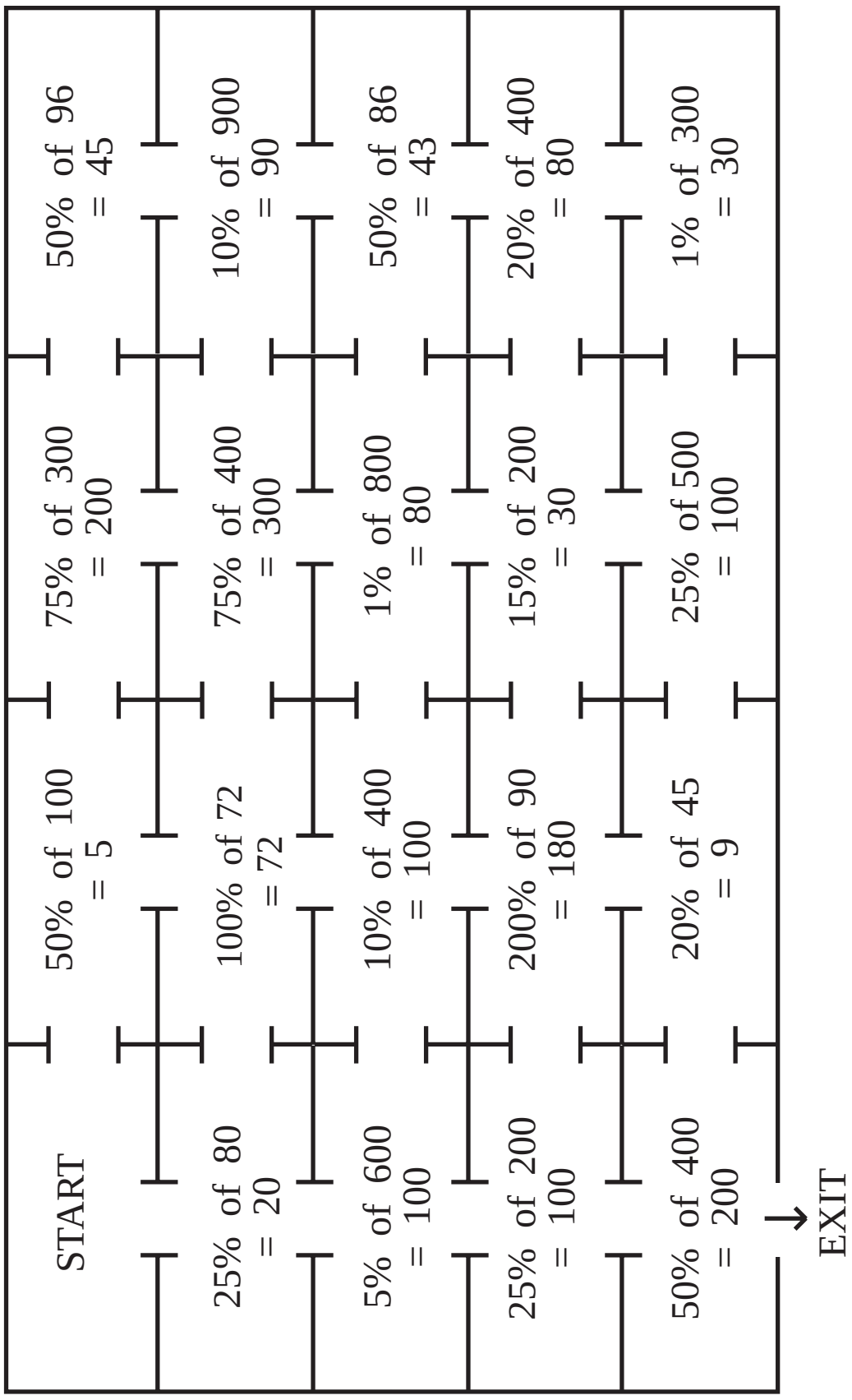
UNIT 17 *Arithmetic: Decimals, Fractions and Percentages* Activities

Activities

ACTIVITY 17.1 *Percentages of Quantities*

Look at the diagram below. START from the top left box and enter the next box which displays a correct statement. Carry on in the same manner until you EXIT.



