OTHER FORMS OF DATA PRESENTATION

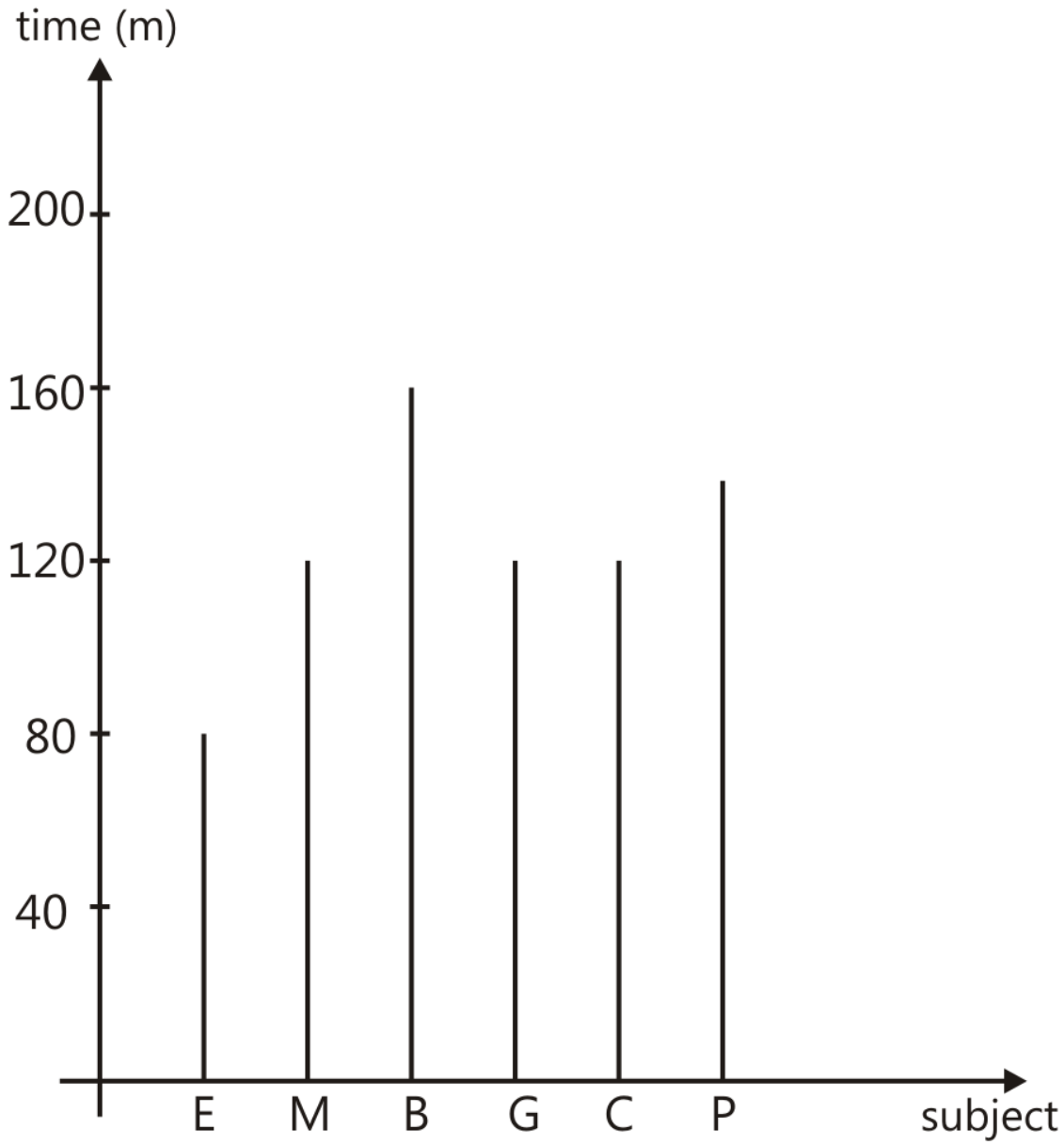
Line Graph

The only outstanding quality of the line graph is that instead of using rectangles as in bar charts, we use straight lines to represent the given information.

