Mathematics
Using Mathematics 2
Access 3

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Support Materials

TEACHER'S NOTES
Using Mathematics 2 (Acc 3)

As stated in the Higher Still Arrangements document all content should be within a context and it is suggested that contexts be varied. An attempt has been made to provide a variety of contexts, within all the outcomes, which will be familiar to most students.

It is also stated in the Arrangements that students should experience calculations without a calculator. There is an increasing emphasis in all mathematics courses on mental and pencil and paper calculations, indeed external examinations at all levels of Standard Grade and Higher Still will have a non-calculator paper. There is no external assessment at Access level and the internal assessment allows access to a calculator. It is therefore up to teachers in the classroom to ensure that all students are able to perform simple calculations without a calculator. If, in the case of multiplication and division, some students have difficulty remembering their tables, it is expected that they will have access to a multiplication square.

The support material is designed to be teacher-led. Although worked examples have been included, there is no intention that the material should be used for individualised learning. It is unlikely that in most mainstream secondary schools there will be a class which contains only students working at Access 3 level. These students are more likely to be within a class working at Intermediate level or perhaps a Standard Grade class. In this case, it is suggested that, wherever possible, use should be made of cooperative teaching to ensure that students working at Access 3 are able to be supported within the classroom.

At all times students should be encouraged to set out working, i.e. to show clearly the operation which was used. Activities should be tailored to suit the experience of the individual.

For many students, it is the language of mathematics which is the barrier to learning, e.g. 'how much', 'find the total', 'the sum', all mean to add. A Wordbank has been included to try to help students through the language barrier. A list of terms has been provided along with the appropriate operation. The list is not exhaustive.

Symbols have also been used to assist students:

the calculator symbol indicates when a calculator should be used;

the reading symbol and a **different font** indicate when some advice/help is being given

the writing symbol indicates when students are expected to write.

Outcomes 1 and 2 have been grouped together. The interpretation of a calculator display will require to be reinforced and rounding to the nearest penny from a calculator display will require to be taught. It is recommended that students have access to as many real-life examples as possible, for example bills, pay slips etc. A suggested practical activity to reinforce rounding is to compare the costs of various items to find the 'best-buy'.

The tables used in outcome 3 require some teacher-led discussion and again, students should be given access to as many real-life examples of tables, for example local timetables, holiday brochures etc. At the end of Exercise 4 students will need to be provided with some timetables to plan a journey. At the end of Exercise 6 holiday brochures will be needed as students are asked to plan a holiday.

As in outcome 4 of Using Mathematics 1 (Acc 3), the emphasis in outcome 4 of this unit should be firmly on practical work. Here students will require experience of measuring length, weight and volume. In schools, teachers may wish to consult with the Home Economics, Science and Technical departments to ensure that students experience practical measuring tasks within a realistic context. It is likely that students will require a considerable amount of support here as the answers to the practical exercises will have to be carefully checked and further practice given where necessary. The importance of accuracy in answers should be stressed.

For the exercises on length, rulers, measuring tapes and metre sticks will be required. For weight, kitchen scales (electronic scales are easier to read), bathroom scales and, if possible, balance scales will be required. For volume, measuring jugs and beakers for use with water will be required. Note that the exercise on fitting kitchen units will require brochures on kitchen units. It is not intended that students construct an accurate scale drawing of the kitchen.

Assessment
It is expected that the approach to assessment at Access 3 level is outcome by outcome. Outcome assessments take the form of a closed book test. There is no specified time limit for each assessment. It is expected that teachers will use their professional judgement for each individual student.

Students are not required to demonstrate competence across outcomes, although the opportunity should be taken to assess outcomes together where this would be appropriate and would not place the student at a disadvantage. For example for this unit, it would possibly be more practical to assess outcomes 1 and 2 together.

It is assumed that students will have access to a calculator. Students who are used to working with concrete material or a multiplication square should be allowed to do so if teachers feel that it would be beneficial.

Further advice on assessment is given within the National Assessment Bank for Using Mathematics 2 (Acc 3).

USING MATHEMATICS 2 (ACC 3)
Outcomes 1 & 2

Exercise 1
You may use a calculator for this exercise

Reminders

On your calculator,

1.4 is one pound forty pence (£1.40)
0.2 is twenty pence (20p or £0.20)
1.03 is one pound three pence (£1.03)

VAT stands for **Value Added Tax** - a tax means you have to pay extra, so you <u>add</u> VAT

Discount means that you will save money, so, you <u>take away</u> a discount

If you get stuck - look up the Wordbank to help you.

Wherever possible - set out your working

1. Here are three supermarket till receipts.
    Find the total of each one.

(a)

Safeco	
Bread	0.74
Milk	0.56
Yoghurt	1.52
Digestives	0.75
Potatoes	0.64
Bleach	0.39
Paper Hankies	1.55
TOTAL	

(b)

Asdabury	
Crisps multi	2.25
Corn Flakes	1.48
Jam	0.82
Tomato Soup	0.43
Chicken Soup	0.43
Bacon	1.58
Smoked Ham	1.79
Soap powder	5.65
Newspaper	0.42
Fun size choc	2.15
TOTAL	

(c)

Sainsco	
Variety pack	1.32
Apples 8 pack	1.44
Bananas (1.2kg)	1.56
Ribena multi	3.48
Toilet Rolls (12)	4.96
Coffee (400g)	4.73
Fruit Juice	1.80
TOTAL	

2. Alex buys a moped costing £329 plus £57.60 VAT.

   How much does Alex pay for the moped?
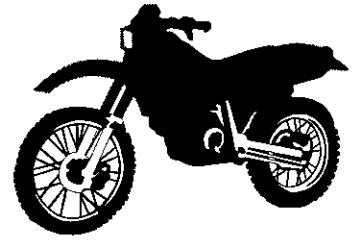
3. Shona has £50.
   She buys a pair of trousers costing £34.99.

   How much money does Shona have left?

4. Here is Miriam's gas bill

NORTHERN GAS	COMPANY LIMITED	£
	Standing Charge	15.60
	Cost of units used	39.58
	TOTAL	

Find the total cost of Miriam's gas bill.

5. Mark and Angela have had their lounge decorated.
   Here is a copy of the bill they received from the decorators.

	DECORATING	£
SPOTLESS	CO.	
	Wallpaper	32.40
	Paint	12.45
	Labour	64.00
	VAT	19.05
	TOTAL	

Calculate the total amount Mark and Angela had to pay.

6. A CD player usually costs £54.60.
   A discount of £3.25 is being offered.

   How much will the CD player now cost?

7. Mary orders a gardening book from the book club.
   The book costs £12.49 and plus £2.35 for postage.

   How much will Mary pay altogether?

8. Myra's mobile phone bill has just arrived.

MOBILE PHONE COMPANY		
June		£
	Cost	44.58
	VAT	7.80
	TOTAL	

   Work out the total cost of the phone bill.

9. Here is Mrs Gracie's electricity bill.

BRIGHT ELECTRIC COMPANY		£
Standing Charge (1 Feb - 30 Apr)		11.45
	Cost of units used	28.15
	TOTAL	

   Find the total cost of the electricity bill.

Exercise 2

You may use a calculator for this exercise

Reminders

1 year = 12 months

Deductions from pay mean you get less money, so, you **take away** deductions

Gross pay is the **total** amount earned

Net pay is often called take-home pay

This information is often given on a pay-slip like the one shown below.

This is the total
amount earned

This includes
Income Tax

Gross Pay	Total Deductions	Net Pay
£1054.70	£340.50	£714.20

This is the amount
which will
be taken away

This is the amount
actually paid
Take Home Pay
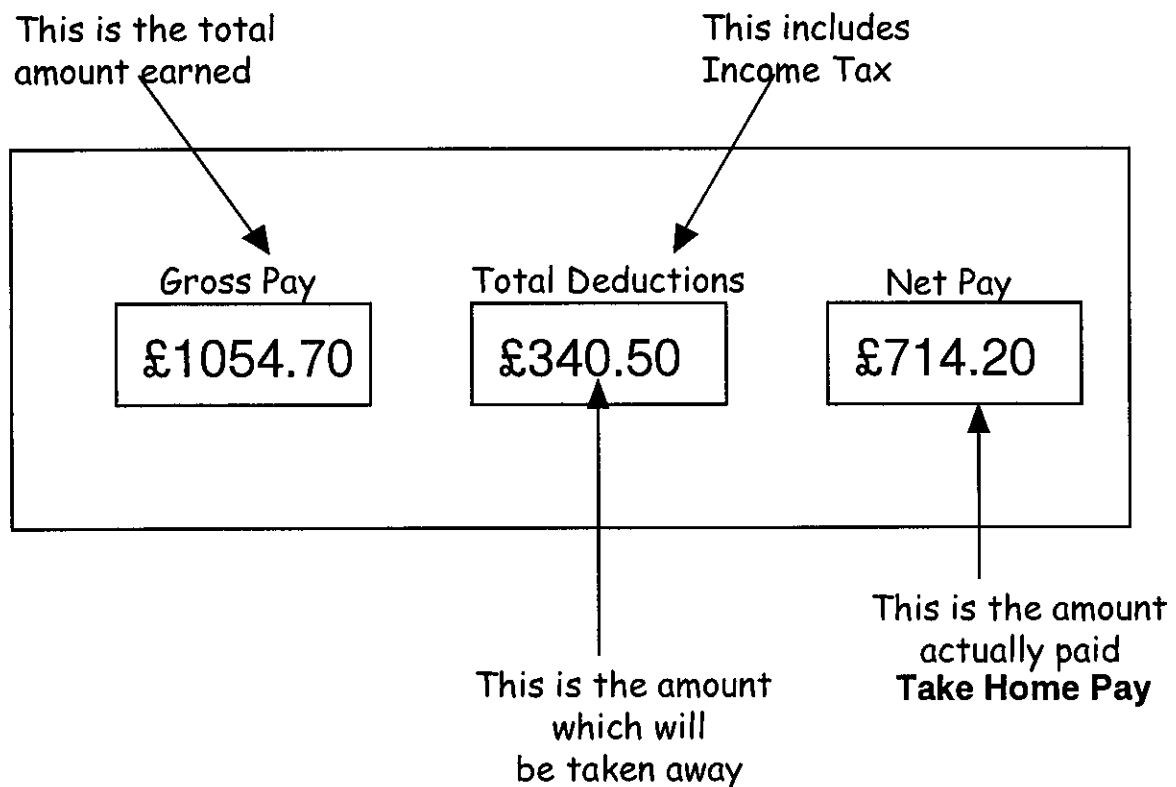
Net Pay = Gross Pay - Deductions

Don't forget to write your answers in pounds e.g.
£86.30

Wherever possible - set out your working

1. Here is Tom's weekly wage slip.

Gross Pay	Total Deductions	Net Pay
£368.40	£122.15	

Find Tom's net pay.

