

## LINE GRAPHS

Line graphs are a useful tool for

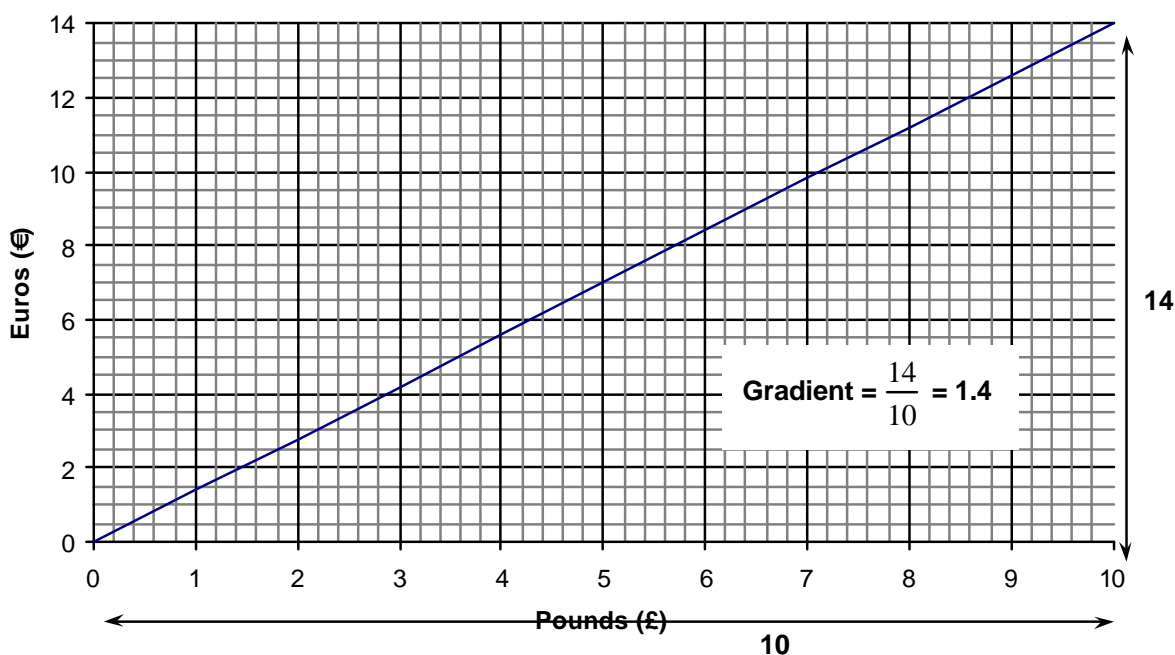
- displaying a relationship that you already know between two sets of figures or
- finding out what the relationship is between two sets of figures.

### Conversion Graphs

If the exchange rate between pounds and euros is £1 = €1.40, you can draw up a table of figures. (Use your calculator to check these.)

Pounds (£)	1	2	3	4	5	6	7	8	9	10
Euros (€)	1.4	2.8	4.2	5.6	7	8.4	9.8	11.2	12.6	14

Conversion Graph for pounds (£) and euros (€)



- The graph of these values is a straight line
- It goes through (0,0) because no money is the same in any currency.

Because the graph has **both** these features, you can say:

- As the pounds go up in equal steps, so do the euros.
- The number of euros is **directly proportional** to the number of pounds.
- From the gradient: the number of euros = 1.4 x the number of £s.



**Exercise 1**

1. This table gives approximate conversions between miles and km

miles	10	20	30	40	50	60	70	80	90	100
km	16	32	48	64	80	96	112	128	144	160

Draw a line graph to show this data.

Work out the gradient and use it to complete this statement: 1 mile =            km.

2. This table gives the exchange rates for £1 in various currencies:

Australia	\$2.4 (dollars)	New Zealand	\$2.6 (dollars)
Canada	\$2.1 (dollars)	Saudi Arabia	5.8 riyal
India	73 rupees	South Africa	11 rand
Japan	180 yen	USA	\$1.5 (dollars)

Choose a currency and draw a conversion graph for £ 0 - £500.

Work out the gradient of your graph and check that it is the same as the conversion factor.

3. This table gives the price of various bags of pre-packed potatoes.

Weight (kg)	2	5	8	12
Price (£)	1.04	2.60	4.16	6.24

- Draw a line graph by hand.
- Work out the gradient to give the price per kilogram
- Enter the same data into a spreadsheet and compare the printouts of a **line graph** and a **scatter diagram** drawn using this data. Which gives a correct graph?