Example: Represent the information in the table below on a line graph.

Subject	Eng (E)	Math (M)	Bio (B)	Geo (G)	Chem (C)	Phy (P)
Time allotted	80	120	160	120	120	140

Solving



Pie Chart

Data can be represented in circular form called the Pie Chart. The pie chart shows the relationship of the parts of the whole. In the bar charts we compare the lengths of bars but in pie charts we compare areas of sectors of a circle/pie. Since it is a circular representation of data, the pie is divided into sectors. The area of each sector is proportional to the magnitude of data it represents. The area of each sector in turn is proportional to the angle of the sector.

Since the pie is a circle and contains 360^{o}, the proportion that each part bears to the whole will be the corresponding proportion to 360^{o}.

Subject	English	Math	Biology	Geography	Chemistry
Time allotted (m)	80	120	160	120	120

Construct a pie chart to represent the information.

Solving

First find the total time allotted, i.e. 80 + 120 + 160 + 120 + 120 = 600 minutes. This implies relationship of the pie chart to the actual time is:

$$\frac{360^o}{\theta\ of\ sector} = \frac{600}{time\ alloted}$$

$$\theta\ of\ sector = \frac{time\ alloted}{600} \times 360^o$$

For English = $\frac{80}{600} \times 360^o = 48^o$

For Mathematics = $\frac{120}{600} \times 360^o = 72^o$

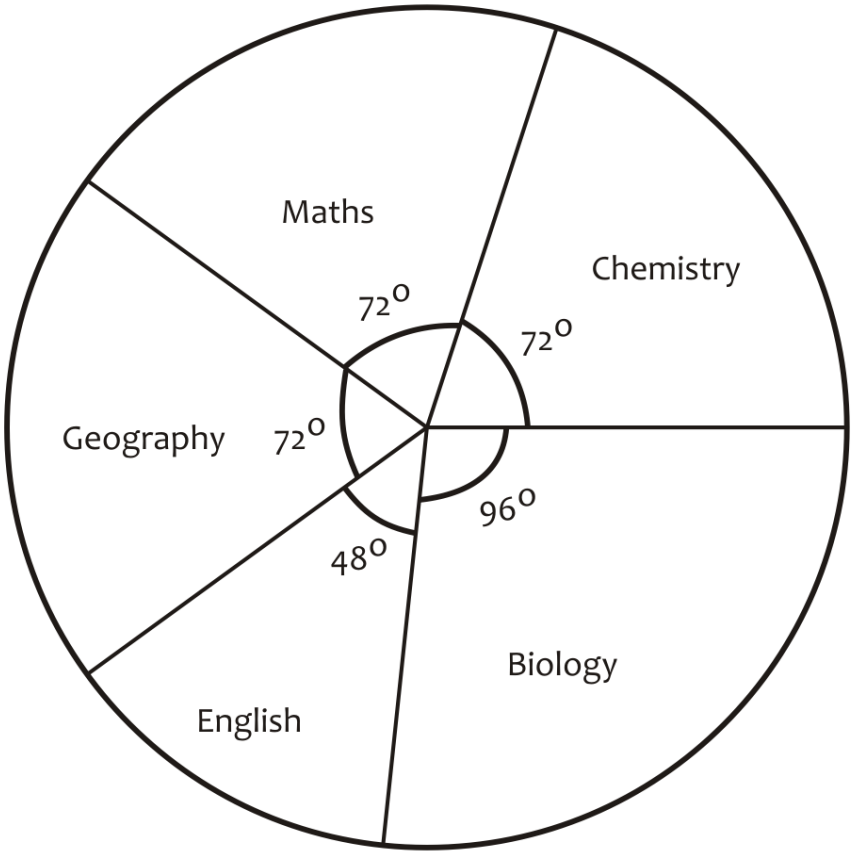
For Biology = $\frac{160}{600} \times 360^o = 96^o$

For Geography = $\frac{120}{600} \times 360^o = 42^o$

For Chemistry = $\frac{120}{600} \times 360^o = 72^o$

As a check, add up all the angles obtained and see if the sum is equal to 360°. Thus, 48° + 72° + 96° + 42° + 72° = 360°.