2. Last week Mark's gross pay was £286.55.
His total deductions were £87.35.

Find his net pay.
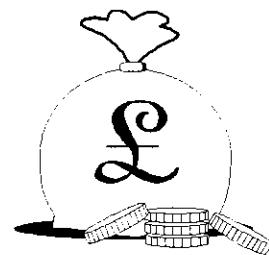
3. In April, Jennifer's gross pay was £972.50.
Her total deductions were £341.20.

Find her net pay.

4. Here is John's monthly pay slip.

Gross Pay	Total Deductions	Net Pay
£982.75	£317.60	

Find John's net pay.

5. Alison's gross pay is £200.
   Her total deductions are £72.58 .

   What is Alison's net pay?

6. Mary is paid £5.40 for each hour she works.
   She works 40 hours each week.

   How much is Mary's pay each week?

7. Mark is a car mechanic.
   He is paid £9.20 per hour.

   How much does he get paid for a 36 hour
   week?
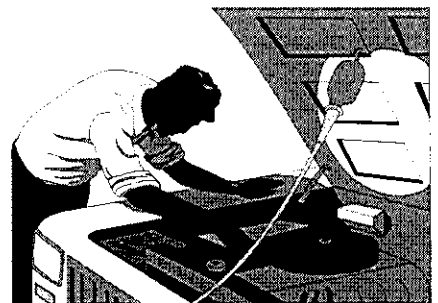
8. Calum works in a factory.
   He is paid £1.40 for every part he makes.

   How much is he paid if he makes 54 parts?

9. Carol is a machinist.
   She is paid £3.25 for each pair of jeans she makes.

   How much does she get paid for making 18 pairs of jeans?

10. Rachel works for a total of 24 hours.
    She is paid £4.85 for each hour she works.

    How much is Rachel paid?

Reminders

Pay-slips often look like the one below

This is Steven's pay slip

Steven Mathieson			
BASIC PAY £81.50	OVERTIME £14.42	BONUS £12.00	GROSS PAY £107.92
NAT. INSURANCE £6.40	INCOME TAX £19.22	OTHER £4.20	TOTAL DEDUCTIONS £29.82
			NET PAY £76.10

Row 1

Row 2

Row 1 : Basic Pay + Overtime + Bonus = Gross Pay

Row 2 : Nat. Insurance + Income Tax + Other = Total Deductions

Net pay = Gross pay - Total deductions

If you get stuck – look up the Wordbank to help you.

11. Here is Alan's pay slip.

Alan McGregor			
BASIC PAY £304.60	OVERTIME £15.00	BONUS £0.00	GROSS PAY **£319.60**
NAT. INSURANCE £4.70	INCOME TAX £79.96	OTHER £5.80	TOTAL DEDUCTIONS **£90.46**
			NET PAY

a) What is Alan's total gross pay?

b) How much are his total deductions?

c) Find Alan's net pay.

12.

Sally Thomson			
BASIC PAY £186.57	OVERTIME £64.32	BONUS £18.50	GROSS PAY
NAT. INSURANCE £11.58	INCOME TAX £52.62	OTHER £9.54	TOTAL DEDUCTIONS
			NET PAY

a) Work out Sally's gross pay.

b) How much are her total deductions?

c) Find Sally's net pay.

13.

Nazia Akhtar			
BASIC PAY £276.80	OVERTIME £82.73	BONUS £0.00	GROSS PAY
NAT. INSURANCE £21.57	INCOME TAX £58.10	OTHER £5.75	TOTAL DEDUCTIONS
			NET PAY

a) What is Nazia's gross pay?

b) How much are her total deductions?

c) Find Nazia's net pay.

14.

Linda Mason			
BASIC PAY £212.58	OVERTIME £0.00	BONUS £55.00	GROSS PAY
NAT. INSURANCE £16.05	INCOME TAX £43.65	OTHER £0.00	TOTAL DEDUCTIONS
			NET PAY

a) Work out Linda's gross pay.

b) How much are her total deductions?

c) Find Linda's net pay.

Exercise 3
You may use a calculator for this exercise

Reminders

If you sell something for more than it cost you
- you make a **profit**

If you sell something for less than it cost you
- you make a **loss**

If you get stuck - look up the Wordbank to help you

Example

A school buys 48 packets of crisps for £9.60

The school tuck shop sells the crisps for a total of £12.96.

How much profit do they make?

Take away to find the profit, so £12.96 - £9.60 = £3.36

The tuck shop makes a profit of £3.36

Wherever possible - set out your working.

1. A man bought a picture for £40.
    He sold it a week later for £48.50.

    How much is his profit?

2. Scott bought a bicycle for £128.
    Two months later he sold it to a friend for
    £95.

    How much of a loss did Scott make?
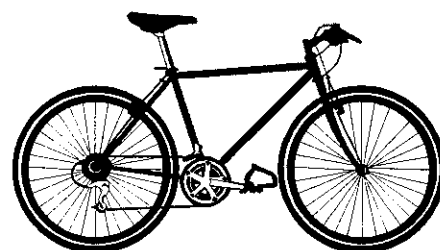
3. Sam buys a second hand car for £580.
    He spends another £140 'doing it up', and then sells the car for £790.

    a) How much did the car cost Sam altogether?

    b) How much profit did he make?

4. Robert spent £600 on a new computer.
    He later sold it for £360.
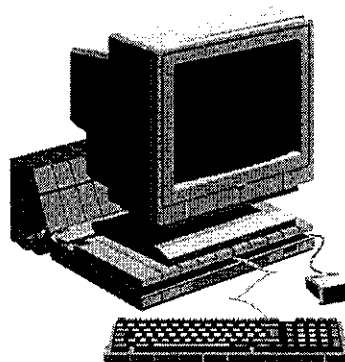
    How much of a loss did Robert make?

5. Mary made 36 bars of tablet for the church fair.
    It cost her a total of £4.80 to make the tablet.
    She sold it at the church fair for 25p per bar.

    a) How much did Mary get for selling all 36 bars of tablet?

    b) How much profit did she make?

6. Steve bought some kitchen units to sell in his DIY store.
    Each unit cost £50.

    A year later Steve sold the remaining units at £38 each.

    How much of a loss did he make on each one?

Exercise 4

You may use a calculator for this exercise

Reminders

Examples

a) Round 4.8 cm to the nearest cm

4.8 cm is between 4 cm and 5 cm
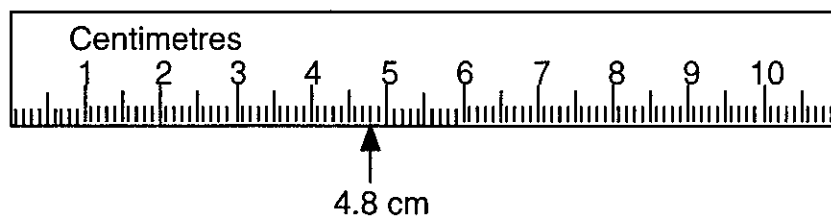
4.8 cm

It is nearer to 5 cm

So, we say that

4.8 cm = 5 cm (to the nearest cm)

b) Round 2.1 cm to the nearest cm

2.1 cm is between 2 cm and 3 cm
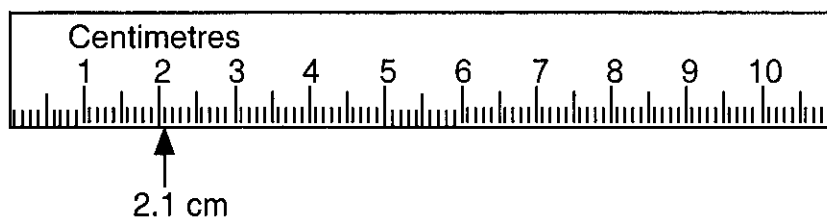
2.1 cm

It is nearer to 2 cm

So, we say that

2.1 cm = 2 cm (to the nearest cm)

c) Round 8.5 cm to the nearest cm

8.5 cm is between 8 cm and 9 cm

Centimetres
1   2   3   4   5   6   7   8   9   10

↑
8.5 cm

When the number is half-way between,
round up to the higher number

You would say that

8.5 cm = 9 cm (to the nearest cm)

Now try these two questions - remember to include units in
your answer.

1. Round 9.2 cm to the nearest cm

Centimetres
1   2   3   4   5   6   7   8   9   10

↑
9.2 cm
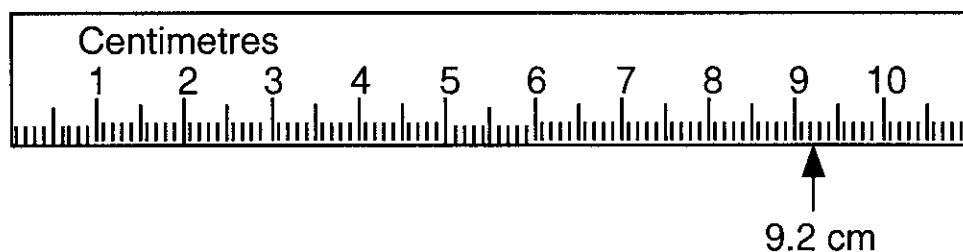
2. Round 5.8 cm to the nearest cm

Centimetres
1   2   3   4   5   6   7   8   9   10

↑
5.8 cm
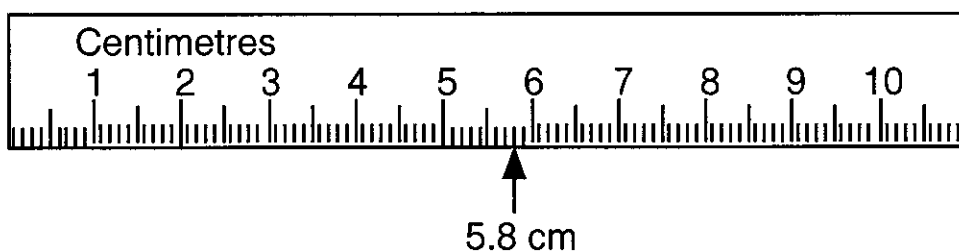
Reminders

The rules you have learned apply to <u>all units of measurement</u>

e.g.

a) Round 3.2 kg to the nearest <u>kilogram</u> (kg).

3.2 kg is between 3 kg and 4 kg

It is nearer to 3 kg

so, 3.2 kg = 3 kg (to the nearest kg)

b) Round 4.9 m to the nearest <u>metre</u> (m).

4.9m is between 4 m and 5 m

It is nearer to 5 m

so, 4.9 m = 5 m (to the nearest m)

c) Round 6.3 to the nearest <u>whole number</u>.

6.3 is between 6 and 7

It is nearer to 6

so, 6.3 = 6 (to the nearest whole number)

3. Round each of the following amounts to the nearest unit (nearest whole number)

a) 4.6 m   b) 72.4 kg   c) 11.7 cm

d) 2.3 litres   e) 104.1 cm   f) 3.8 m

g) 16.2 grams   h) 4.9 tonnes   i) 46.5 ml

Reminders

When you write an amount of money in pounds, you use 2 digits after the point to show the pence.

e.g. £3.65 means £3 and 65 pence

Example 1

When you round off an amount like £3.968 you look at the pence

£3.968 ◄——— Any number after the pence means 'a bit more'

Since the 8 is bigger than 5 we round up to 97 pence

This is the pence

£3.968 = £3.97 (to the nearest penny)

Example 2

Round £2.593 to the nearest penny.