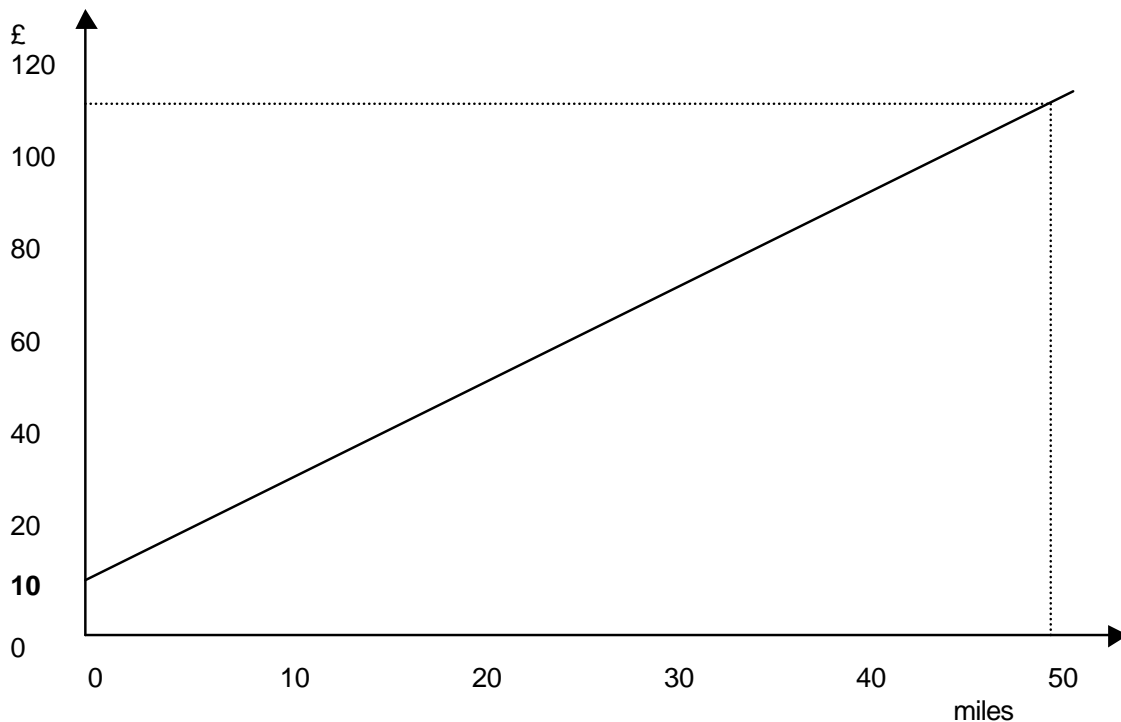


**More complicated graphs**

**Example**

A taxi firm charges £10 + £2 per mile for long distance trips. This table gives the fares for up to 50 miles.

Distance (miles)	0	10	20	30	50
Fare (£)	10	30	50	70	110



The point where the line meets the £s axis is £10 because the meter is set to that much before the journey starts. It is like the standing charge in a gas bill.

**Exercise 2**

1. A mobile phone company offers two tariffs:

Tariff	Monthly charge (£)	Charge per minute (£)
<b>Chatterbox</b>	0	0.50
<b>Lo-user</b>	10	0.30

Complete the table of charges for each phone.

<b>Chatterbox</b> minutes	0	20	40	60	80	100
£	0	10	20			

<b>Lo-user</b> minutes	0	20	40	60	80	100
£	10	16	22			

Putting the minutes along the bottom, draw both graphs on the same set of axes. Find out the number of minutes that cost the same on both tariffs.



2. A sales rep is offered a choice of pay,  
 a. £300 per week  
 or  
 b. £100 per week basic pay + 15% commission on all sales.

Complete this table of possible earnings.

Sales (£)	0	500	1000	1500	2000	2500
Commission (£)	0	75				
Total weekly pay (£)	100	175				

Hand draw a line graph with sales as the horizontal axis to show these figures.

From your graph, read off how much she would have to sell to earn more than £300.

Explain what the intercept with the vertical axis means.

Try to create a spreadsheet that would do the calculations for you.

Obtain a scatter diagram and check that it gives the same answer as your hand drawn graph.

The firm then comes up with another offer of 20% commission on all sales, but no basic weekly wage.

Add another column to your spreadsheet to give the earnings for that option.

Redraw the scatter diagram with both sets of data.

Work out the gradient of the new line and explain the significance of this figure.

Write a few sentences explaining what else you can tell from the graph.

