This activity shows how to use a straight line graph to find costs.
In most of the examples there is a 'start-up' amount.

24-hour Plumber

Call-out	**£20**
Hourly rate	**£40**

Information sheet

A plumber charges £20 to come to your home and then £40 for every hour she works.

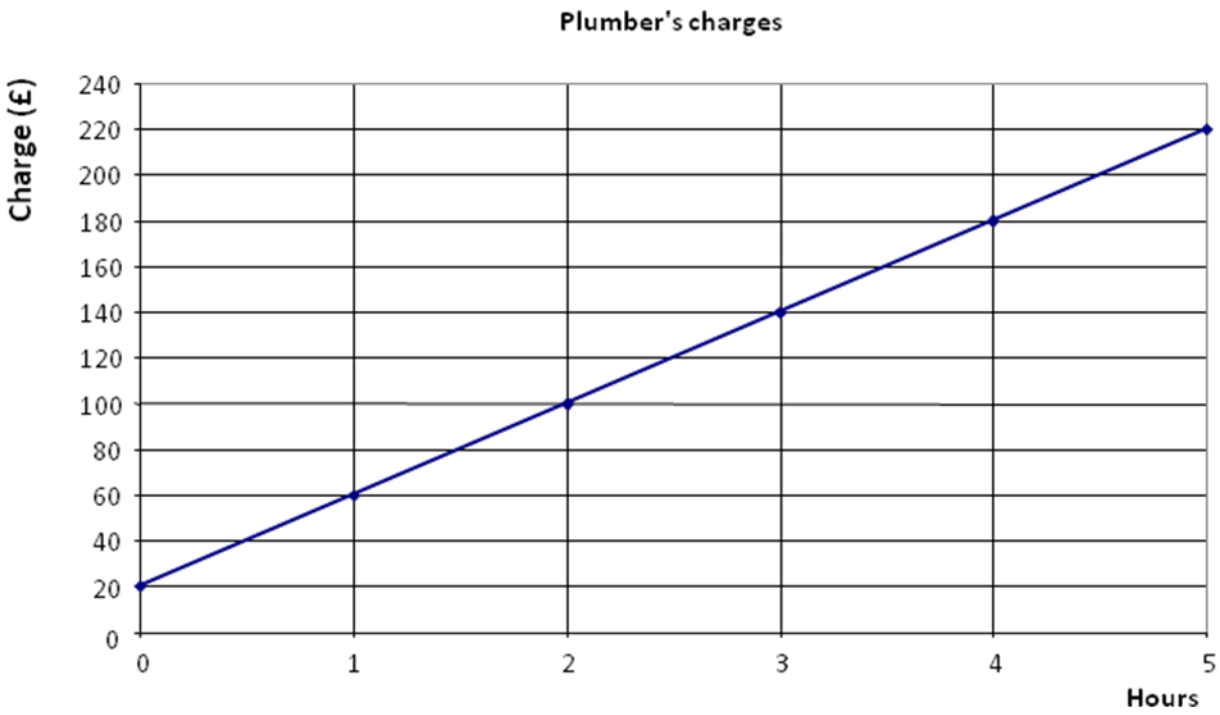
For a 2 hour job she charges £100.
This table gives the charges for up to 5 hours work.

Hours	0	1	2	3	4	5
Charge (£)	20		100			

Think about…

What are the missing charges?

Here is the same information in a line graph.



For every hour the plumber works, the charge goes up by £40.

It is a straight line.

The line starts at starts at £20.

Think about…

Why doesn't the graph start at (0, 0)?

Try these

1 Use the plumber's graph to find:

a the charge for 2½ hours work. **b** how long she would work for £170.

2 A mobile phone company offers two tariffs:

Tariff	Monthly charge (£)	Charge per minute (£)
Chatterbox	20	0.02
Lo-user	0	0.04

a Complete the table of charges for each phone.

Chatterbox minutes	0	400	800	1200
£	20	28		

Lo-user minutes	0	400	800	1200
£	0	16		

b Draw both graphs on the same set of axes (putting minutes along the bottom).

c Write down the number of minutes that costs the same on both tariffs.

d Is one tariff cheaper than the other? Explain your answer.

3 A taxi firm charges £2.80 + £2.40 per mile for journeys
(Night Rate 11 pm – 7 am, all day Sunday, Bank Holidays, and from 8 pm on Christmas Eve and New Year's Eve).

a Complete this table of fares.

Distance (miles)	0	1	2	3	4
Fare (£)	2.80	5.20	7.60		

b i Show this information on a line graph.

ii What is the charge for 3½ miles?

iii How far can you go if you have just £7?

c The same taxi firm charges £2.60 + £1.70 per mile for journeys Monday to Saturday 7 am to 11 pm.

i Complete this table of fares.

Distance (miles)	0	1	2	3	4
Fare (£)					

ii Put this information on the same axes as the Night Rate and Sunday fares.

iii How much more does it cost for a 2½ mile journey after 11.00 pm than earlier in the evening?

iv Write a few sentences to explain what is similar and what is different about the shape of the two graphs.

4 A sales rep gets £200 per week basic pay + 10% commission on all sales.

a Complete this table of earnings.

Sales (£)	0	500	1000	1500	2000	2500
Commission (£)	0	50				
Total weekly pay (£)	200	250				

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

ii From your graph, read off how much the rep has to sell to earn more than £400.

iii Explain what the intercept with the vertical axis means.

c i Create a spreadsheet to calculate the values in the table in part a).

ii Use the spreadsheet to draw a scatter diagram.
Check that it gives the same answers as your hand drawn graph.

d The firm considers changing to 20% commission on all sales, but no basic weekly wage.

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

ii Redraw the scatter diagram with both sets of data.

iii Work out the gradient of the new line. Explain its significance.

iv Write a sentence explaining what else you can tell from the graph.

At the end of the activity

Try to answer these questions.

- Why was the plumber's charge not directly proportional to the time she worked?
- How can you tell from the graph on page 1 that the charge is not directly proportional to the time?
- What does the intercept tell you about the plumber's charge?
- What does the gradient tell you?
- What are the advantages of using a graph to find charges for jobs?
- What are the disadvantages?