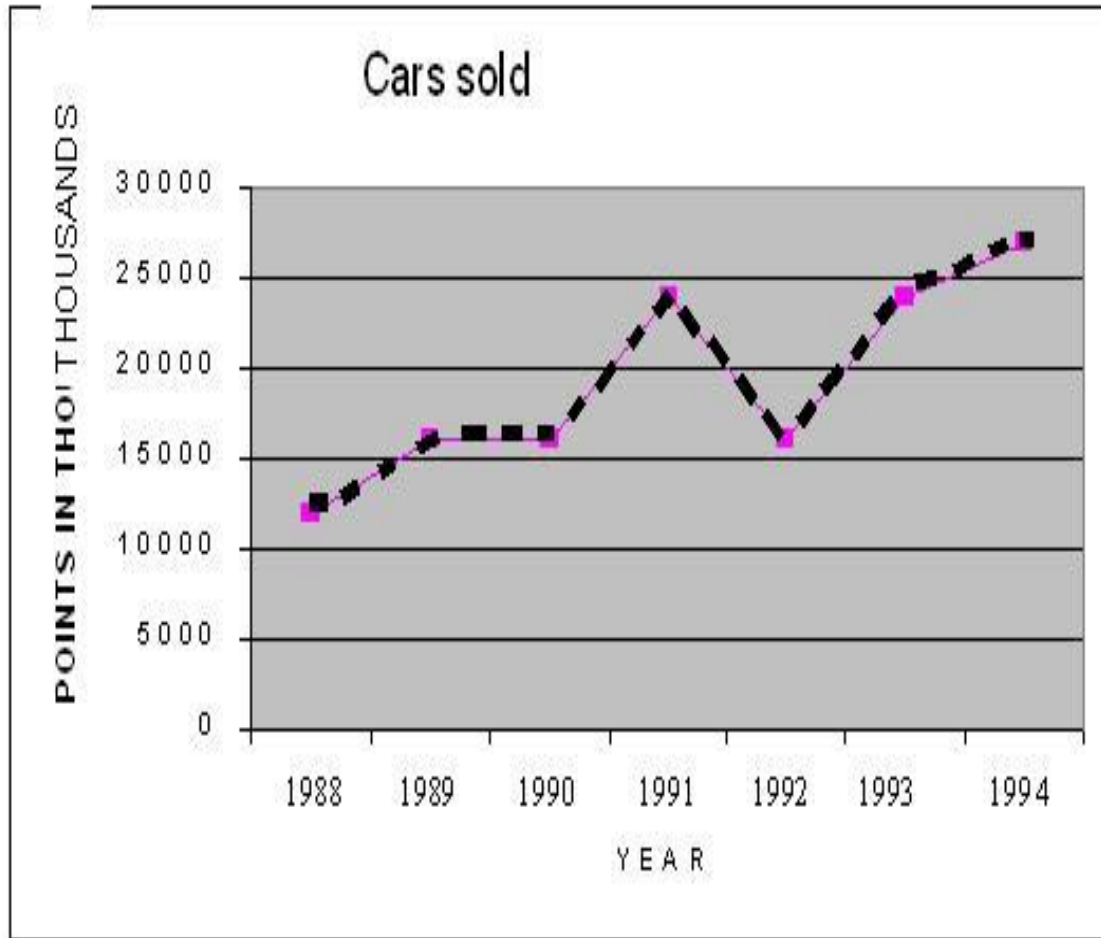
Exercise!

Given the graph below, determine:

1. What % of people surveyed drove a motorbike?
2. Calculate the size of the smallest sector in degrees?



4. Broken-line Graphs



- Use for **DISCRETE** data
- Shows a **trend**

Continuous vs Discrete Data

Exercise!

