

# Statistics 4

This class deals with cumulative frequency curves and pie charts.

## To Draw a Cumulative Frequency Curve (Ogive)

**Example 1** Draw a cumulative graph (ogive) to represent the following information, which shows the marks obtained by 100 students in a maths exam.

Marks	0 -10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Students	10	2	5	10	41	28	4

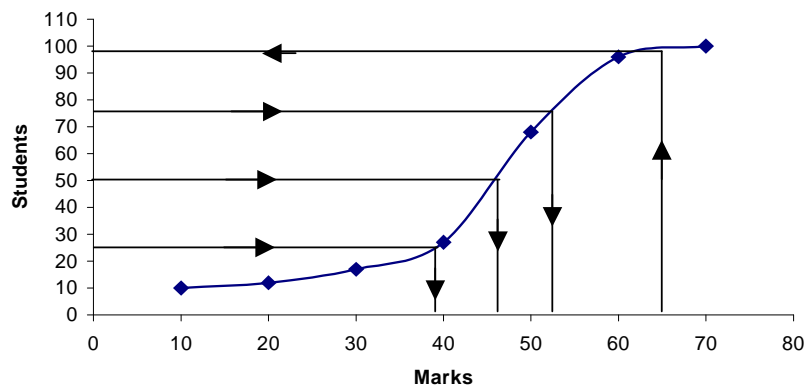
Use the graph to find

- (a) The median mark
- (b) The interquartile range.
- (c) The number of students that obtained over 65 marks.

We must first draw a cumulative frequency table. Remember to ADD.

Marks	<10	<20	<30	<40	<50	<60	<70
Students	10	12	17	27	68	96	100

**Cumulative Frequency Curve**



- (a) Median – This is half of the total frequency. We always start half way up the vertical axis at the 50<sup>th</sup> student, draw a line straight across until it hits the curve and then come to find the answer.

Answer 46.

(b) Interquartile range - this is between the first quarter and the third quarter of the total frequency.

Start at 25 and 75 on the vertical axis come across to hit the graph and then come straight down for the interquartile range.

$$\text{Answer} = 53 - 38 = 15$$

(c) There are a huge number of questions here. Care must be taken to decide from which axis to start from. This very much depends on the information given in the question so read it carefully.

In this question we were given the marks and asked to find the number of students. Start on the horizontal axis, go up to hit the graph and across for the answer.

Since it says "over 65 marks" we take the answer away from 100.

$$\text{Answer} = 100 - 99 = 1$$

**Note** With any of the answers above we are allowed to an error of  $\pm 3$ .

**Example 2** From the cumulative frequency fill in the frequency distribution table.

Age	<2	<4	<6	<8	<10
No. of people	3	7	15	19	20

Age	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10
No. of people					

To fill in the frequency table just SUBTRACT.

Age	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10
No. of people	3	4	8	4	1

## Pie Charts

**Example 3** The number of goals scored in 20 matches was as follows. Draw a pie chart.

No. of goals	0	1	2	3	4
No. of games	6	2	4	5	3

If we are asked to draw a pie chart we must

- (a) find the total number of games (add up the bottom)
- (b) find the angle for each game by using

$$\text{Angle} = \frac{\text{no. of games}}{\text{total}} \times \frac{360}{1}$$

$$0 \text{ goal} = \frac{6}{20} \times \frac{360}{1} = 108^\circ$$

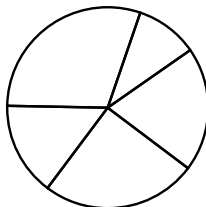
$$1 \text{ goal} = \frac{2}{20} \times \frac{360}{1} = 36^\circ$$

$$2 \text{ goals} = \frac{4}{20} \times \frac{360}{1} = 72^\circ$$

$$3 \text{ goals} = \frac{5}{20} \times \frac{360}{1} = 90^\circ$$

$$4 \text{ goals} = \frac{3}{20} \times \frac{360}{1} = 54^\circ$$

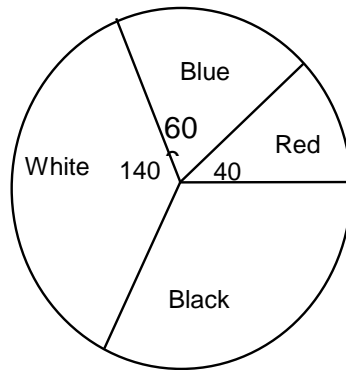
**Pie Chart**



**Given the pie chart.**

$$\text{Number required} = \frac{\text{Angle}}{360} \times \frac{\text{Total}}{1}$$

**Example 4** Find the numbers in all the parts if the total is 18.



$$\text{White } \frac{140}{360} \times \frac{18}{1} = 7$$

$$\text{Blue } \frac{60}{360} \times \frac{18}{1} = 3$$

$$\text{Red } \frac{40}{360} \times \frac{18}{1} = 2$$

$$\text{Black } \frac{120}{360} \times \frac{18}{1} = 6$$