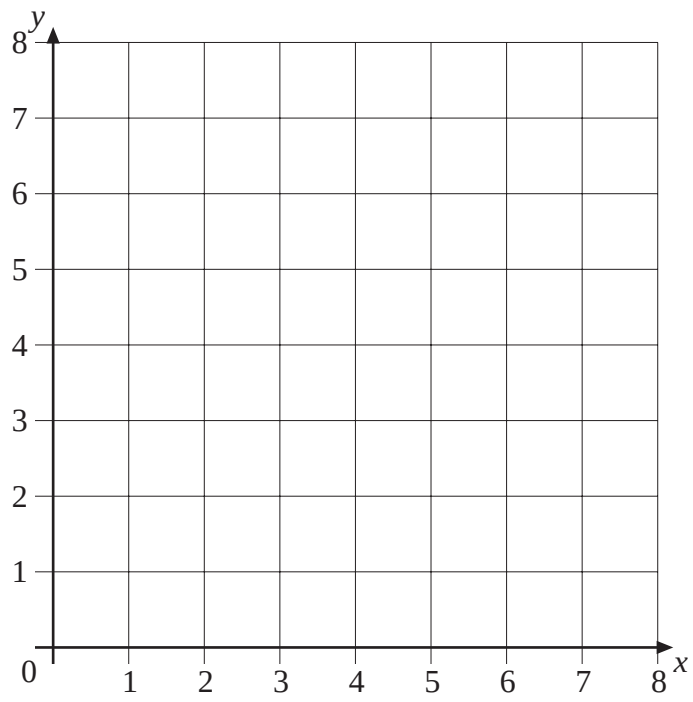
UNIT 3 *Graphs* Activities

Activities

ACTIVITY 3.1 *Scatter Graphs*

This is a whole class or group activity for pupils to collect, illustrate and to make deductions about data.

You will need a grid of the form below, either on the board or OHP.



1. Using the labels:

   x = no. of brothers and sisters,

   y = no. of aunts and uncles,

   for the whole class (or group) input the data for each class member onto the scatter plot.

   What trends can be deduced from the data?

2. Repeat problem 1 with the same x but with y = no. of pets.

3. Using a large scatter graph, with

   x = birth month (take January = 0, February = 1, etc.)

   y = shoe size,

   complete the graph for class members. Is there any trend in the data?

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* Note – if a data point occurs twice, represent this as ⊙; the third occurrence is shown as ◎, etc.

ACTIVITY 3.2 *Negative Numbers*

A key use of negative numbers is in sport, and in particular, in determining the position of clubs in the football league tables. In the early part of the season this is especially true, as there are few differences in points obtained (3 for win (W), 1 for draw (D), 0 for lose (L)) as only a small number of matches have been played (P). When teams have equal numbers of points, the order is determined by the highest goal difference.

1. The table below shows the Premiership League table on Friday 28 August 1998.

	Matches				Goals		
Team	P	W	D	L	For	Against	Points
Charlton	2	1	1	0	5	0	4
Leicester City	2	1	1	0	4	2	4
Aston Villa	2	1	1	0	3	1	4
Wimbledon	2	1	1	0	3	1	4
Arsenal	2	1	1	0	2	1	4
Liverpool	2	1	1	0	2	1	4
Leeds United	2	1	1	0	1	0	4
West Ham United	2	1	1	0	1	0	4
Sheffield Wednesday	2	1	0	1	3	1	3
Coventry City	2	1	0	1	2	2	3
Nottingham Forest	2	1	0	1	2	2	3
Manchester United	2	0	2	0	2	2	2
Newcastle United	2	0	2	0	1	1	2
Derby County	2	0	2	0	0	0	2
Chelsea	2	0	1	1	2	3	1
Blackburn Rovers	2	0	1	1	0	1	1
Middlesbrough	2	0	1	1	1	3	1
Everton	2	0	1	1	0	2	1
Tottenham Hotspur	2	0	0	2	1	6	0
Southampton	2	0	0	2	1	7	0

Find the goal difference, i.e. goals for and goals against, to check that the teams are in the correct order.