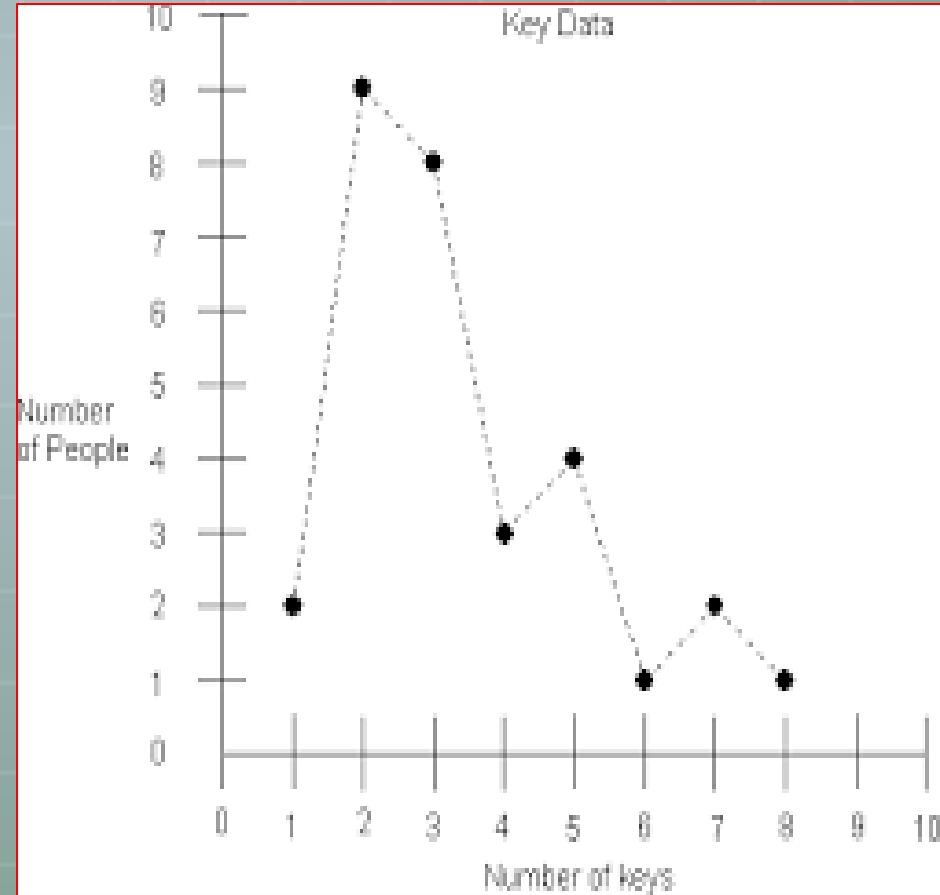
Draw a broken-line graph of the following data:

Time of day	Temperature (°c)
08h00	2
10h00	9
12h00	26
14h00	28
16h00	24
18h00	20
20h00	18

Exercise!

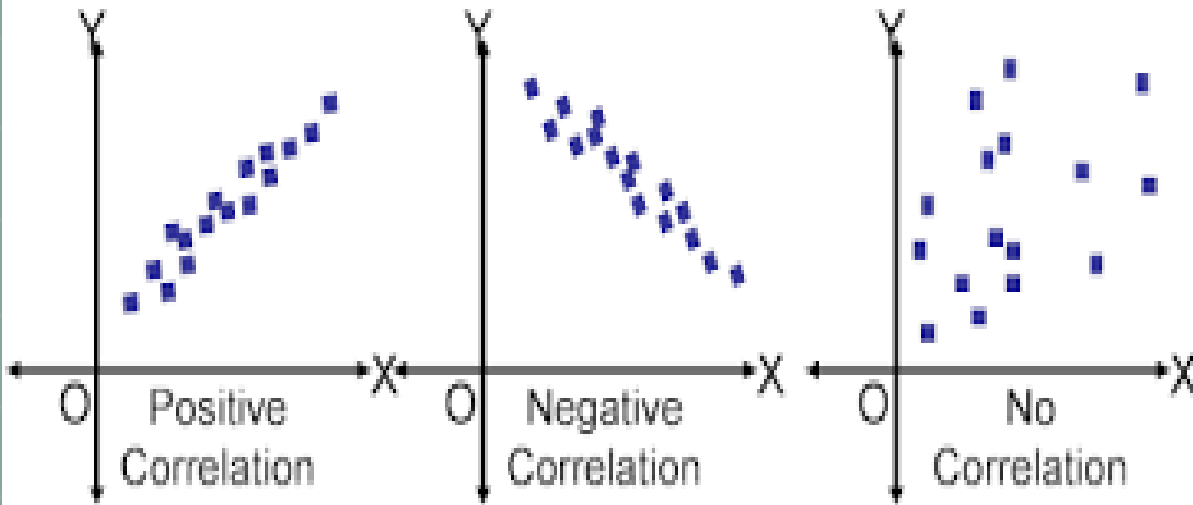
Given the graph below, determine:

1. How many keys do most people have?
2. What % of people have 5 keys?
1. Describe the trend of the graph.



4. Scatter Plots

SCATTER PLOT EXAMPLES



- Used to determine if there is a relationship between 2 variables
- Line that best fit shows the trend

Understanding Scatter Plots

Exercise!

Draw a scatter plot of the following data below and state whether is a correlation:

Weight (kg)	Height (m)
60	1.57
72	1.68
58	1.60
65	1.55
85	1.84
51	1.39
46	1.2
93	1.95

Exercise!

