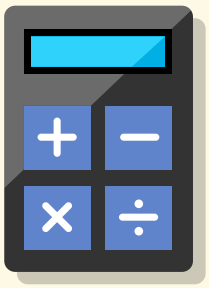
Graphing and analysing the distribution of superannuation data



This sequence is intended as a framework to be modified and adapted by teachers to suit the needs of a class group.

Resources needed

- Graphing distributions and correlations – Visualiser
- Graphing data distributions and associations – Worksheet
- Distribution of income and super in Australia – Investigation

Suggested activity sequence

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Part A: Calculating super

1. If students have not encountered the concept of superannuation in previous maths lessons, or need to revise the concept play: *What is super?*.
2. Explain to students that the superannuation guarantee is currently 12% of ordinary time earnings and remind them that for every week they work for over 30 hours, they are entitled to the superannuation guarantee (providing they earn more than $450 for the month).
3. Explicitly teach students how to calculate the superannuation guarantee using a gradual release of responsibility model.

   To calculate the money your employer puts into your super account for you:

$$Super = 12\% \times salary$$

For example: You're a third-year apprentice plumber and your weekly wage is $669.53 per week. How much super should your employer pay into your super account?

$$Super = 12\% \times salary$$

$$= 0.12 \times \$669.53$$

$$= \$80.34$$

Work backwards: Your employer pays $73.65 into your super account for the week. What was your salary for the week?

$$Super = Percentage \times Salary"$$

Dividing both sides of the equation by the percentage:

$$\frac{\text{Super}}{\text{Percentage}} = \frac{\cancel{\text{Percentage}} \times \text{Salary}}{\cancel{\text{Percentage}}}$$

$$\text{Salary} = \frac{\text{Super}}{\text{Percentage}}$$

$$= \frac{\$73.65}{0.12}$$

$$= \$602.50$$

Complete the following table of superannuation calculations.

Salary	Super
$1 250	
$920	
$1 323.50	
	$54.95
	$248.34

Part B: Modelling use of Excel to find mean and median

1 Model the following task. If you're all working together on this, everyone will need access to a computer with spreadsheet software.

This is the weekly wage of 5 people in a netball team. Two people in the team didn't want to share their information.

$1,845 $1,529 $2,135 $1,150 $986

a. Set up a spreadsheet and put the weekly pay data in Excel.

	A	B	C
1		Weekly pay	Employers' super contributions (11% of salary)
2			
3			
4			
5			
6			
7	Average (mean)		
8	Median		

b. Sort from lowest to highest.

c. Put in a formula to calculate super (=0.11*B2).

d. Put in formulas to calculate average and median (for example: =AVERAGE (C2:C6) and =MEDIAN(C2:C6)).

e. Discuss with students about the average and the median being the same.

2 The rest of the team have decided to share what they get paid. One gets $950 and the other gets $3,428.

a. Add these extra rows, sort the data, check the formulas and then examine the mean and median. Again, discuss what's happened to these 2 measures of central tendency.

Set up this table on your spreadsheet.

Category	Number of people in this category
0-999	
1000-1999	
2000 -2999	
3000-3999	1
Total	*Put in a sum formula here*

b. Tally the wages and put them in each category ($3000 - $3999 has been done for you).

c. Add the formula to calculate the total number of people. Discuss with students what they expect the figure to be (7) and what they should do if it's not.

d. Invite students to complete Part 1 of the *worksheet*.

Part C: Modelling and practising how to graph and analyse data

2. The *visualiser* includes information that will support you to model how to graph and analyse distribution data.
3. Use the visualiser to teach about each type of graphical representation in turn. After you have modelled each, ask students to practice by answering the questions on the worksheet and discuss their answers before moving to the next section. The order is shown below:

Visualiser element	Worksheet section
Introduction (slide 2)	N/A
Histograms (slides 3-12)	Part 2, questions 1-3
Box plots (slides 13-27)	Part 2, questions 4-6 (questions 7-8 are optional)
Cumulative frequency (slides 28-34)	Part 2, questions 9-15.
Scatterplots (slides 35-44)	Part 3, questions 1-8

Part D: Investigating super

The investigation is optional but may be used to elicit evidence of student levels of understanding and proficiencies in relation to the achievement standard. It could be set as an assessment task to be completed in the students' own time.