Next, construct a circle with parts corresponding to the angles calculated, thus we have:



Histogram

The Histogram is another form of data presentation using bars or rectangles. Notwithstanding, they have their bars or columns joined together (that is, there are no spaces between the bars). Thus, a histogram is a bar chart with some more distinctive features such as class interval, class mark, and class boundaries.

Consider the table below containing heights of 33 students in SS1:

Heights	Frequency
150 – 154	3
155 – 159	5
160 – 169	8
165 – 169	10
170 – 174	7

In the frequency table above, the class interval is 5, i.e. 150 – 154, (i.e. by counting the numbers 150, 151, 152, 153, and 154 within the interval). 150 is the lower class limit and 154 is the upper class limit, so the horizontal width of each rectangle in a histogram is given by the class interval. Now, a class mark is defined as

$$\frac{150 + 154}{2} = \frac{304}{2} = \mathbf{152}$$

Another class mark can be found by

$$\frac{155 + 159}{2} = \frac{314}{2} = \mathbf{157}$$

The class mark for each class interval is always different and can be found by this method. The class interval can also be found by the difference between two successive class marks, e.g. 157 – 152 = 5.

Another feature of the histogram is that the rectangles or bars have common boundaries. These common boundaries make for continuity and that means they are made to coincide. To get these common boundaries, we subtract 0.5 or ½ from and add 0.5 or ½ to lower and upper class limits respectively.

Using the table above showing the heights of 35 students in SS1, the class limits are 150 and 154, 155 and 159, 160 and 164, etc. while the class boundaries are 149.5 and 154.5, 154.5 and 159.5, 159.5 and 164.5, etc.

The height of each bar or rectangle corresponds to the frequency in the distribution as in the case of bar charts.

Differences between a bar chart and a histogram are as follows:

1. There are no spaces in the bars of histogram but there are spaces between the bars of bar charts.
2. The width of each rectangular bar in histogram corresponds to the class size while in bar chart the bars are simply equal, not based on any class size.
3. Class boundaries are used in histogram while there are no class boundaries in bar charts.