Given the graph below, explain the correlation between the no. of missed classes and exam score:



✧ Probability

$$\text{Probability} = \frac{\text{no.of favourable events}}{\text{total no.of events}}$$

e.g. 1. Determine the probability of rolling a “6” on a dice. $P(6) = \frac{1}{6} = 16.67\%$

2. Determine the probability of rolling a “6” and a “1” in two consecutive roll

Basic
Probability

Theoretical vs
Experimental Probability

? ? ?

For compound events (more than 1 event), we can use 2 different tools...

1. Two way Table:

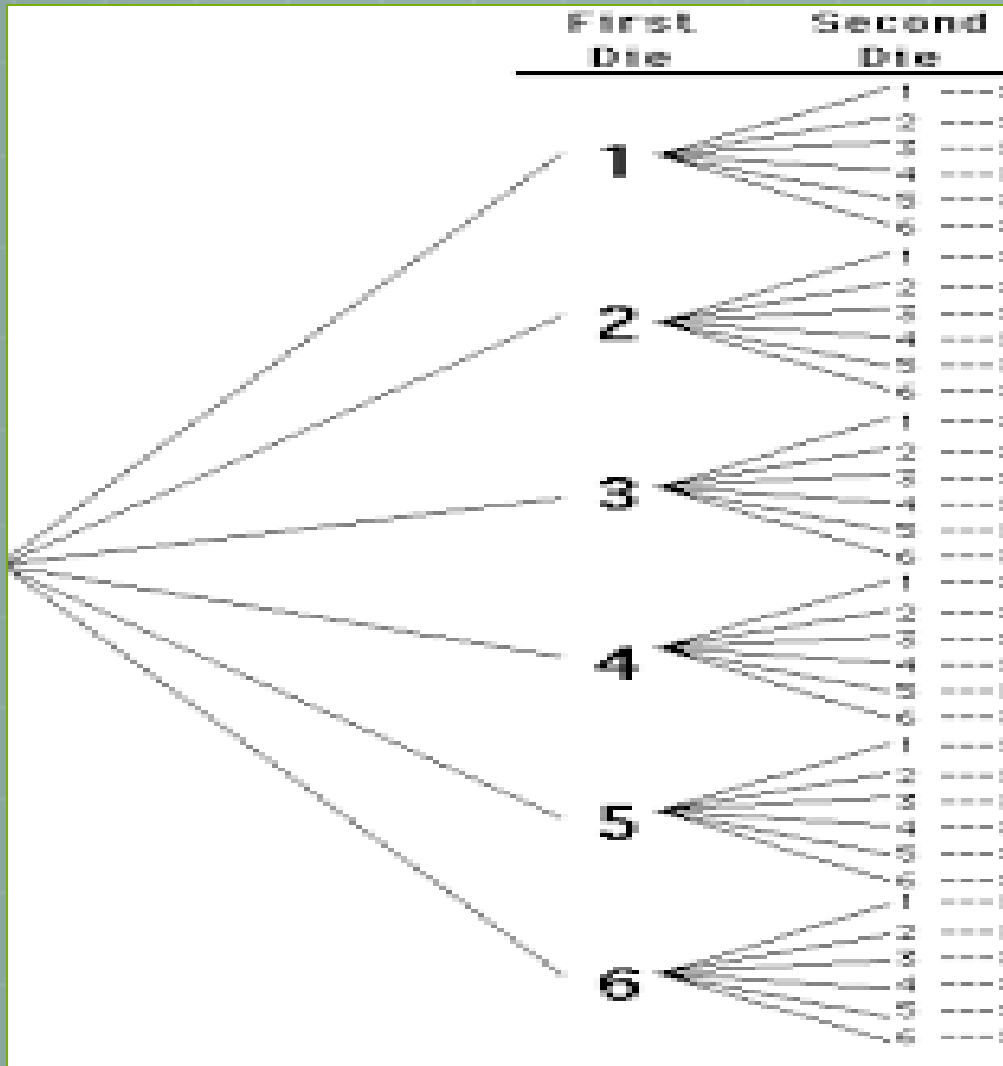
		Dice #1					
		1	2	3	4	5	6
Dice #2	1	(1,1)	(2,1)	(3,1)	(4,1)	(5,1)	(6,1)
	2	(1,2)	(2,2)	(3,2)	(4,2)	(5,2)	(6,2)
	3	(1,3)	(2,3)	(3,3)	(4,3)	(5,3)	(6,3)
	4	(1,4)	(2,4)	(3,4)	(4,4)	(5,4)	(6,4)
	5	(1,5)	(2,5)	(3,5)	(4,5)	(5,5)	(6,5)
	6	(1,6)	(2,6)	(3,6)	(4,6)	(5,6)	(6,6)

