

51. Linear equations and tables of values

IMEC12 p. 26

 Multiplicative Thinking
 Generalising

Tasks

- Deconstruct a linear graph from the previous lesson to learn about slope and intercept.
- Create equations and tables of values from a statement.
- Graph coordinates from a table of values.
- Identify the intercept and slope or gradient.

Strategies

- Algebra as Spreadsheets
- Relationship Table

Resources

- Spreadsheet program or graph paper

Responsive teaching steps

This lesson builds on Scenario 4 from Lesson 7. If students have not completed that step, start with it first. The next few lessons build student understanding for the Investigation.

1. Read the Explore section together. Students should be able to graphically identify the intercept. At this stage, the slope or gradient is simply identified as the increase in total cost as we add each extra attendee.
2. Draw attention to the points on the graph, which are always expressed with the x-coordinate followed by the y-coordinate. This will help to calculate the slope.
3. Students work with a partner to complete the questions in each section and check their answers. Discuss any difficult questions as a class.
4. Have students explain a process for working out how to write the equation.

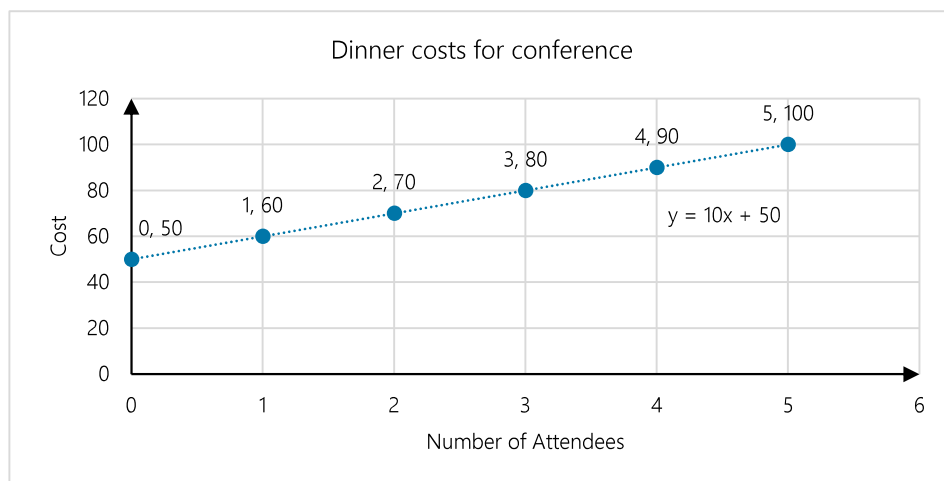
For the remaining time in this lesson, provide students with the instructions and a spreadsheet program and let them explore creating line graphs from tables of values. They will soon work out how to use the formulas without much help.

Linear equations and tables of values

GENERALISING MULTIPLICATIVE THINKING

In previous lessons we used a formula to complete a table of values. By plotting the values on the Cartesian Plane, we noticed that they formed a line. This is called a linear function.

- The graph below shows: cost = food $\times$ number of attendees + booking fee, or cost = $fn + b$.
- The food cost was set at \$10 per attendee. The booking fee was \$50. So, cost = $10n + 50$.
- We plotted the n on the x-axis and c on the y-axis, so the graph below shows: **$y = 10x + 50$**



Explore

Let's explore the graph above:

1. At what point does the graph cross the y axis? This is called the **intercept**.
Where is that in the equation $y = 10x + 50$?
2. Each time we add one more attendee, the total cost goes up by the same amount.
This is called the **slope** or **gradient**. Circle the gradient in the equation $y = 10x + 50$.

In the questions that follow, we are going to vary the scenario and see what happens.

For each question you need to:

- Write the equation to calculate the total cost.
- Create a table of values just like in lesson 7 (use the **Relationship Table** strategy).
- Draw a new set of points on your existing graph and join them with a line.
- Identify the intercept and the slope (or gradient) in the equation.

Apply and Practise

3. The booking fee changes to \$20, but the food cost per attendee stays at \$10.
4. The booking fee changes to \$60, but the food cost per attendee stays at \$10.
5. The booking fee changes to \$10, but the food cost per attendee stays at \$10.
6. What do you notice about each of your lines?