

PENANG SANGAM HIGH SCHOOL

YEAR 10 MATHEMATICS

WEEK 25,26 and 27

STRAND 6: CHANCE AND DATA

SUB STRAND: DATA REPRESENTATION

LEARNING OUTCOME: Analyze and illustrate data extracted from practical situations.

Grouping of Data

Organize numerical data into a frequency table

Numerical data

FREQUENCY TABLE



Day	Number of customers	Frequency
Monday	 	18
Tuesday	 	13
Wednesday	 	20
Thursday	 	14
Friday	 	21
Saturday	 	27
Sunday	 	26

FREQUENCY TABLE

Favorite Pets		
Pet	Tally Marks	Number
		10
		4
		6

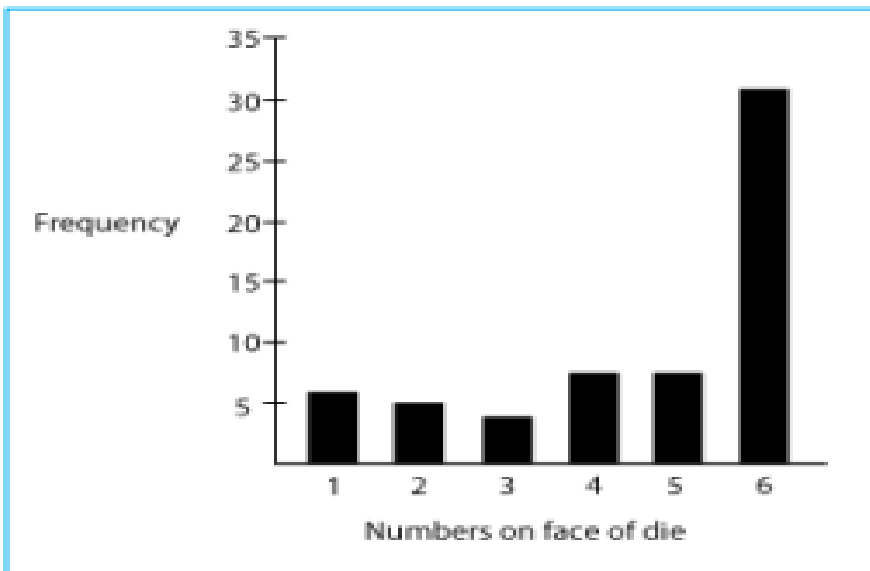
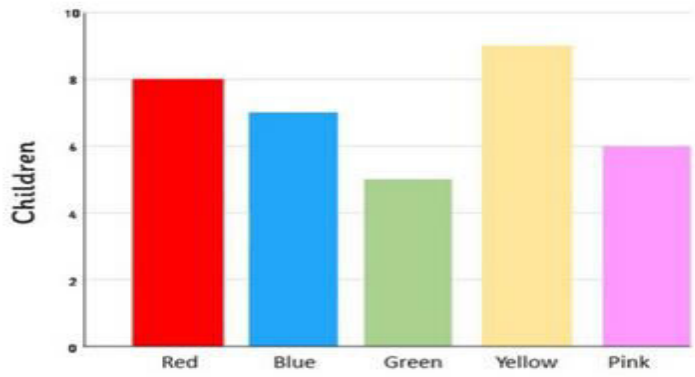
Occurrence of the numbers thrown with a die	
Number	Frequency
1	6
2	5
3	4
4	7
5	7
6	32

BAR GRAPH

What is a bar chart?

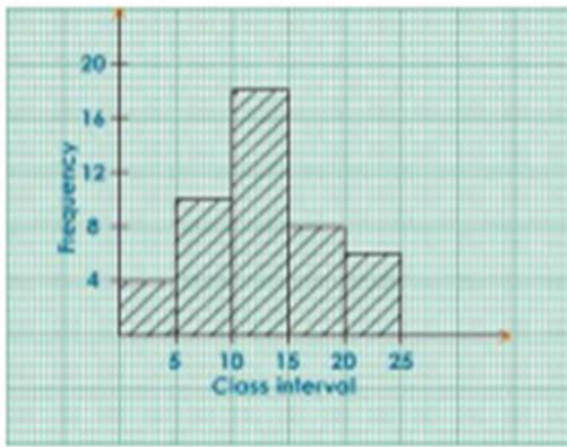
A bar chart (or graph) organizes information into a graphic using bars of different lengths. The length of these bars is proportional to the size of the information they represent. For example, here is a vertical bar graph showing the popularity of different colours among a group of children.