£2.593164

This is the pence

Any number after the pence means 'a bit more'

Since the 3 is less than 5 we leave it as 59 pence

£2.593 = £2.59 (to the nearest penny)

4. Round each of the following amounts to the nearest pence.

   a) £4.762   b) £10.476   c) £134.257

   d) £29.333   e) £12.9242   f) £45.6781

5. Use a calculator to do the sums. Write down your answer rounded to the nearest pence.

   a) £46.35 ÷ 8   b) £104.17 ÷ 3
   c) £1000 ÷ 6   d) £11.97 ÷ 2

6. A pack of 12 cans of orange costs £3.46.

   Find the cost of each can, to the nearest pence.

7. David spends £4.62 on a multi-pack of sweets.
   The pack contains 5 individual bags of sweets.

   Find the cost of 1 bag of sweets, to the nearest pence.

8. Four packets of biscuits weigh 1165g.
   Each packet weighs the same.
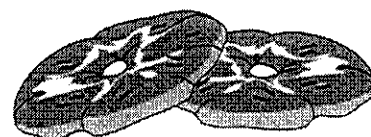
   Find, to the nearest gram, the weight of 1 packet of biscuits.

9. Andreas works in a factory.
   He fills 8 boxes in 30 minutes.

   Find, to the nearest minute, how long Andreas takes to fill one box.
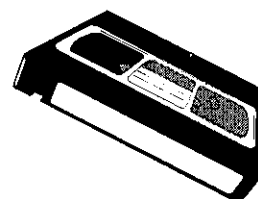
10. Terry buys a multi-pack of video tapes costing £10.49.
There are 5 tapes in the pack.

Find, correct to the nearest <u>pence</u>, the cost of 1 video tape.

11. Marilyn can travel 14 km, by car, in 5 minutes.

Find, correct to the nearest <u>km</u>, how far she can travel by car in 1 minute.

Exercise 5
You may use a calculator for this exercise

Reminders

To find a fraction of an amount we **divide**

To find $\frac{1}{2}$ divide ($\div$) by 2

To find $\frac{1}{10}$ divide ($\div$) by 10

To find $\frac{1}{5}$ divide ($\div$) by 5

To find $\frac{1}{4}$ divide ($\div$) by 4

To find $\frac{3}{4}$ first find $\frac{1}{4}$ by **dividing** by 4

         and then **multiply** by 3 to find $\frac{3}{4}$

Examples

3. A raincoat costs £86.

    In the sale the coat is $\frac{1}{2}$ price.

    How much is the raincoat in the sale?

    To find $\frac{1}{2}$ we divide by 2 , so

    $86 \div 2 = 43$

    Write your answer in words like this:

    The raincoat is £43 in the sale.

    Remember to state what you are finding : The raincoat

2. A bar of chocolate weighs 200g

    Hugh eats $\frac{3}{4}$ of the bar.

    How many grams of chocolate does Hugh eat?

    To find $\frac{3}{4}$,

    find $\frac{1}{4}$ by dividing by 4

    $200 \div 4 = 50$

    then multiply by 3 to find $\frac{3}{4}$

    $50 \times 3 = 150$

    Hugh eats 150g of chocolate.

Wherever possible - set out your working

1. Find

a) $\frac{1}{2}$ of 740m

b) $\frac{1}{5}$ of 48kg

c) $\frac{1}{10}$ of £63.20

d) $\frac{3}{4}$ of 16cm

e) $\frac{1}{4}$ of £309

f) $\frac{1}{5}$ of 1260 yards

2. What is $\frac{1}{4}$ of 60kg ?

3. What weight is $\frac{1}{5}$ of 340 tonnes?

4. A school has 680 pupils. $\frac{1}{10}$ of them are in sixth year.

How many pupils are in sixth year?

5. Find $\frac{3}{4}$ of 140 cm.

6. A school has 420 pupils.

$\frac{1}{10}$ are absent.

How many are absent?

7. A man earns £270 per week.

He saves $\frac{1}{5}$ of this.

How much does he save each week?

8. $\frac{1}{2}$ of all houses have central heating.

In a town of 8760 houses how many have central heating?

9. A student earns £16.80 on a Saturday.

He spends $\frac{1}{4}$ of this on travelling.

How much does he spend on travelling?

10. There are 24 hours in a day.

I am awake for $\frac{3}{4}$ of this.

How many hours am I awake?
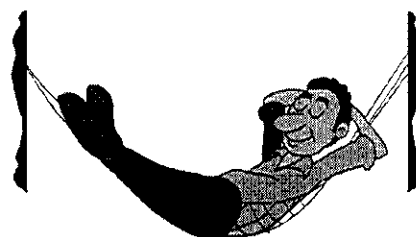
Exercise 6
You may use a calculator for this exercise

Reminders

A percentage is a fraction out of 100

Per cent means for every hundred

You need the Percentage Worksheets 1 & 2

Complete both sides of Worksheet 1, then do Worksheet 2

Write the following fractions as percentages.
Copy the first two, then do the rest of the exercise in the same way.

1. $\dfrac{10}{100} = 10\%$

2. $\dfrac{25}{100} = 25\%$

3. $\dfrac{20}{100} =$

4. $\dfrac{50}{100} =$

5. $\dfrac{75}{100} =$

6. $\dfrac{100}{100} =$

You need the Percentage Worksheet 3

Complete both sides of the worksheet

Look carefully at your answers to both sides of Worksheet 3.

You should see that

$$1 = 100\%$$
$$\frac{1}{4} = 25\%$$

$$\frac{1}{10} = 10\%$$
$$\frac{1}{2} = 50\%$$

$$\frac{1}{5} = 20\%$$
$$\frac{3}{4} = 75\%$$

Where a percentage is easily changed into a fraction (like those listed above) we use the method shown below to find a percentage of a quantity.

Examples

1. Find 50 % of £40

   we change 50% to the fraction $\frac{1}{2}$ and then find $\frac{1}{2}$ of £40

   $\frac{1}{2}$ x £40 $= 40 \div 2 = £20$

2. Find 20 % of 800 m

   we change 20% to the fraction $\frac{1}{5}$ and then find $\frac{1}{5}$ of 800 m

   $\frac{1}{5}$ x 800 m $= 800 \div 5 = 160$ m

   You need Percentage Worksheet 4
   Complete all 3 pages of Worksheet 4

Exercise 7

You may use a calculator for this exercise
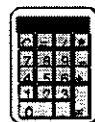
Shops often use signs like the one shown when they are having a sale.

SALE
10%
OFF

Wherever possible - set out your working

1.   Sport Connect are offering a saving of 10%

10% OFF MARKED PRICES

PRICE CUT

a) How much do you save if you buy a football strip priced £56?

b) How much do you save if you buy a pair of trainers priced £42.50?

2.   a) How much do you save on a dining table priced £180 in this sale?

b) How much do you save on a bed settee priced £248?

SALE
25%
OFF

3.

HALF PRICE

a) What is the sale price of a leather jacket normally priced £220?

b) What is the sale price of a raincoat normally priced £125?

Exercise 8

You may use a calculator for this exercise

Reminders

If you get stuck - look up the Wordbank to help you.

This is the Simpson family.
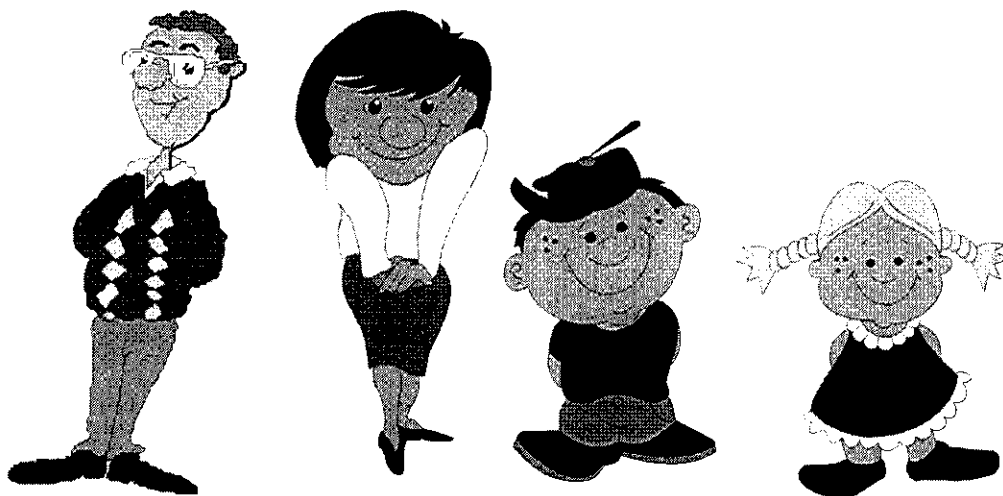
Mr and Mrs Simpson and their children, Bert and Flossie are moving house today.

Wherever possible - set out your working

SCOTMOVE will do the Simpson's removal to their new house.

1.   SCOTMOVE charge £30 per hour.
     The move takes a total of 5 hours.

     How much will the removal firm be paid?
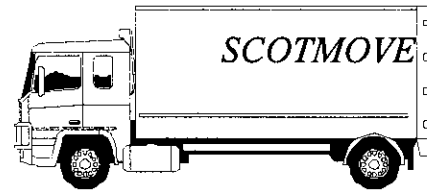
2.   Mr Simpson's car needs petrol for the journey.
     He buys 36 litres of petrol.
     It costs 71p per litre.

     How much does he spend on petrol?

The new house!

3.   Bert counts the windows at the front of the new house.

     He can see 5 windows upstairs at the front.
     Each of these windows has 15 small panes of glass.

     How many small panes of glass are there altogether on the upstairs
     front windows?

4. **They decide to order a take-away meal from the Chinese Restaurant.**

Mr Simpson has Lemon Chicken
Mrs Simpson has Chicken Satay
Bert has Beef Curry and
Flossie has Sweet & Sour Pork.

Find the total cost of the four meals.

Menu

STARTERS

Chicken & sweetcorn soup	£1.30
Barbecued Spare Ribs	£3.30
Crispy Pancake Roll	£1.65

MAIN DISHES

Lemon Chicken	£4.30
Beef in Chilli Sauce	£4.60
Chicken Satay	£4.60
Special Chow Mein	£4.55
Sweet & Sour Pork	£3.65
Vegetable Curry	£3.90
Beef Curry	£3.90

DELIVERY FREE!!

5. **The delivery man arrives with their meals.**
Mr Simpson pays with a £20 note.

How much change will he get?