ACTIVITY 17.2 *Currency Exchange*

The chart shows the exchange rate between the pound and various foreign currencies on Monday 10 March 1997.

THE £ ABROAD

Australia	A $	2.03
Canada	C $	2.20
Denmark	D Kr	10.41
France	F Fr	9.20
Germany	DM	2.73
Hong Kong	HK $	12.40
Ireland	IR£	1.03
Italy	L	2712.00
Japan	Y	194.91
Spain	Pes	231.40
Switzerland	S Fr	2.36
U.S.	$	1.60

1. How many
   (a) $ can you obtain for £10,
   (b) DM can you obtain for £5,
   (c) A$ can you obtain for £20,
   (d) L can you obtain for £2.50?

You can also use the table for converting foreign currency to pounds.

2. How many pounds can you obtain for
   (a) 24 F Fr (b) 47 DM
   (c) 101000 L (d) 100 $
   (e) 4000Y?

In practice, most currency exchanges charge commission, either a percentage or a fixed amount.

3. Find how much you can obtain for £200 in
   (a) $ with a commission charge of 2%,
   (b) DM with a commission charge of 1.5%,
   (c) F Fr with a fixed commission charge of £2.50.

Banks have different rates for buying and selling foreign currency, as well as commission charges.

MEP BANK

	BUY	*SELL*
£1	2.90 DM	2.73 DM
Commission charge	3%	2%

4. How many DM do you get for £1000 at the *MEP Bank*? (Use selling rates.)

5. After changing your £1000 into DM, you find that your trip is cancelled.
   (a) How many pounds do you get back, using the buying and commission rates shown opposite?
   (b) How much money have you lost?

6. Suppose you change £1000 to U.S.$ at the *SELL* rate above in 'The £ Abroad' table, with 2% commission charge.
   To what level does the *BUY* rate of the pound have to fall in order to break even when you change back to pounds? (Assume a 3% commission charge.)

ACTIVITY 17.3 *VAT Problems*

In the UK most articles are sold at the basic price plus

Value Added Tax (VAT) at $17\frac{1}{2}\%$.

Some goods such as cars and fuel, have an extra tax, whilst others such as food and children's clothes are exempt from VAT.

For example, a portable music centre of basic price £200, will also have VAT of

$$£200 \times \frac{17.5}{100} = £35$$

added, to give a total price of £235.

Finding the VAT to be charged using a calculator is relatively straightforward. However, even *without* a calculator, VAT is easy to find by calculating 10%, 5% and $2\frac{1}{2}\%$, and then adding them up.

So, for £200, we have

10%	→ £ 20	
5%	→ £ 10	(divide by 2)
$2\frac{1}{2}\%$	→ £ 5	(divide again by 2)
$17\frac{1}{2}\%$	→ £ 35	(add up)

1. *Without* using a calculator, find the VAT to be added for articles at a basic price of:

   (a) £120 (b) £80 (c) £500.

Businessmen and companies can often claim back VAT. For example, if the total price is £235, they can claim back £35.

2. What is the VAT when the total price is: (a) £117.50 (b) £470 ?

3. If £17.50 is the VAT portion of a total price of £117.50,

   (a) what is the VAT portion of a total price of £1.00 ?

   (b) what is the VAT portion of a total price of £x ?

4. (a) Explain why dividing the *total* price by approximately 6.71 gives the VAT .

   (b) Give the values of the divisor (correct to 5 significant figures), which should be used for more accurate calculations.

5. (a) Suppose VAT is increased to 19%. What divisor (correct to 5 significant figures) is now needed to find the VAT part of the *total* price?

   (b) Use this divisor to find the VAT included in these total prices:

   (i) £119 (ii) £50 (iii) £80.

Extension

Generalise the formula for the divisor for VAT at a rate of r%.