Favourite Colour



HISTOGRAM

Class Interval	Frequency
0 - 5	4
5 - 10	10
10 - 15	18
15 - 20	8
20 - 25	6



Data

Month	Number of Eggs sold
March	105
April	200
May	158
June	167
July	220
August	171

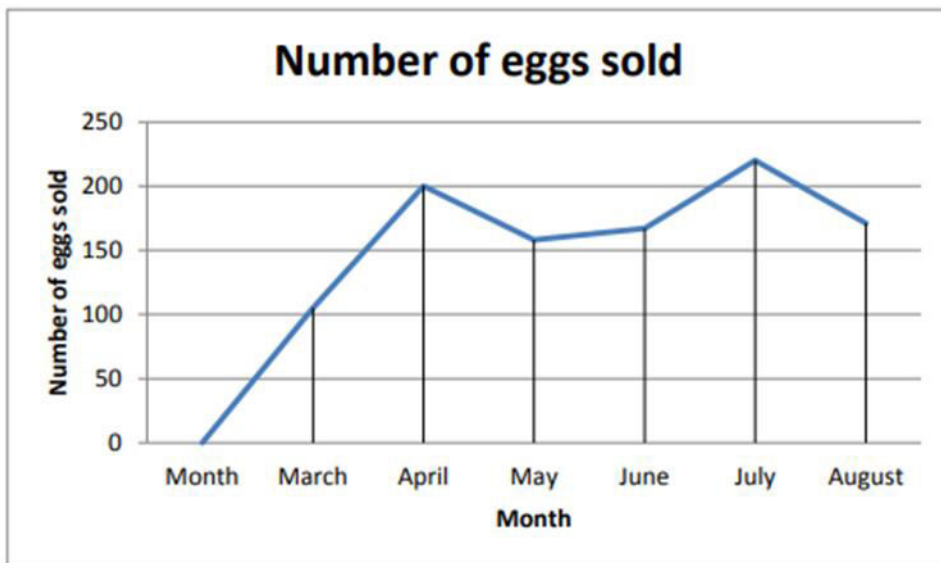
Eggs sold at Corner Shop March to August

LINE GRAPH

What is Line Graph?

is a type of chart used to show information that changes over time. We plot line using several points connected by straight lines. We also call it a line chart. The line graph comprises of two axes known as 'x' axis and 'y' axis.

The horizontal axis is known as the x-axis. The vertical axis is known as the y-axis.



MEASURES OF CENTRAL TENDENCY

MEAN

MEDIAN

MODE

Define MEAN MEDIAN MODE

The **Mean** is what most people consider the average. You add up all the numbers in the set and divide by how many numbers you have. That's the Mean.

The **Median** is the number in a set that has an equal number of numbers above and below it. If there's an even number of numbers, you take the Mean of the middle two.

The **Mode** is the number that repeats the most in a set. If there aren't any repeated numbers there is no Mode.