6. **Mrs Simpson opens a bottle of cola to have with their meal.**
The bottle holds 500 ml of cola.
She pours an equal amount into each of the four glasses.

How much does she pour into each glass?

The next morning is Saturday and the Simpsons go to the shops.

The first shop is Marks & Sparks.

Bert and Flossie need school clothes.

Polo Shirts
£8.50
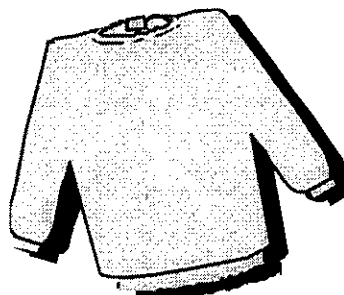
Sweatshirts
£14.75

7. Find the total cost of 2 sweatshirts and 3 polo shirts.

8. **They then go to the household department.**

Quilt covers	£38 each
Flat sheets	£14.50 each
Fitted sheets	£15.75 each
Pillowcases	£8.50 per pair

Find the total cost of 1 quilt cover, 1 fitted sheet and 1 pair of pillowcases.

Mrs Simpson notices the sale sign.

9. What is the new price of the quilt cover?

QUILT
COVERS
ALL
HALF
PRICE

After Marks and Sparks they go to the supermarket.

Here is the till receipt.

fabric softener	2.28
cheese	1.79
milk	0.54
toothpaste	1.39
baked beans	0.27
bran flakes	1.36
oven chips	1.87
Pasta shells	0.79
Pkt sauce carbonara	1.35
low cal lemonade	1.29
wash up liquid	0.54
bin bags	1.74
crunch biscuits	0.62
choc mousse (4 pack)	1.86
butter	0.85
TOTAL	

10.   Find the total cost of the shopping.

11.   Mrs Simpson paid with two £10 notes.

How much change will she get?

The Simpsons go back to the car park.

12.   The car has been parked for 4 hours 15 minutes.

CAR PARK	
0 - 2 hours	80 p
2 - 3 hours	£1.10
3 - 4 hours	£1.50
4 - 5 hours	£2.00

How much will they need to pay ?
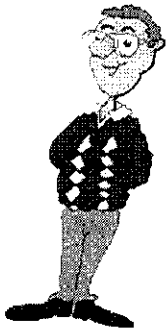
On the way home, the Simpsons go to the DIY Superstore.

Mr Simpson wants to look at tiles.

He is going to tile a wall in the kitchen.

The tiles they like are square and measure 30 cm by 30 cm.

30 cm

30 cm

13. How many tiles would you need to go along a wall

    a) 90 cm long?

    b) 120 cm long

    c) 150 cm long?

    d) 600 cm long?

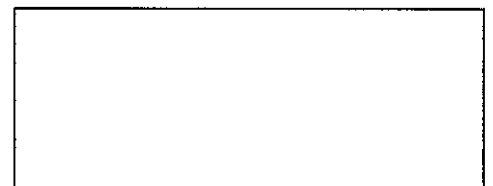14. If you put 10 tiles side by side what length of wall would they cover?

Mr Simpson makes a note of the size and the price of the tiles.

When they get home Mr Simpson measures the length
and height of the wall he is going to tile.

360 cm length

This is a sketch of the wall with the length
and height marked in.

120 cm
breadth

15.   a) How many tiles will fit in a row across the way?

     b) How many rows of tiles will be needed?

     c) How many tiles will he need altogether to cover the wall?

16. There are 10 tiles per pack.

    a) How many packs of tiles will the Simpsons need to buy?

    b) Each pack of tiles costs £8.85 .

       How much will it cost to tile the wall?

On Monday, it's 'Back to work' for Mr and Mrs Simpson and 'Back to School' for Bert and Flossie.

Mr Simpson works in the bank.
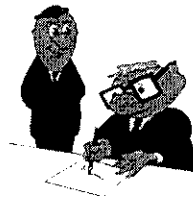
17.   Here is a copy of his monthly pay slip.

Gross Pay	Total Deductions	Net Pay
£1246.60	£420.50	£

    Find his net pay.

18.   Mrs Simpson works as a 'home-help'.

       She gets paid £6.80 per hour.

       If she works for 15 hours each week,
       how much does she get paid?

19. Bert and Flossie walk to school each morning
and walk home again at the end of each day.

The school is 1.8 km from their new house.

a) How far do they walk each day?

b) How far do they walk each week?

20. Flossie is pleased that it will soon be the end of term.
She works out that she has 4 weeks left at
school.
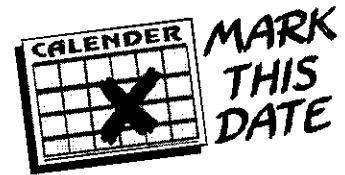
a) How many days are there in 4 weeks?

Bert reminds her that she does not go to school at the weekend.

b) How many school days are left?

21. Bert does a paper round every day of the week.

Here is a list of the number of papers he delivers each day.

Monday	18
Tuesday	18
Wednesday	18
Thursday	20
Friday	18
Saturday	25
Sunday	26

a) How many papers does Bert deliver each week?

He gets paid 10p for every paper he delivers.

b) How much money does he earn each week?
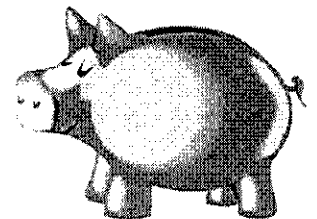
Bert knows it is only 7 weeks until they go away on holiday.
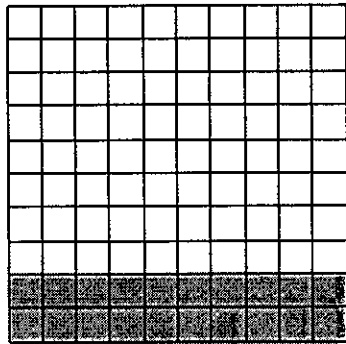
He decides to save up his 'paper round money' for the next 7 weeks.

c) How much money will Bert have saved up
by the time he goes on holiday?

Each large square has 100 small squares

(a)

Number of squares shaded = 20

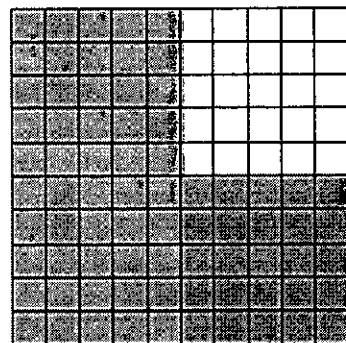Fraction shaded = $\dfrac{20}{100}$

Percentage shaded = 20%

(b)
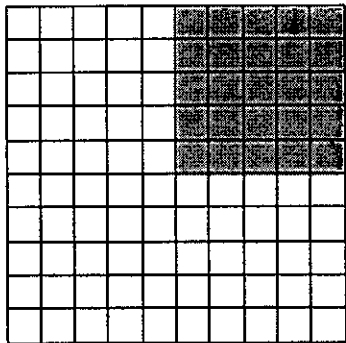
Number of squares shaded =
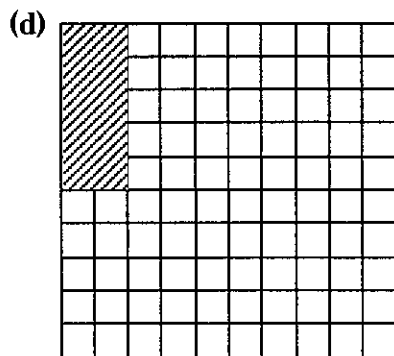
Fraction shaded =

Percentage shaded =

(c)
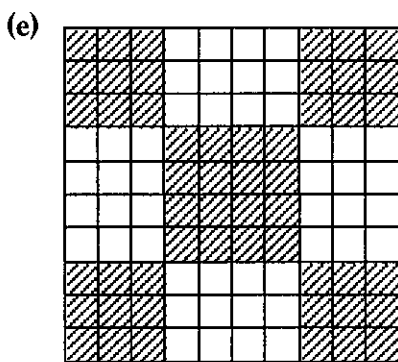
Number of squares shaded =

Fraction shaded =

Percentage shaded =
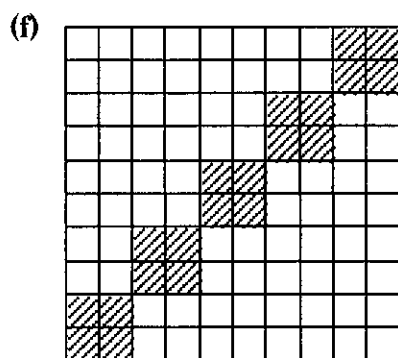
(d)

Number of squares shaded =

Fraction shaded =

Percentage shaded =

(e)

Number of squares shaded =

Fraction shaded =

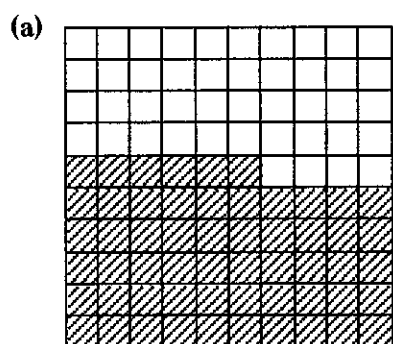Percentage shaded =

(f)

Number of squares shaded =
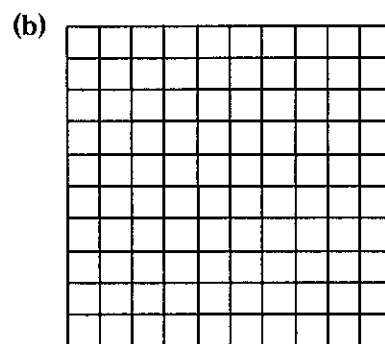
Fraction shaded =

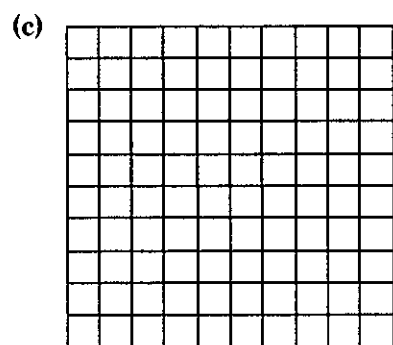Percentage shaded =

Now complete Worksheet 2

Percentages Worksheet 2

For each of the following questions, shade the given percentage.
The first question has been done for you.
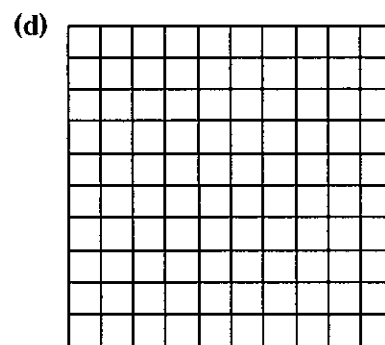
(a)

Percentage to be shaded = 56%

(b)

Percentage to be shaded = 35%

(c)

Percentage to be shaded = 65%

(d)

Percentage to be shaded = 82%

(e)
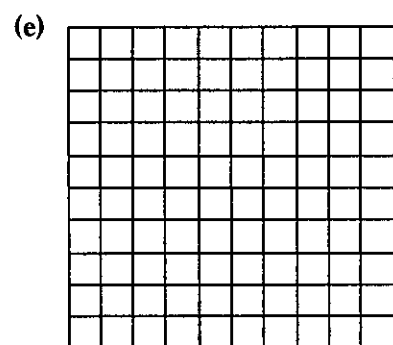
Percentage to be shaded = 30%

(f)
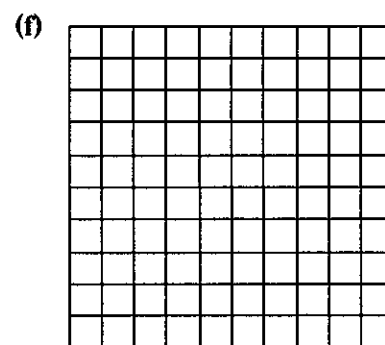
Percentage to be shaded = 15%

Percentages Worksheet 3   Side 1

On each diagram shade in the fraction given.