2. The results of matches played at the weekend 29/30 August are given below.

Arsenal	0	Charlton	0
Blackburn Rovers	1	Leicester City	0
Coventry City	0	West Ham United	0
Everton	0	Tottenham Hotspur	1
Middlesbrough	1	Derby County	1
Sheffield Wednesday	0	Aston Villa	1
Southampton	1	Nottingham Forest	2
Wimbledon	1	Leeds United	1
Newcastle United	1	Liverpool	4

What was the order of the teams in the league after these matches had been played?

Extension Find out when, in recent years, goal difference has decided a league title, promotion or relegation.

ACTIVITY 3.3 *Conversion Graphs*

Many travel agents and banks will change money from one currency to another, They will also charge commission, either as a fee or as a percentage of the amount of money you are changing. Here are two examples for changing pounds (£) to dollars ($).

EasyChange

Rate: £1 buys $1.50

Commission: £4 per transaction

Better Exchange

Rate: £1 buys $1.60

Commission: 10%

1. If you have £100 to change, how much commission will you pay with *EasyChange*?

   How much money will you have left to change?

   How many dollars will you get?

2. If you have £100 to change, how much commission will you pay with *Better Exchange*?

   How much money will you have left to change?

   How many dollars will you get?

3. Repeat problems 1 and 2 for changing (a) £20 and (b) £200, to dollars.

   What conclusion can you reach to help you decide which of these two companies to use for changing your money?

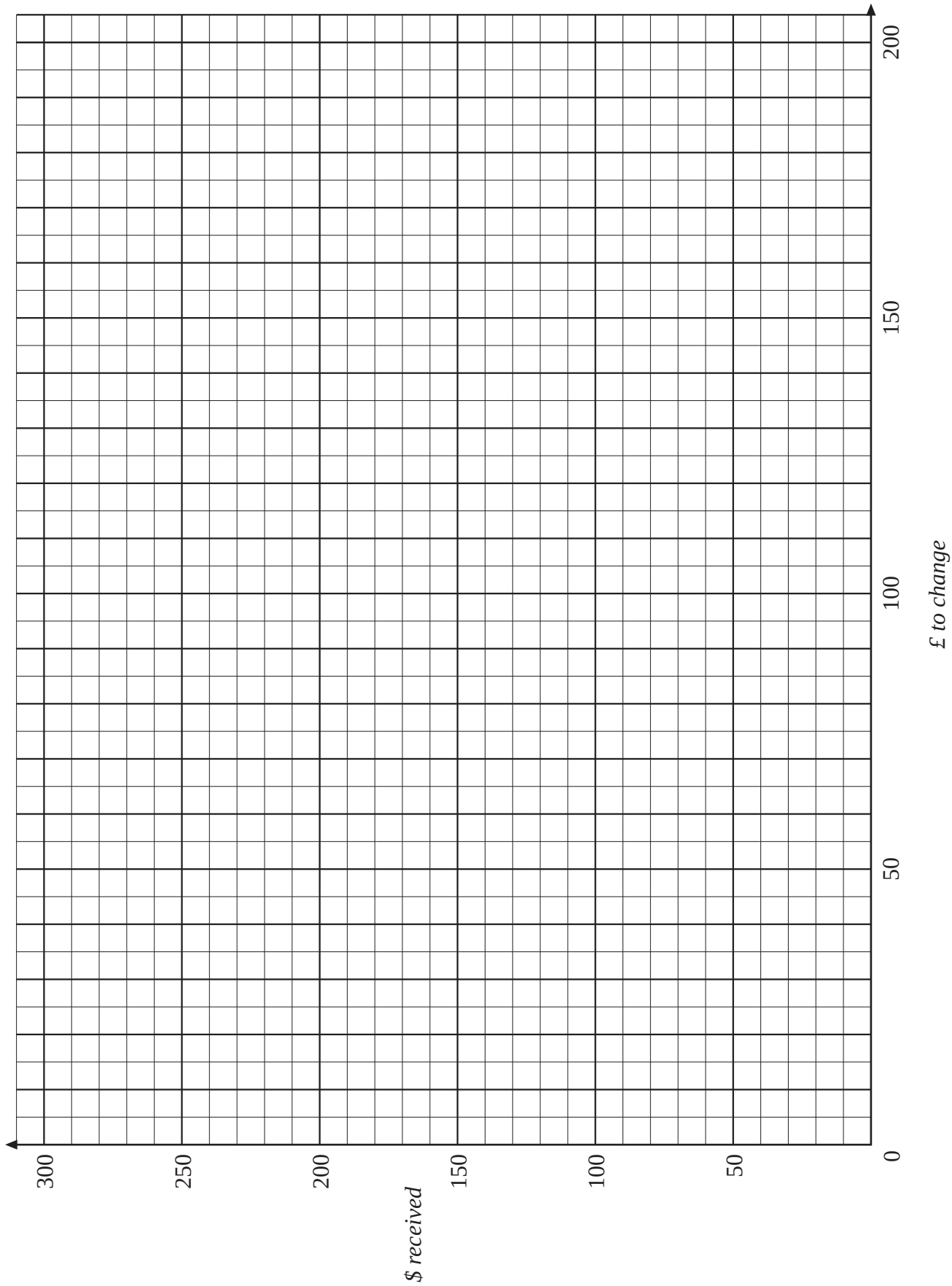
You can easily see what is happening if you draw conversion graphs for each company on the same graph.