$$P(6 \text{ then } a_1) = \frac{1}{36} = 2.78\%$$

•The order is very important

Complex Two-way Tables

4. Tree Diagrams



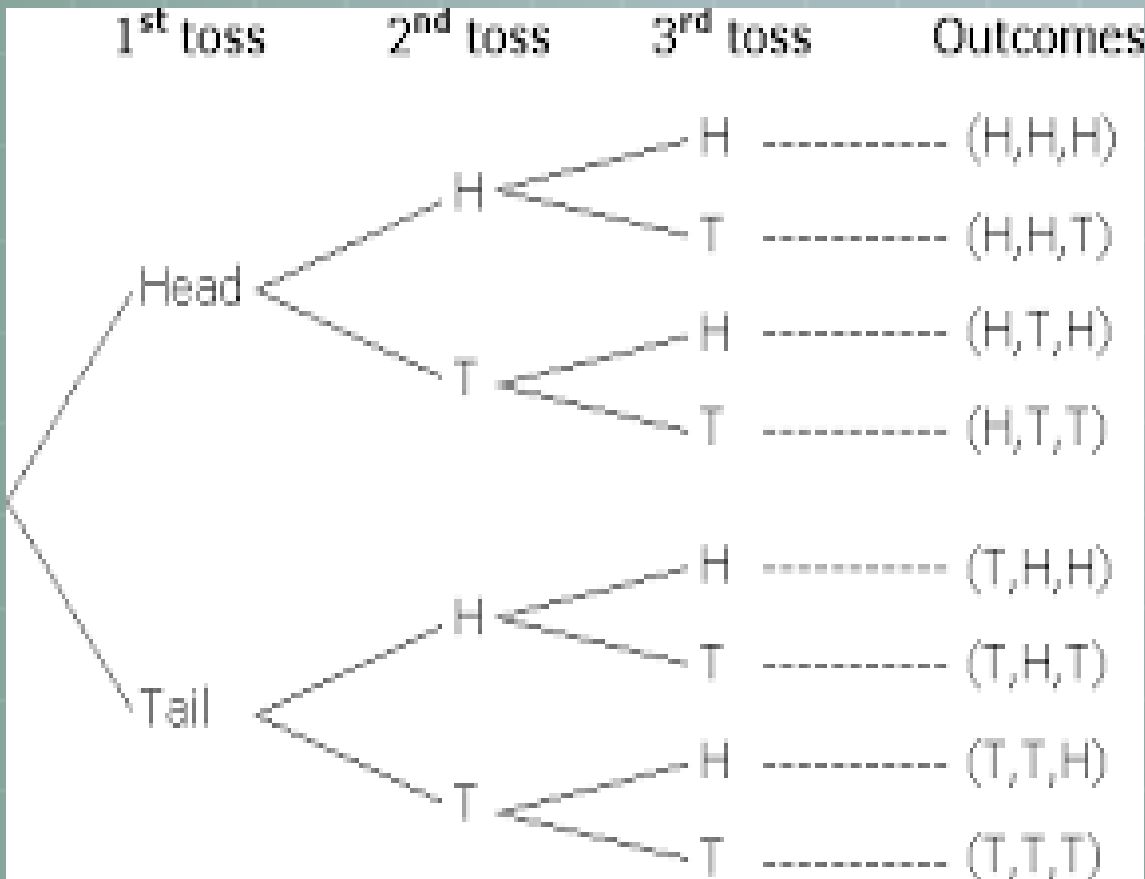
$$P(6 \text{ then a } 1) = \frac{1}{36}$$

$$= 2.78\%$$

Working with Tree
Diagrams

Examples

1. Use a tree diagram to determine the probability of getting “tails” three times in a row, when a coin is tossed.



$$\therefore P(3 \text{ tails}) = \frac{1}{8}$$

$$= 12.5\%$$

2. Use a two way table to determine the probability of throwing a dice and getting “Heads” ; and then tossing a coin and getting a “s”

$$P(\text{heads};s) = \frac{1}{12}$$

$$= 8.33\%$$

Dice \ Coin	1	2	3	4	5	6
Heads	H;1	H;2	H;3	H;4	H;5	H;6
Tails	T;1	T;2	T;3	T;4	T;5	T;6

Exercise!

1. Determine the probability of:

1.1 There being snow in Iceland.

1.2 There being a polar bear in Jamaica.

1.3 Getting a red heart in a standard deck of cards.

1.4 Drawing a pear in a fruit basket that contains 5 apples; 4 bananas and 3 pears

Exercise!

2. Use the tree diagram to determine the probability of picking the following meal combinations-"soup, chicken & malva pudding"- from the menu below

starters	Main	Dessert
Garlic roll	Chicken	Ice-cream
Mushrooms	Beef	Malva pudding
Salad	Fish	
Soup		

Exercise!

3. Use the Two way table to determine the probability of rolling two dice and getting a total sum of the two dice equal to 8