ACTIVITY 17.4 *Card Games with Decimals, Fractions and Percentages*

The templates that follow consist of

- *decimal* cards 0.65 to 1.0 in steps of 0.5
- *fraction* cards 0.05 to 1 in steps of $\frac{1}{20}$
- *percentage* cards 5% to 100% in steps of 5%
- *blank* cards for other numbers.

The cards can be used for a variety of games, both as whole class activities and for both paired or individual tasks. Some suggestions are given below:

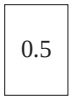
(A) *Conversions*

Here the teacher shows, at speed, one card (say, *fractions*), and asks pupils for the conversion (to *decimal* or *percentage*). (A good competition between pairs or rows, etc. of pupils.)

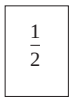
An exercise best done at pace, involving at some stage all the pupils.

(B) *Sequences*

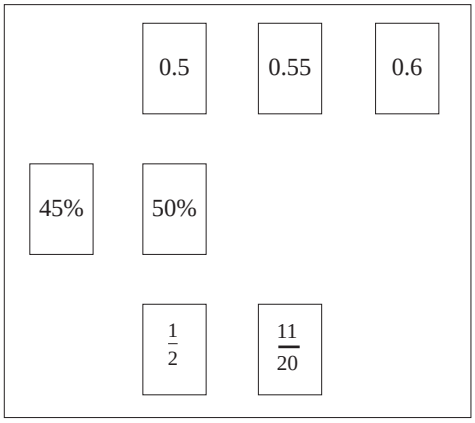
Put cards on the board (using Blu-Tack), e.g.



Deal out all the other cards to the class.



Taking turns around the class, pupils place a card in order on the board: they must forego their turn if they cannot place a card in sequence. After 4 turns the board might look like this:



(C) *Ordering*

Give out 6 cards at random to each pupil (you will need more copies of each sheet) and ask them to order them – quickest wins. (You could play this as a knockout competition, with an overall winner or winning team.)

ACTIVITIES Unit 17 *Decimal Cards 1*

0.25	0.5
0.2	0.45
0.15	0.4
0.1	0.35
0.05	0.3

ACTIVITIES Unit 17 *Decimal Cards 2*

0.75	1.0
0.7	0.95
0.65	0.9
0.6	0.85
0.55	0.8

ACTIVITIES Unit 17 *Fraction Cards 1*

$\frac{1}{4}$	$\frac{1}{2}$
$\frac{1}{5}$	$\frac{9}{20}$
$\frac{3}{20}$	$\frac{2}{5}$
$\frac{1}{10}$	$\frac{7}{20}$
$\frac{1}{20}$	$\frac{3}{10}$

ACTIVITIES Unit 17 *Fraction Cards 2*

$\frac{3}{4}$	1
$\frac{7}{10}$	$\frac{19}{20}$
$\frac{13}{20}$	$\frac{9}{10}$
$\frac{3}{5}$	$\frac{17}{20}$
$\frac{11}{20}$	$\frac{4}{5}$

ACTIVITIES Unit 17 *Percentage Cards 1*

25%	50%
20%	45%
15%	40%
10%	35%
5%	30%

ACTIVITIES Unit 17 *Percentage Cards 2*

75%	100%
70%	95%
65%	90%
60%	85%
55%	80%

ACTIVITIES Unit 17 *Blank Cards*










ACTIVITIES 17.2 and 17.3 *Notes for Solutions*

Notes and solutions given only where appropriate.

17.2 1. (a) 16 $ (b) 13.65 DM (c) 40.6 A$ (d) 6780 L

2. (a) £2.61 (b) £17.22 (c) £37.24 (d) £62.50 (e) £20.52

3. (a) 313.6 $ (b) 537.81 DM (c) 1817 F Fr

4. 2675.4 DM

5. (a) £894.88 (b) £105.12

6. 1.52

17.3 1. (a) £21 (b) £14 (c) £87.50

2. (a) £17.50 (b) £70

3. (a) £0.1489 or 14.89p (to 2 d.p.) (b) £0.1489x or 14.89x p (to 2 d.p.)

4. (b) 6.7143

5. (a) 6.2632 (b) (i) £19 (ii) £7.98 (iii) £12.77