(a)

$$\frac{1}{2}$$

(b)

$$\frac{1}{10}$$

(c)

$$\frac{1}{5}$$

(d)

$$\frac{1}{4}$$

(e)

$$\frac{3}{4}$$

(f)
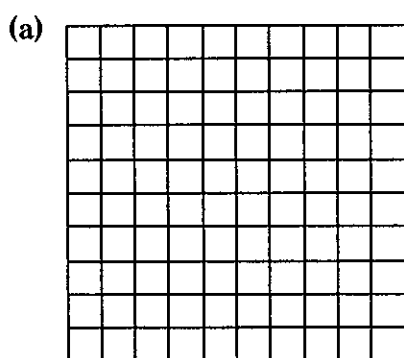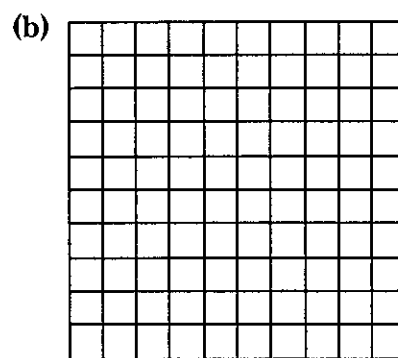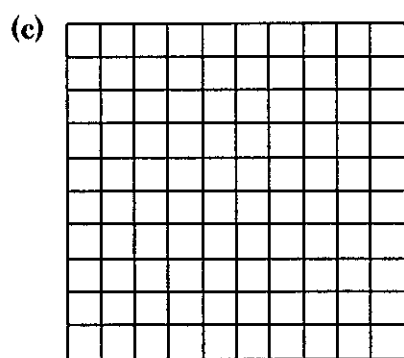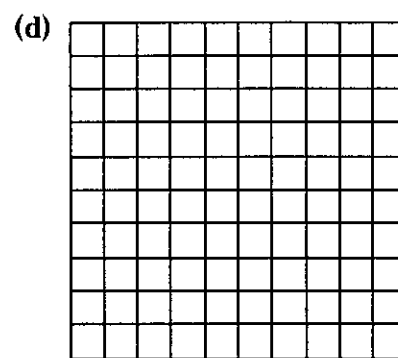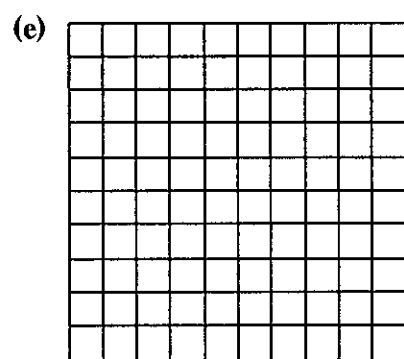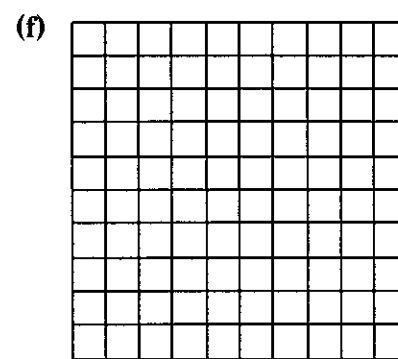
$$\frac{3}{10}$$

Percentages Worksheet 3   Side 2

On each diagram shade in the percentage given.

(a)

50%

(b)

25%

(c)

10%

(d)

20%

(e)

75%

(f)
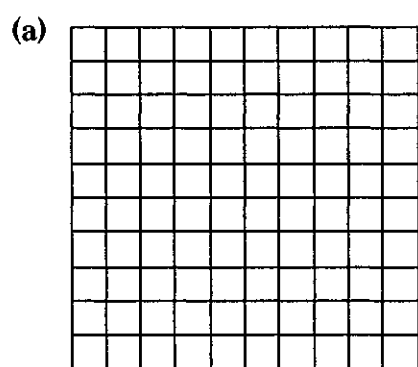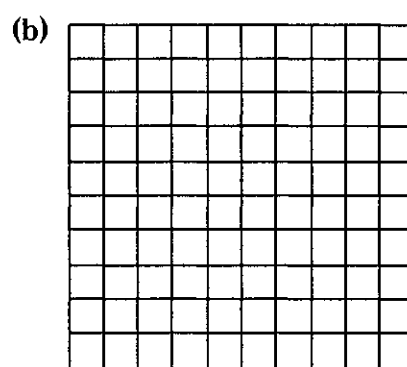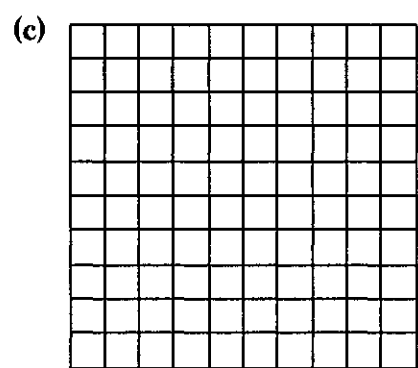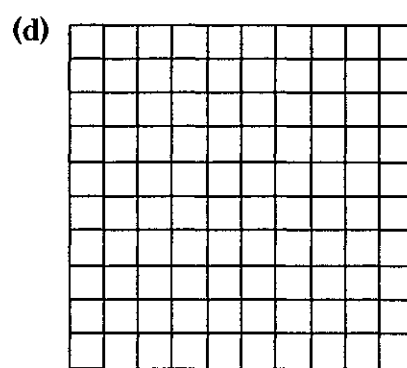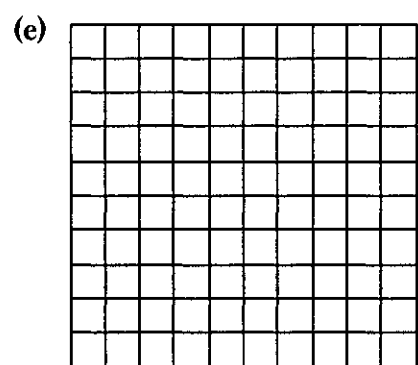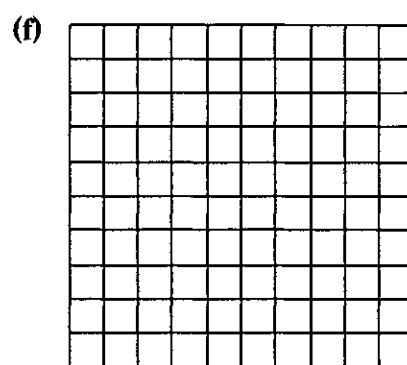
30%

Go back to Page 21 of the booklet

Percentages Worksheet 4

Complete each of the following examples

1. 50% of £70

$= \dfrac{1}{2}$ x £70

$=$

2. 25% of 60 km

$= \dfrac{1}{4}$ x 60 km

$=$

3. 20% of £35

$= \dfrac{1}{5}$ x £35

$=$

4. 50 % of 8 m

$= \dfrac{1}{2}$ x

5. 75% of 200 kg

$= \dfrac{3}{4}$ x

6. 10 % of £90

$= \dfrac{1}{10}$ x

Now do questions 7, 8 and 9.

Set your working out as shown above.

7. 20% of £15.50 people

$=$

$=$

8. 75% of 160 km

$=$

$=$

9. 25% of 3000

$=$

$=$

TURN OVER

Set your working out in the same way.

10. 10% of the pupils in first year have red hair.
    There are 140 pupils in first year.
    How many first year pupils have red hair?

```
WORKING



```

11. Paul has 56 football stickers.
    He gives 50% of them to his brother.
    How many football stickers does he give his brother?

```
WORKING



```

12. A packet of biscuits weighs 300g.
    A special offer gives an extra 25% free in the packet.
    How much more does the special offer packet weigh?

```
WORKING



```

13. A town has a population of 25490 people.
20% of them are unemployed.
How many people in the town are unemployed?

```
┌─────────────────────────────────────┐
│ WORKING                             │
│                                     │
│                                     │
│                                     │
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

14. 75% of all pupils own a calculator.

In a class of 28 pupils, how many own a calculator?

```
┌─────────────────────────────────────┐
│ WORKING                             │
│                                     │
│                                     │
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

USING MATHEMATICS 2 (ACC 3)
Outcome 3

Exercise 1

Reminders

12 hour time uses **am** and **pm**

am means 'before noon' so 4.20 am means 20 past 4 **in the morning**

pm means 'after noon' so 10.15 pm means quarter past ten **at night**

If you get stuck - look up the Wordbank to help you

Use **am** and **pm** to write each of the following times.

The first one has been done for you.

1. Three o'clock in the afternoon   **3.00 pm**

2. Half past six in the morning

3. Quarter past nine in the evening

4. Twenty minutes past one in the afternoon

5. Ten minutes to five in the afternoon

6. Five minutes past eleven in the morning

7. When you get out of bed in the morning

8. When you go to bed at night

9. The start of lunch break

10.The end of lunch break

Match each of the following 12-hour times with the times written in words.

The first one has been done for you.