4. (a) Draw the conversion graph for *EasyChange*. First plot the three data points found in problems 1 and 3. Use a copy of the grid given. Draw a straight line through these points (it should also go through $x = 4$, $y = 0$).

   (b) On the same graph, draw the conversion graph for *Better Exchange*. First plot the three data points found in problems 2 and 3. Draw a straight line through these points (it should also go through the origin, $x = y = 0$).

   (c) Where do the lines intersect? From your graph, estimate the best outcome when changing (i) £50, (ii) £150.

ACTIVITY 3.3 *Conversion Graph*



ACTIVITIES 3.1 - 3.2 *Notes and Solutions*

Notes and solutions are only given where appropriate.

3.1 This is a whole class activity which aims to involve all pupils in plotting 'their' point, and also provides an opportunity to begin a discussion on correlation.

3.2 This will be of particular interest to keen football fans (there are similar applications in cricket and rugby); the aim here is to show how negative numbers do have meaning beyond the usual 'temperature' examples.

	Matches				Goals			
Team	P	W	D	L	For	Against	Goal Diff.	Points
Liverpool	3	2	1	0	6	2	+4	7
Aston Villa	3	2	1	0	4	1	+3	7
Nottingham Forest	3	2	0	1	4	3	+1	6
Charlton	3	1	2	0	5	0	+5	5
Wimbledon	3	1	2	0	4	2	+2	5
Arsenal	3	1	2	0	2	1	+1	5
Leeds	3	1	2	0	2	1	+1	5
West Ham United	3	1	2	0	1	0	+1	5
Leicester City	3	1	1	1	4	3	+1	4
Coventry City	3	1	1	1	2	2	0	4
Blackburn Rovers	3	1	1	1	1	1	0	4
Sheffield Wednesday	3	1	0	2	3	2	+1	3
Derby County	3	1	0	2	1	1	0	3
Tottenham Hotspur	3	1	0	2	2	6	– 4	3
Manchester United	2	0	2	0	2	2	0	2
Middlesbrough	3	0	2	1	2	4	– 2	2
Newcastle United	3	0	2	1	2	5	– 3	2
Chelsea	2	0	1	1	2	3	– 1	1
Everton	3	0	1	2	0	3	– 3	1
Southampton	3	0	0	3	2	9	– 7	0

ACTIVITY 3.3 *Notes and Solutions*

Notes and solutions are only given where appropriate.