Mean

Add all the numbers then divide by the amount of numbers

9, 3, 1, 8, 3, 6

$$9 + 3 + 1 + 8 + 3 + 6 = 30$$

$$30 \div 6 = 5$$

The mean is 5

Median

Order the set of numbers, the median is the middle number

9, 3, 1, 8, 3, 6

1, 3, 3, 6, 8, 9

The median is 4.5

Mode

The most common number

9, 3, 1, 8, 3, 6

The mode is 3

Range

The difference between the highest number and lowest number

9, 3, 1, 8, 3, 6

$$9 - 1 = 8$$

The range is 8

Exercise

The quiz scores of seven students are

9, 8, 8, 7, 5, 4, 3

The **median** quiz score is

A. 4

C. 7

B. 6

D. 8

The **range** of the scores is

A. 4

C. 7

B. 6

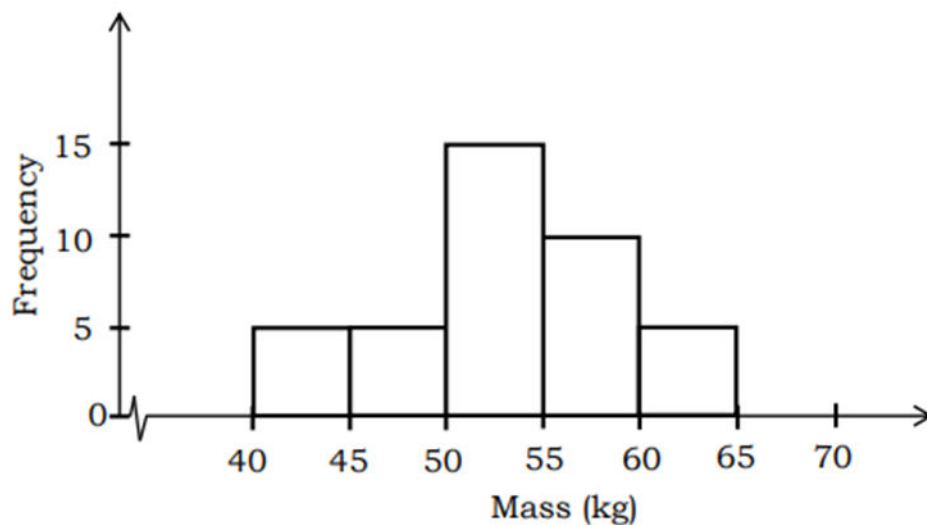
D. 8

The table below shows the results of a survey on the absence of students from a class over a certain period of time.

No. of days absent (x)	Frequency (f)
0	1
1	1
2	4
3	4
4	5
5	2

- (i) How many students are in the class?
- (ii) Find the **mean** number of days a student was absent.

The graph below shows the mass in kg of students in Year 10A at Levu High School.



- (i) Name the type of graph shown above.
- (ii) What is the modal interval?

The table below shows the results of a survey on the absence of students from a class over a certain period of time.

No. of days absent (x)	Frequency (f)
0	1
1	1
2	4
3	4
4	5
5	2

- (i) How many students are in the class?
- (ii) Find the **mean** number of days a student was absent.

MEASURES OF DISPERSION

LEARNING OUTCOMES

Students should be able to:

- Identify and describe different measures of dispersion
- Calculate the measures of dispersion from an ungrouped data
- Calculate the measures of dispersion from frequency tables
- Interpret the meaning of numerical values representing measures of dispersion
- Relate the measures of dispersion to real life situations

MEASURES OF DISPERSION

gives us the information of how spread out the values of a data set is.

Range

Formula: Range = Highest Score – Lowest Score

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Quartiles and the interquartile range

Range

What is the range of the following data:

4 8 1 6 6 2 9 3 6 9

The largest score is 9; the smallest score is 1; the range is $9 - 1 = 8$

Inter quartile Range

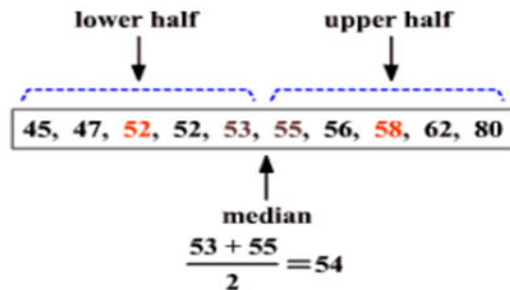
The difference between the upper and lower quartiles is called the interquartile range

Example

For the set given below, identify the median, the middle value of the 1st set and the middle value of the 2nd set

45, 47, 52, 52, 53, 55, 56, 58, 62, 80

Answer

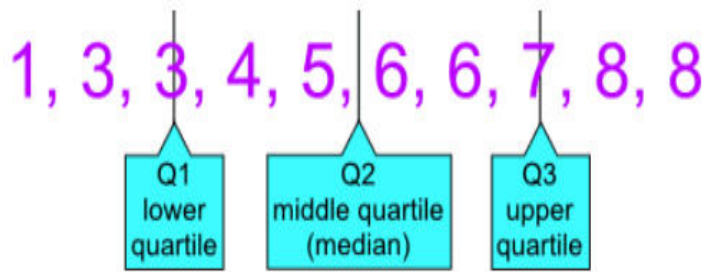


Example

- 21 31 32 34 44 45 48 49 55 65 80
- Q1-----lower quartile
- Q2---median
- Q3---upper quartile
- Q1----32
- Q2 45
- Q3---55