11   matches with   i

11.	**3.20 pm**	a.	quarter to five in the morning
12.	1.05 am	b.	eight o'clock in the morning
13.	6.40 am	c.	ten past seven in the evening
14.	9.10 pm	d.	twenty five minutes to three in the afternoon
15.	11.55 am	e.	five minutes past one in the morning
16.	8.00 am	f.	five minutes to twelve in the morning
17.	2.35 pm	g.	half past ten at night
18.	10.30 pm	h.	ten minutes past nine in the evening
19.	4.45 am	**i.**	**twenty minutes past three in the afternoon**
20.	7.10 pm	j.	twenty minutes to seven in the morning

Exercise 2

Reminders

We normally use the 12-hour clock in everyday life
Hours go from 1 to 12

am means before noon
pm means after noon

The 24-hour clock is used mainly for timetables and digital clocks.
Time is given as a four digit number
Hours go from 1 to 24

This time scale matches up the 12-hour times with the 24-hour times

a.m.		p.m.
12midnight —— 0000		1 —— 1300
1 —— 0100		2 —— 1400
2 —— 0200		3 —— 1500
3 —— 0300		4 —— 1600
4.00 a.m. or 0400 → 4 —— 0400		5 —— 1700
5 —— 0500		6 —— 1800
6 —— 0600		7 —— 1900
7 —— 0700		8 —— 2000
8 —— 0800		9 —— 2100 ← 9.00 p. Or 2100
9 —— 0900		10 —— 2200
10 —— 1000		11 —— 2300
11 —— 1100		12 midnight —— 2400
12 noon —— 1200		
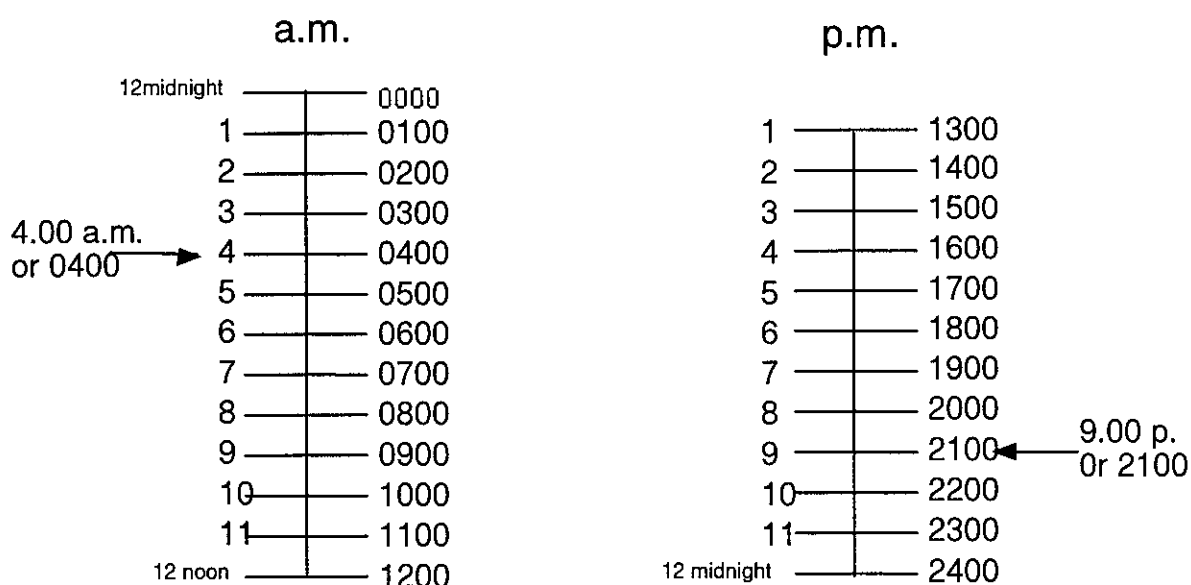
Examples

Before noon	After noon (add 12 to the hours)
2 am = 0200	2 pm = 1400
6.30 am = 0630	6.30 pm = 1830
11.48 am = 1148	11.48 pm = 2348

Remember : midnight can be 0000 or 2400

Use the time scale to help you if you get stuck
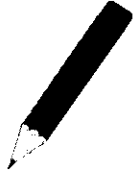
Write the following 24-hour clock times as 12 -hour times using am and pm

1. 03 15   2. 19 27   3. 21 45

4. 05 20   5. 06 50   6. 15 25

7. 12 35   8. 04 40   9. 13 45

10. 05 35   11. 21 20   12. 23 59

Write the following times as they would appear on a 24-hour clock.

13. 5.25 pm   14. 1.15 am   15. 8.05 pm

16. 10.40 am   17. 4.30 pm   18. 2.55 am

19. half past six in the evening

20. ten minutes to four in the morning

21. quarter past two in the afternoon

22. eleven o'clock at night

23. quarter to eight in the evening

24. five minutes past ten in the morning

25. twelve o'clock midday

Exercise 3

Reminders

1 hour = 60 minutes

A length of time should be given in hours and/or minutes

A time of day should be given in

24-hour time (using 4 digits)

or in 12-hour time (using am or pm).

Write out the new time in figures:

1. 40 minutes later than 06 15

2. 30 minutes later than 14 15

3. 12 minutes later than 08 30

4. quarter of an hour later than 7.20 pm

5. 20 minutes earlier than 3.30 pm

6. 2 hours earlier than 4.15 pm

7. 10 minutes earlier than 6.30 am

8. half an hour later than 5.05 pm

How many minutes are there between:

9. 05 10 and 05 50

10. 02 10 and 02 45

11. 4.25 pm and 4. 50 pm

12. 2.30 pm and 3.15 pm

13. 11 55 and 12 40

14. 7.10 am and 7.30 am

15. It is 6.45 pm.
    The programme I want to watch on TV starts in 1 hour 15 minutes.

    When does the programme start?

16. Elaine has just missed the 07 43 train.
    The next train she can get is at 07 58.

    How long will Elaine wait on the next train?
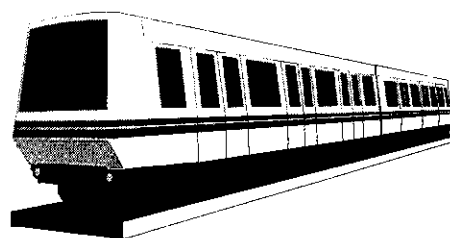
17. Martin leaves home at 08 10.
    He gets to work at 08 55.

    How long does it take Martin to travel to his work?

18. Diana goes to hockey practice after school.
    It starts at 3.45 pm and lasts for 1 hour 30 minutes.

    When does hockey practice finish?
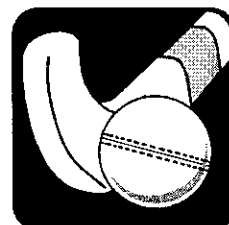
19. Mary starts watching a film at 9.30 pm.
    The film finishes at 10.55 pm.

    How long does the film last?

20. William is making a meal.
    He puts the chicken into the oven at 5.10 pm.
    The chicken will take 1 hour 20 minutes to cook.
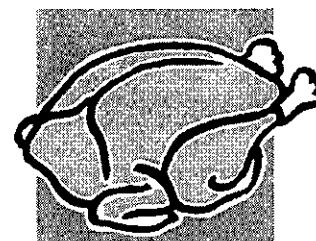
    At what time will the chicken be ready?

Exercise 4

Reminders

- Timetables are often printed in 24-hour time.

- Always take time to read all the information carefully.

Here is part of the train timetable for trains going from Glasgow to London

The timetable shows information about 4 different trains

Monday to Friday		A	B	C	D
Glasgow	(d)	07:15	09:40	12:30	15:25
Lanark	(d)	07:45	---	13:00	---
Newcastle	(d)	09:30	10:50	15:15	16:35
Birmingham	(d)	11:40	13:00	17:25	18:45
London	(a)	13:15	14:35	18:00	20:20

The last train leaves Newcastl leaves Newcastl at 16:35 and arrives in London at 20:20

The first train leaves Glasgow at 07:15
It calls at Lanark, Newcastle & Birmingham.
It gets to London at 13:15 or 1.15pm

The second train does not stop at Lanark, so no time is given

Often letters and codes are used.

These are explained in a 'key' (or 'note') which is printed beside the timetable. In this timetable,

(d) means departure – the time when the train leaves

(a) means arrival – the time when the train arrives

If you get stuck - look up the Wordbank to help you

Monday to Friday		A	B	C	D
Glasgow	(d)	07:15	09:40	12:30	15:25
Lanark	(d)	07:45	---	13:00	---
Newcastle	(d)	09:30	10:50	15:15	16:35
Birmingham	(d)	11:40	13:00	17:25	18:45
London	(a)	13:15	14:35	18:00	20:20

Use the Glasgow to London timetable to answer these questions :

1. When does train C leave Glasgow ?

2. Anne wants to travel from Glasgow to Newcastle.

   She wants to leave Glasgow in the afternoon.

   Which two trains could Anne travel on?

3. When does the 09 40 train get to London?

4. Frank lives in Lanark.

   He wants to get a train from Lanark to Birmingham.

   Which trains could he get?

5. Simon arrives at Birmingham station at 17 05.

   When is the next train to London?
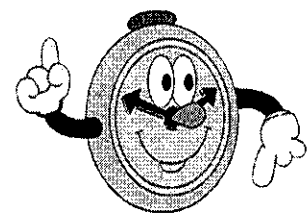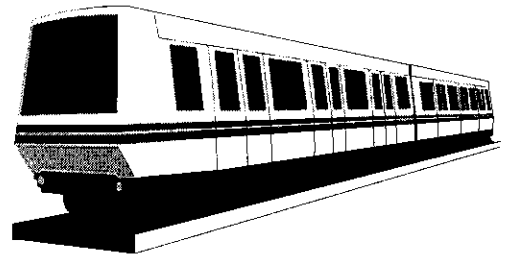
Here are timetables giving information on travelling from London to Jersey and back, by train and by ferry.
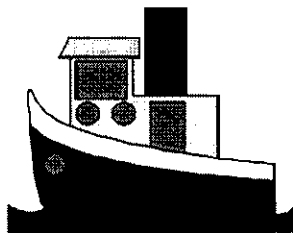
20 30	dep	London (Waterloo)
21 16	dep	Basingstoke
21 42	dep	Southampton
22 25	dep	Bournemouth
23 30	arr	Weymouth Quay
00 15	dep	Weymouth Quay
05 45	arr	Jersey

Jersey	dep	23 40
Weymouth Quay	arr	05 10
Weymouth Quay	dep	05 55
Bournemouth	arr	07 00
Southampton	arr	07 43
Basingstoke	arr	08 19
London (Waterloo)	arr	09 05

arr - time of arrival
dep - time of departure

Use the timetable to answer the following questions:

6. When does the train leave London?

7. a) When does the train arrive in Weymouth?
   b) When does the ferry leave Weymouth?
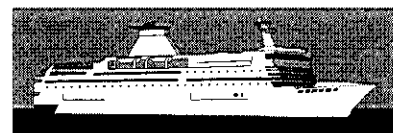
8. When does the ferry arrive in Jersey?

9. When does the ferry leave Jersey to travel to Weymouth?

10. How long does it take for the train to travel from Bournemouth to London?

Here is a bus timetable for journeys between Aberdeen and Glasgow.
The timetable uses the 24 hour clock.

	A	B	C	D
Aberdeen	09 00	11 18	14 41	18 05
Dundee	10 20	12 38	16 03	19 25
Perth	10 42	13 00	16 25	19 47
Stirling	11 17	13 32	16 58	20 19
Glasgow	11 48	14 03	17 35	20 50
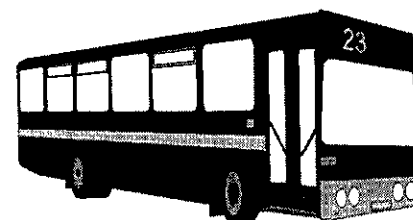
11. Which buses leave Aberdeen in the morning?