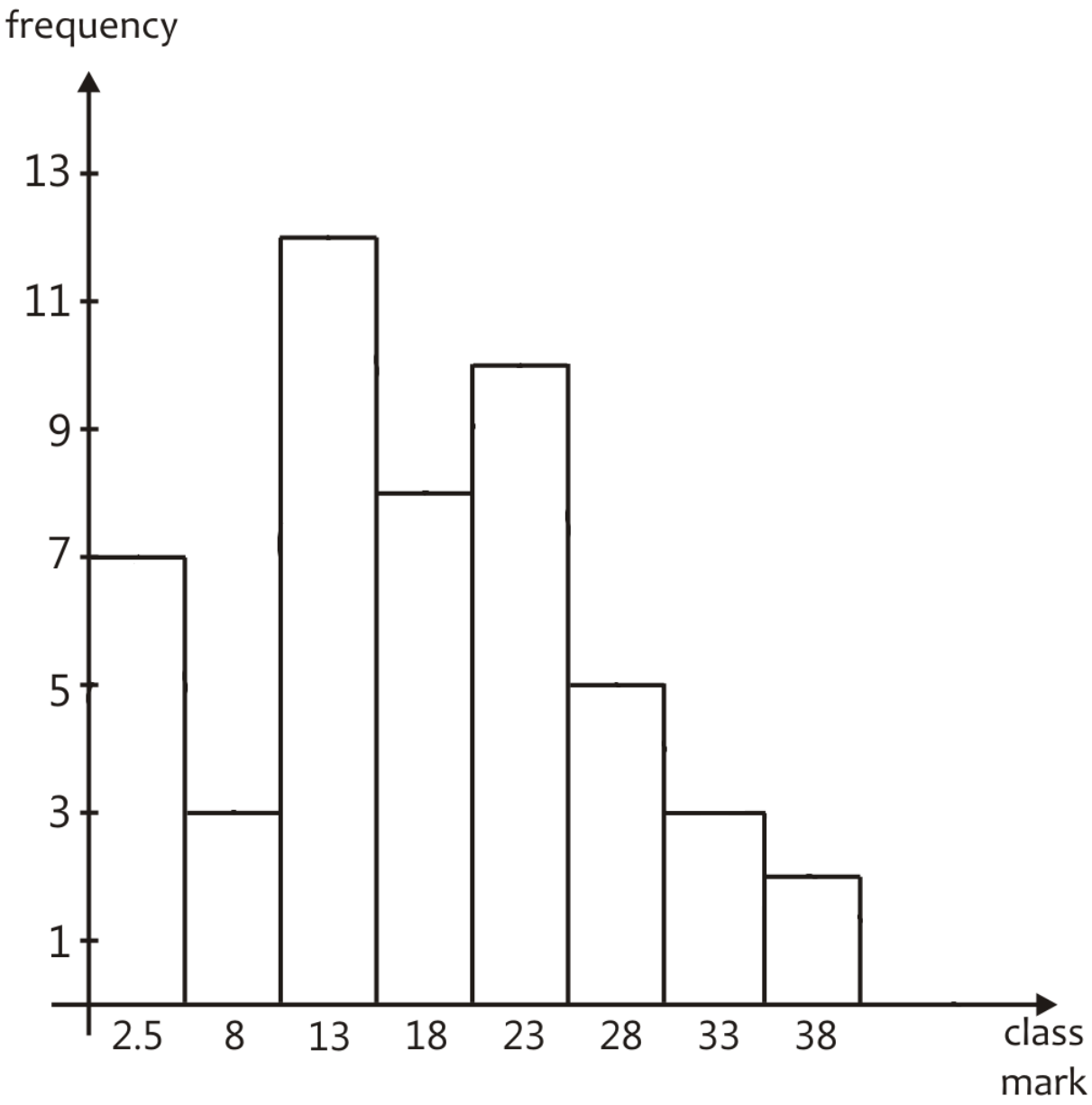
Example: The scores of 50 students in a mathematics test are given in the table below:

Scores	Frequencies
0 – 5	7
6 – 10	3
11 – 15	12
16 – 20	8
21 – 25	10
26 – 30	5
31 – 35	3

36 – 40	2

Solving

Class interval	Class boundaries	Frequencies
0 – 5	-0.5 – 5.5	7
6 – 10	5.5 – 10.5	3
11 – 15	10.5 – 15.5	12
16 – 20	15.5 – 20.5	8
21 – 25	20.5 – 25.5	10
26 – 30	25.5 – 30.5	5
31 – 35	30.5 – 35.5	3
36 – 40	35.5 – 40.5	2


frequency
13
11
9
7
5
3
1
2.5
8
13
18
23
28
33
38
class mark

Frequency Polygon

A polygon is defined as any plane figure bounded by straight lines. Examples are triangles, squares, etc. Hence, a frequency polygon is a closed plane graph formed by plotting the frequencies against their respective class mid-points of the frequency distribution. That is, the class frequencies are plotted at the class marks. The frequency polygon is obtained by joining the plotted points by straight lines.

Using the previous example, we could plot a frequency polygon for the 50 students in the mathematics test:

Scores	Boundaries	Class marks	Frequencies
0 – 5	-0.5 – 5.5	2.5	7
6 – 10	5.5 – 10.5	8	3
11 – 15	10.5 – 15.5	13	12
16 – 20	15.5 – 20.5	18	8
21 – 25	20.5 – 25.5	23	10
26 – 30	25.5 – 30.5	28	5

31 – 35	30.5 – 35.5	33	3
36 – 40	35.5 – 40.5	38	2

