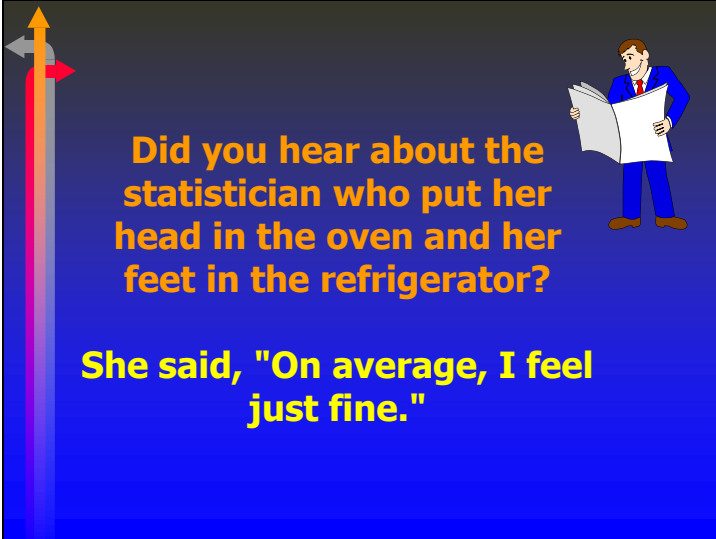
A decorative graphic featuring a vertical bar with a rainbow gradient on the left side. At the top of this bar, there are three arrows: an orange arrow pointing upwards, a grey arrow pointing to the left, and a red arrow pointing to the right. The background of the graphic is a blue gradient.


**Central Tendency
& Variability**

AS - 12.4.3



Did you hear about the statistician who put her head in the oven and her feet in the refrigerator?

She said, "On average, I feel just fine."



Which average?

All three averages are useful for summarizing e.g. the distribution of household incomes.

- In 1998, the income common to the greatest number of households (mode) was R25 000.
- Half the households (median) earned less than R38 885.
- The mean income was R50 600.

Reporting only one measure of central tendency might be misleading and perhaps reflect a bias.


☀ The table shows the heights of 50 randomly chosen Grade 12 school girls.

height (cm)	midpoint (x)	frequency (f)	(f)(x)
150- <155	152,5	4	1102,5
155- <160	157,5	7	2925,0
160- <165	162,5	18	1842,5
165- <170	167,5	11	1035,0
170- <175	172,5	6	710,0
175- <180	177,5	4	8225,0


Calculate the mean height of the girls?

Mean height =

height (cm)	midpoint	frequency (f)
150- <155	152,5	4
155- <160	157,5	7
160- <165	162,5	18
165- <170	167,5	11
170- <175	172,5	6
175- <180	177,5	4



1. Find the mode:
2. Calculate the median:



Measures of Variability

It is a single summary figure that describes the spread of data within a distribution.


- Range – difference between the smallest and largest observations.
- Percentiles – where p% of the values falls below a certain value.
- Interquartile Range (IQR) - Range of the middle half of median scores.

✶ The results of a survey of the travelling time (in minutes) of 200 workers are as follows.

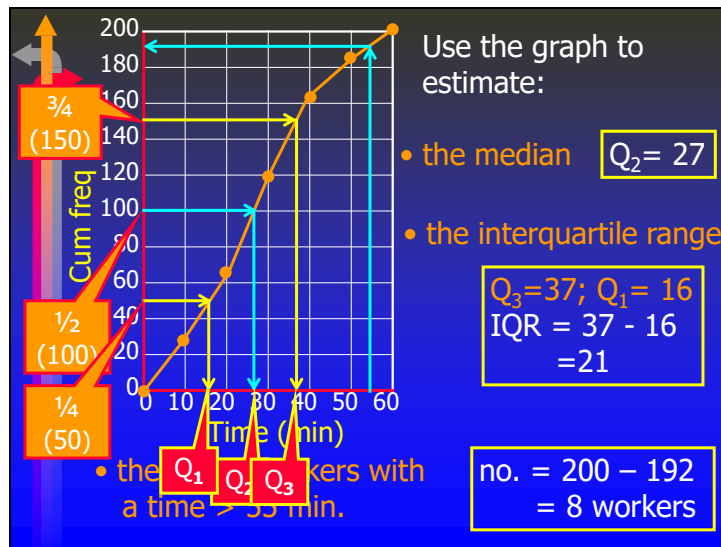
Time (min)	Freq. (f)	Cum. freq.
$0 < x \leq 10$	28	28
$10 < x \leq 20$	37	65
$20 < x \leq 30$	55	120
$30 < x \leq 40$	44	164
$40 < x \leq 50$	22	186
$50 < x \leq 60$	14	200


Complete the cumulative frequency table.
Draw a smooth cumulative frequency curve.

Plot these numbers



Slide 8






Five-number summary

The summary consists of the lowest data value, first quartile (Q_1), median (Q_2), third quartile (Q_3) and highest data value.

- ☀ Unathi sells the following number of computers in 12 months:

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

1. Arrange the data in ascending order.



Percentiles

A percentile is a score **below** which a certain percentage of values fall. There are 100 percentiles in a sample.

Oscar's height is at the 90th percentile and his weight is at the 60th percentile for his age. Describe Oscar's physical build in general terms.

He is taller than 90% of the people but only weighs more than 60% of the people - possibly tall and thin.

☀ In 2004 the snow depth at Tiffendell was measured (in mm) for 25 days and recorded.

242, 228, 217, 209, 253, 239, 266, 242, 251,
240, 223, 219, 246, 260, 258, 225, 234, 230,
249, 245, 254, 243, 235, 231, 257.

Depth (mm)	200-210	210-220	220-230	230-240	240-250	250-260	260-270
freq	1	2	3	5	7	5	2

1. Complete the frequency table.