12. Which buses arrive in Glasgow after 2 pm?

13. Which bus leaves Perth at 1.00 pm?

14. Which bus arrives in Glasgow at twenty five to six?

15. You get to the bus station in Perth at 10.30 am.
    When is the next bus to Glasgow?

16. a) How long does the 9 o'clock bus take to travel from Aberdeen to Glasgow?

    b) How long does the last bus take to travel from Aberdeen to Glasgow?

    c) Which of these two buses takes longer to complete the journey?

    d) How much longer does it take?

Now ask your teacher for some train or bus timetables which are used where you live.

17.   Work with a partner and use the timetables to plan a journey.

- Decide on a place to go to first,
- then decide which day and time would be suitable,
- how long the journey will take and
- whether the bus/train stops at any other places on the way.
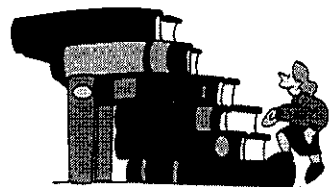
Write a short report on your journey plan.

Exercise 5

Reminders

Tables are used everyday for: trains, buses, football results,.....

Answer the questions using the table provided.

If you get stuck - look up the Wordbank to help you

Wherever possible - set out your working

1. Letter Post Rates:

Weight not over	First Class	Second Class
60g	26p	19p
100g	39p	31p
150g	52p	40p
200g	66p	50p
250g	77p	61p
300g	88p	70p
350g	£1.00	80p
400g	£1.14	92p
450g	£1.30	£1.05
500g	£1.45	£1.20
750g	£2.35	£1.70*
1000g	£3.05	
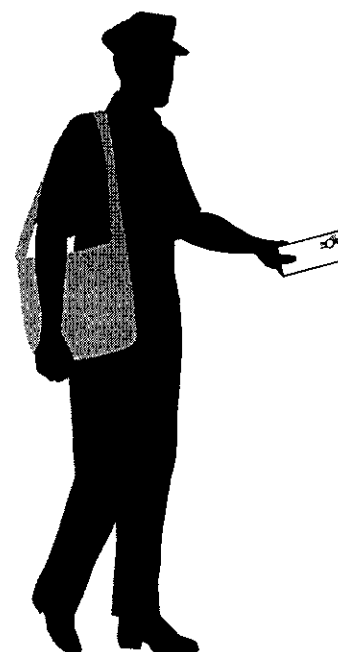
* Items heavier than 750g cannot be sent second class

a) How much will it cost to post a first class letter that weighs
   (i) 60g   (ii) 200g   (iii) 45g
   (iv) 490g   (v) 351g

b) You send a 320g letter by second class instead of first class.
   How much do you save?

2. This is a copy of the League Table for Group 9 in the European Championship .

GROUP 9

	P	W	D	L	F	A	Pts
Czech Republic	6	6	0	0	14	3	18
Scotland	5	2	2	1	7	6	8
Estonia	6	2	1	3	11	11	7
Bosnia	5	2	1	2	7	8	7
Lithuania	6	1	2	3	5	8	5
Faroe Islands	6	0	2	4	2	10	2

Key: Number of

P   games played
W games won
D games drawn
L   games lost
F   goals scored for them
A goals scored against them
Pts points

a) Which team won only one match?

b) Which team had no draws?

c) Which team lost the most matches?

d) Which team scored most goals?

e) Which team scored the same number of goals as were scored against them?

f) Which team had most points?

g) Scotland play the Czech Republic in their next match. Scotland lose.
   The score is   Scotland - 2   Czech Republic - 3

You get 3 points for a win, and 0 points for losing.

Copy and complete the part of the table below to show
how the information has changed.

	P	W	D	L	F	A	Pts
Czech Republic	7	7	0	0		5	
Scotland		2	2	2			8

3. A health club displays a list of all the classes they run.

The section below shows the classes on offer over the weekend.

TIME	CLASS	RATING	STUDIO
	Friday		
10 00 - 11 00	Spinning	All	2
14 00 - 15 00	Beginner step	All	1
14 45 - 15 30	Spinning	All	2
17 00 - 17 45	Aqua play	Age 9 - 15	Pool
17 00 - 18 15	Cardioblast	Advanced	1
18 30 - 19 30	Step up	Advanced	1
19 00 - 20 00	Spinning	All	2
19 45 - 20 45	Tai chi	All	1
	Saturday		
09 45 - 10 30	Spinning	All	2
09 30 - 11 15	Kids club	Age 5 - 12	1
10 00 - 10 50	Aqua aerobics	All	Pool
15 00 - 16 00	Aerobics	All	1
17 15 - 18 00	Circuit	Advanced	1
	Sunday		
12 30 - 13 30	Yoga	All	1
14 00 - 16 00	Kids club	Age 5 - 12	1
14 00 - 15 00	Aqua play	Age 9 - 15	Pool
16 15 - 17 15	Beginner step	All	1
16 30 - 17 15	Super spin	Advanced	2

a) What activity is held in the pool on a Saturday?

b) Where are all the spinning classes held?

c) At what time does the Yoga start on a Sunday?

d) How long does the beginner step class last on a Friday?

e) Alison works from 9.00 am until 5.00 pm on a Friday.

   Which Spinning class can she go to on a Friday?

4.

<div align="center">PIZZAWORLD</div>

Our freshly baked deep pan pizzas come in many varieties
and make a delicious meal.
Choose from **small**, **regular** and **giant pizzas**.
See below for our HUGE range of toppings

	small	regular	giant
Cheese & tomato	£2.05	£3.20	£4.50
Cheese & mushroom	£2.25	£3.50	£4.80
Cheese & onion	£2.25	£3.50	£4.80
Ham & mushroom	£2.60	£3.65	£5.00
Ham & pineapple	£2.80	£3.90	£5.20
Pepperoni	£2.95	£4.00	£5.35

Extra toppings available (prices are per topping added) :
Cheese, mushroom, onion, tomato - add 60p
Pineapple - add 70p
Ham, Pepperoni - add 85p

a) How much is a regular Ham & Mushroom pizza?

b) What is the price of a giant Pepperoni pizza?

c) Robert wants a regular cheese and onion pizza.
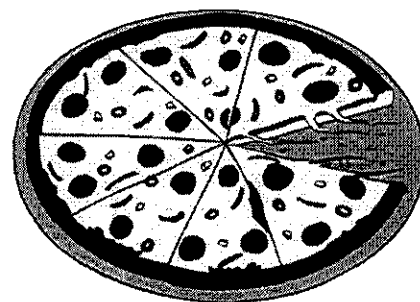
   i) How much does it cost?

   He decides to have tomato on the pizza as well.

   ii) How much extra will it cost?

   iii) How much will he pay altogether for his cheese, onion and tomato
   pizza?

d) How much is a giant pepperoni pizza if onion and mushrooms
   are added as extras?

Exercise 6

Mr & Mrs Simpson, Bert and Flossie are going on holiday to Majorca.
They have decided to stay in the Hotel Pollensa Sun.

They will be staying 'Half Board' - this means that breakfast and evening meal are included in the price.

Look at the price table below.
It shows the prices for 3 different hotels in Majorca.

The last two columns show the prices for the Hotel Pollensa Sun.

	Hotel Laguna		Hotel Pagona		Hotel Pollensa Sun	
Departure on or between	7nts	14nts	7nts	14 nts	7 nts	14nts
26 May - 03 June	409	589	329	429	319	399
04 June - 23 June	419	629	339	439	319	419
24 June - 28 June	479	719	349	449	349	459
29 June - 09 July	569	849	429	579	429	579
10 July - 22 July	599	769	469	499	469	499
23 July - 15 Aug	609	879	449	589	459	599
16 Aug - 31 Aug	599	769	469	499	429	579
01 Sept - 30 Sept	419	629	339	439	319	419

Child price is $\frac{3}{4}$ of adult price.

1. They are going for 14 nights to the Hotel Pollensa Sun, leaving on Saturday 10th July.

   a) What is the cost for 1 adult?
   b) Calculate the cost for 2 adults.
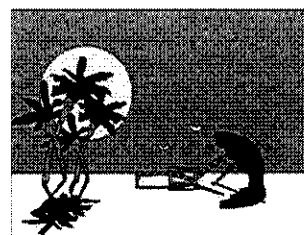
2.
   a) Use the information at the bottom of the table to find the cost of 1
   child   staying for 14 nights at the Hotel Pollensa Sun, leaving on
      Saturday 10th July.

   b) Now work out the price for 2 children.

3. Add your answer to 1 (b) and 2 (b) together to find the total cost
   for the Simpson family.

The Simpsons want to fly from Glasgow Airport.
This means they must each pay an extra amount called a
supplement.
The supplement is added to the cost of the holiday.
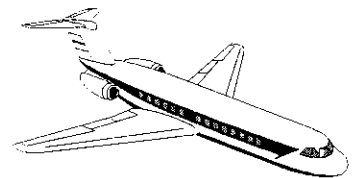
4. This table shows how much the flight supplements are from different
   UK airports.

Flights to Majorca

Departure Airport	Flight Supplement in £ per person
Gatwick	NIL
Birmingham	15
Manchester	23
Glasgow	39
East Midlands	35
Newcastle	32

How much extra will each
of the Simpsons have to pay
to fly from Glasgow?

5. The flight leaves Glasgow at 10 20.
   Write this time in 12-hour time.

6. The flight takes 3 hours and 25 minutes.
   When will the flight be due to land in Majorca?
   Give your answer in 12-hour time.

7. When the Simpsons arrive at Palma airport in Majorca they go
   to collect their hire car.

   They are hiring a Renault Twingo for the 14 days.

   The price list for the car hire is shown.

Code	Car type	3 day hire	7 day hire	14 day hire
A	Renault Twingo	£61	£97	£194
B	Fiat Punto	£69	£113	£225
C	Renault Megane	£92	£151	£302

   How much will the Simpsons pay to hire the car?

After relaxing at the hotel for a few days, Mrs Simpson and Flossie
decide to go to the shops in Palma. They go to a clothes shop to look at
dresses.
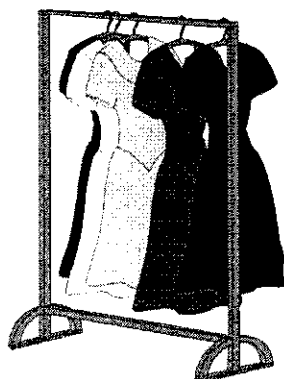
All the clothes and shoes are marked in **European** sizes.
Mrs Simpson is used to British sizes, so she uses a
conversion chart to help her change from British to
European sizes.

