



Activity description

This activity can be used to introduce linear graphs.

The worksheet shows students how to draw a graph using formulae in Excel. It then introduces the concepts of gradient and intercept, and asks students to relate these to the values in the formula and the initial information. A second example is given for practice, before the final example brings in the idea of a negative gradient.

Suitability

Level 2 (Higher)

Time

1–2 hours

Resources

Student sheets

Optional slideshow

Equipment

Computers with Excel, printer

Key mathematical language

Formula, intercept, gradient, constant, coefficient

Notes on the activity

Students need to be familiar with Excel. In particular they must know how to enter spreadsheet formulae, use ‘fill-down’, and draw a graph using the scatter graph option.

During the activity

Students will require access to computers. Projecting copies of the graphs from the Excel spreadsheet would aid class discussion.

Alternatively use Autograph or similar graph-plotting software so that changes to the gradient and intercept on the y axis can be made quickly.

Points for discussion

As students complete each example, discuss their results and emphasise the connections between the intercept and gradient of the line, the original information, and the formula used to draw the line.

At the end of the activity you could use the slideshow to summarise the main points and help students to reflect on the work they have done.

You could discuss facts like doubling the time of hire not leading to double the cost. This will help to emphasise the difference between these situations and those involving direct proportion.

Extension

The optional extension is repeated below.

Another coach company quotes a basic charge of £30 + £40 per hour. Add another column to your spreadsheet so that you have two lines on your graph. Which firm gives the better deal?

This can be used as a starting-point for work on simultaneous equations.

Answers

Cherry dessert production line

Intercept, 15 = constant term (time taken in minutes to prepare the production line)

Gradient (slope) = $\frac{dy}{dx} = \frac{200}{1000} = 0.2$ (number of minutes per dessert when production starts)

See the Excel spreadsheet supplied, and reproduced below.