Median ,Upper Quartile, Lower Quartile

Identify the median, the upper and lower quartiles



Step 1: Find the Median

$$\begin{aligned} \text{Median} &= \frac{24 + 28}{2} \\ &= 26 \end{aligned}$$

Find the upper and lower quartile of the following set of data

1, 11, 15, 19, 20, 24, 28, 34, 37, 47, 50, 57

Step 2: Lower Quartile

Find the upper and lower quartile of the following set of data

1, 11, 15, 19, 20, 24, 28, 34, 37, 47, 50, 57

$$\begin{aligned} \text{Lower quartile} &= \frac{15 + 19}{2} \\ &= 17 \end{aligned}$$

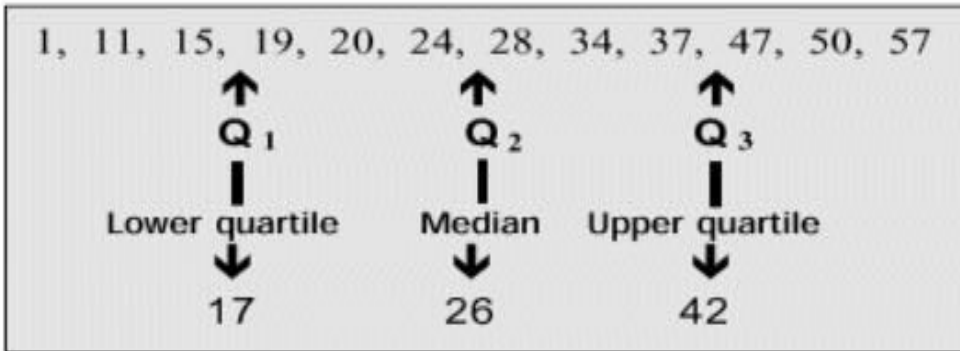
Step 3: Upper Quartile

Find the upper and lower quartile of the following set of data

1, 11, 15, 19, 20, 24, 28, 34, 37, 47, 50, 57

$$\text{Upper Quartile} = \frac{37 + 47}{2}$$

$$= 42$$



EXAMPLE

7, 1, 3, 6, 3, 7 may be ordered as 1, 3, 3, 6, 7, 7

i. The sample median is : 1, 3, **3**, **6**, 7, 7

$$= 3 + 6$$

$$= 9 \div 2 = 4.5$$

ii. The upper quartile and lower quartile is:

1, **3**, **3**, 6, 7, 7

$$\mathbf{Q_1 = 3 \text{ and } Q_3 = 7}$$

iii. The interquartile range is:

1, **3**, **3**, 6, 7, 7

$$= 7 - 3 = 4$$

The quiz scores of seven students are

9, 8, 8, 7, 5, 4, 3

The **range** of the scores is

A. 4

C. 7

B. 6

D. 8

If the upper quartile of a distribution is 13 and its lower quartile is 7, the **interquartile range** of the distribution is

- A. 6
 B. 7
 C. 13
 D. 20

Activity

Quartiles for Frequency Distribution

- **Median** ---half way mark(50th % of the total frequency)
- **Lower Quartile** (25th % of the total frequency)
- **Upper Quartile** (75th % of the total frequency)

Example

Find the **quartiles** and the **inter quartiles** range for the data

<i>x</i>	<i>f</i>	Position
1	3	1,2,3
2	4	4,5,6,7,
3	10	8,9,10,11...17
4	5	18,19,...22
5	3	23,24,25
Total	25	

- The **Total frequency** is **25**
- Half way is 13th score
- $\frac{1}{4}$ way is 7th
- $\frac{3}{4}$ way is 19th

Median is 3

Lower quartile is 2

Upper Quartile is 4

Interquartile Range = 4-2 = 2

Activity

Find the median, quartiles and interquartile Range

x	F	Position
1	4	1,2,3,4
2	2	5,6
3	3	7,8,9
4	4	10,11,12,13
5	2	14,15
Total	15	