3.3 1. £4 ; £96 ; $144

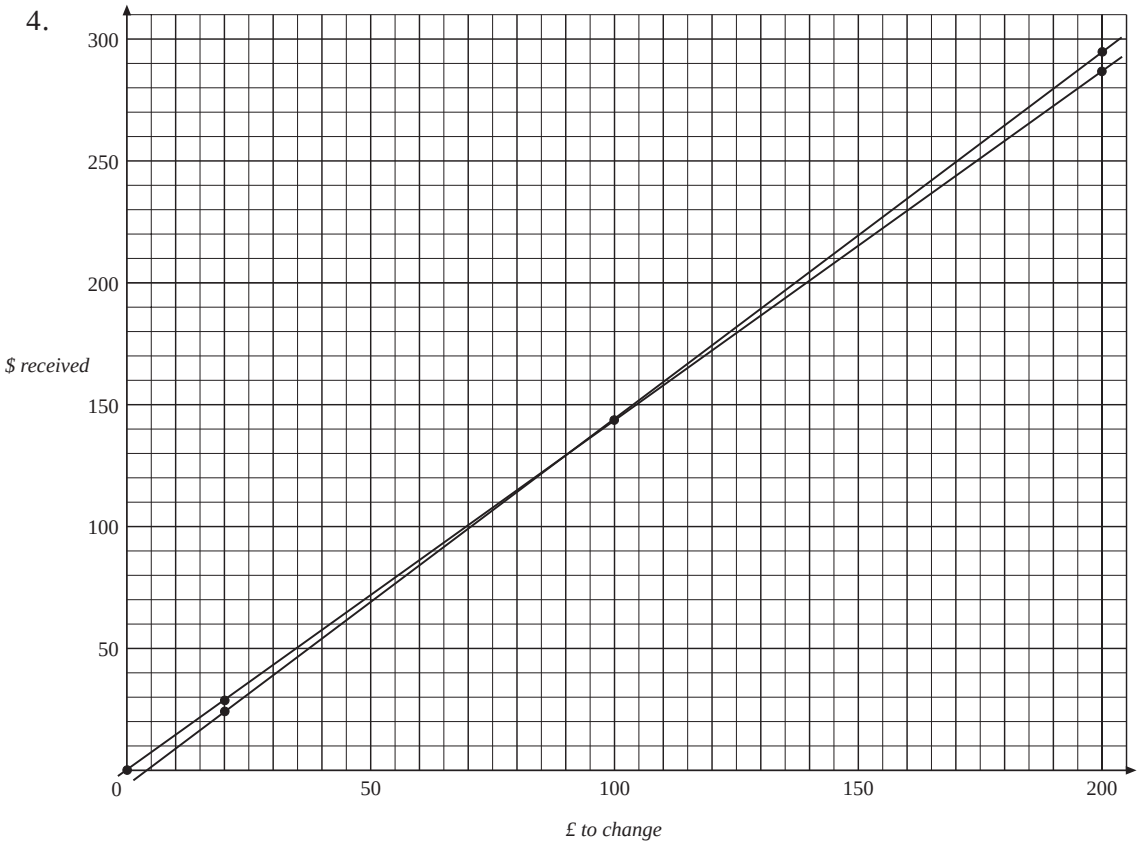
2. £10 ; £90 ; $144

3. (a) £4 ; £16 ; $24 and £2 ; £18 ; $28.8

(b) £4 ; £196 : $294 and £20 ; £180 ; $288

For amounts of less than £100 to change, use *Better Exchange*; for amounts more than £100, use *EasyChange*.

3.3 4.



(c) (i) $72 (ii) $219