Ladies suits and dresses

American	8	10	12	14	16	18
British	10	12	14	16	18	20
European	38	40	42	44	46	48

Ladies shoes

American	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$	8	$8\frac{1}{2}$
British	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7
European	$37\frac{1}{2}$	38	39	$39\frac{1}{2}$	40	$40\frac{1}{2}$

8. Mrs Simpson usually buys a British size 14 dress and British size 6 shoes.

   a) What European size of dress should Mrs Simpson be looking for?

   b) What European size of shoes should fit Mrs Simpson?

The family then spend the rest of their holiday relaxing in the sun.
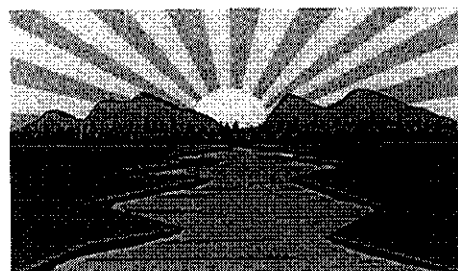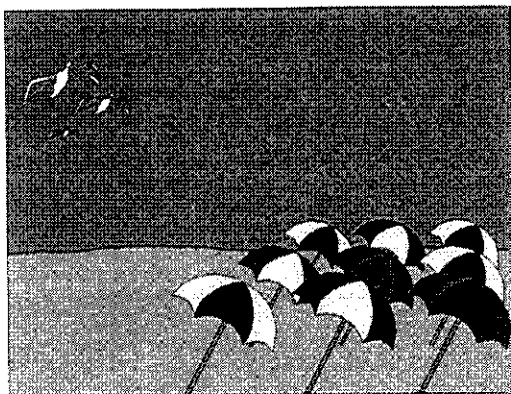
9. Collect a holiday brochure from your teacher.

Copy and complete:

- I am going on holiday to _____,
- I am going to stay for _____ weeks.
- I am leaving on the _____,
- I will stay at the _____,
- It will cost me _____,
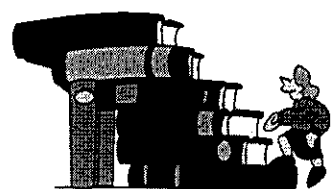
Write out all your information as a short report.

USING MATHEMATICS 2 (ACC 3)
Outcome 4

Reminders

Units of measure

Length - we use rulers, metre sticks, trundle wheels etc.
to measure length

Centimetres

millimetre - used for measuring small lengths
also commonly used in industry for accuracy

centimetre - used for measuring small lengths

metre - used for measuring longer lengths
e.g. length of a room

kilometre - used for measuring longer distances
e.g. the distance between Dundee and Peebles

mile - used for measuring longer distances
e.g. between Dundee and Peebles
still used for distances given on road signs in UK

Exercise 1
Practical exercise

You will need a ruler and a metre stick

1. In your jotter, use a ruler to draw lines which measure
   a) 9 cm   b) 45 mm   c) 7 cm   d) 32 mm

2. Measure, to the nearest **centimetre**

   a) the length of your little finger

   b) the breadth of your hand

   c) the length of your foot
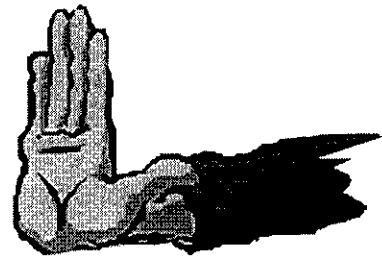
3. Measure to the nearest **millimetre**

   a) the width of your jotter

   b) the length of this page

   c) the length of your pen or pencil

4. Measure, to the nearest **metre**

   a) the length of the classroom

   b) the breadth of the board

   c) the height of the doorway

Reminders

Weight - we use scales to measure weight.

There are all different types of scales :
In Home Economics you use kitchen scales to weigh food.
At home you use bathroom scales to weigh yourself.

gram - used for measuring fairly light items,
also used for accuracy
e.g. for measuring ingredients for baking

kilogram - used for weighing heavier items
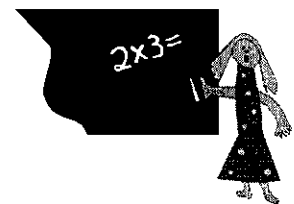e.g. a bag of potatoes, a person
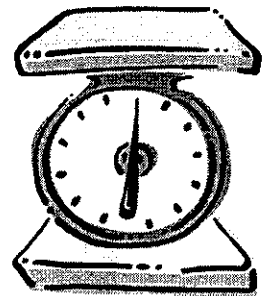
Exercise 2
Practical exercise

For this exercise you will need kitchen scales and bathroom scales.

1. Would you use grams or kilograms to weigh
   a) yourself
   b) a crisp
   c) a sack of potatoes
   d) a ball of wool ?

2. A bag of sugar weighs 1 kilogram.
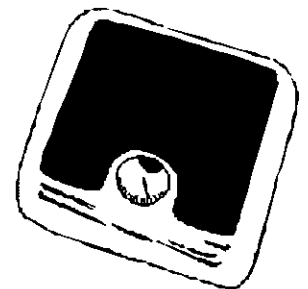
   Gather some newspapers and put them into a carrier bag.
   Stop when you think the bag weighs 1 kg.

   Now weigh the bag of newspapers using the kitchen scales.

   a) What does your bag weigh?

   b) Is that more or less than 1kg?

3. Collect five items you think weigh about 1 kg.
   Weigh each of the items and write down their weights.

Reminders

Volume - In Science and in Home Economics you measure the volume of liquids.
You use a measuring jug or a beaker to do this.

millilitre - smaller of the two units of measure used for liquids
e.g. for measuring the amount of liquid in a glass

litre - used for measuring larger quantities of liquid
e.g. the amount of petrol in the car

Exercise 3
Practical exercise

1. Would you use **millilitres** or **litres** to measure
   a) the juice of an orange
   b) the amount of water in a fish tank
   c) the amount of medicine in a bottle ?

2. Collect three small containers and estimate how many millilitres each will hold.

   a) Note your estimates into your jotter.

   Now use a measuring jug or beaker.
   Fill each of the containers with water and then pour the water into the measuring jug.

   b) Make a note of your answers in your jotter.

3. Collect three large containers and estimate how many litres each will hold.

   a) Note your estimates into your jotter.

   Now use a 1 litre measure.
   Use water to find out how many litres each container holds.

   b) Make a note of your answers in your jotter.

Exercise 4

Choose the best units for measuring these :

1. the weight of a packet of crisps

2. the height of a doorway

3. the weight of a baby

4. the amount of coffee in a mug

5. the amount of perfume in a bottle

6. the length of a driveway

7. the weight of a computer disk

8. the volume of liquid in a swimming pool

9. the distance from London to Hong Kong

10. the volume of a can of soup

Choose from :

kilometres
        centimetres
metres
        millimetres
grams
        kilograms
millilitres
        litres
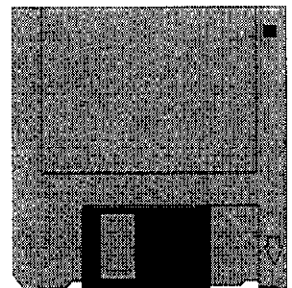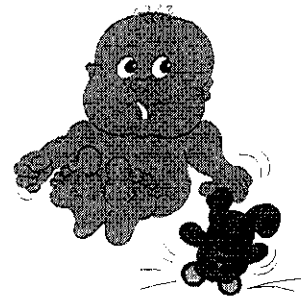
Exercise 5

Practical exercise

Reminders

If you get stuck - look up the Wordbank to help you

Remember to include units in each of your answers

grams (**g**) or kilograms (**kg**) for weight

millilitres (**ml**) and litres (**l**) for volume

millimetres (**mm**) , centimetres (**cm**) and metres (**m**) for length

It is usually a good idea to think about everyday items which we

know the length, weight or volume of before we try to estimate the

length, weight or volume of other things.

This means we have something to 'compare with' :

LENGTH

e.g.   a doorway is about **2 m** high and about **1 m** wide

a new small ruler is about **15 cm** long

a floppy disk is about **3 mm** thick
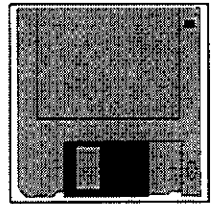
WEIGHT

a bag of sugar weighs **1 kg** (or 1000g)

a small bag of crisps weighs about **30g**

a medium sized apple weighs about **150g**

an average man weighs about **75 kg**

VOLUME (CAPACITY)

a can of coke holds **330 ml**

a medicine spoon holds **5 ml**

a bucket holds about **10 litres** of water

fresh orange juice is usually sold in **1 litre** cartons
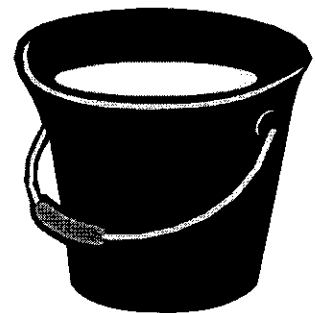
1. Put these items into order, by weight, starting with the one you **think** will be the lightest

a) yourself

b) a pencil

c) a textbook

d) a can of cola

e) a calculator

f) a pack of jotters
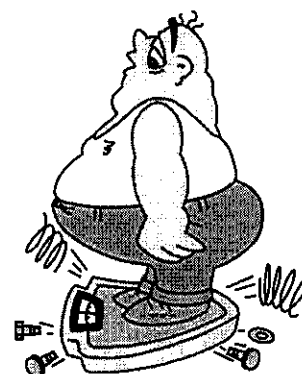
2. Now estimate the weight of each of the items.

Note your estimates into your jotter.

3. Using either the kitchen scales or bathroom scales, measure the weight of each of the items in your list and note their weights into your jotter beside your estimates.

How close were your estimates?

Show your answers to your teacher.

4. Put these items into order, by volume, starting with the one you **think** will be the least

a) a mug

b) a teaspoon

c) a bucket

d) a cup

e) a milk carton

f) a can of cola

g) a soup tin

h) a egg cup

5. Now estimate the volume of each of the items in question 4.

   Note your estimates into your jotter.

6. Using the measuring jug, measure the volume of each of the items in your list and note their volumes into your jotter beside your estimates.

   How close were your estimates?

   Show your answers to your teacher.

You need Measure Worksheet 1
  - complete both sides of the worksheet

Exercise 6

Reminders

It is useful to be able to change from one unit to another

Length
1 m = 100 cm = 1000 mm

Examples

1. 2 m = _____ mm

    To change from m to mm we multiply by 1000

    2 x 1000 = 2000 , so

    2 m = 2000 mm

2. 3.4 m = _____ cm

    To change from m to cm we multiply by 100

    3.4 x 100 = 340 , so

    3.4 m = 340 mm

3. 2750 mm = _____ m

    To change from mm to m we divide by 1000

    2750 ÷ 1000 = 2.75 , so

    2750 mm = 2.75 m

You need **Measure Worksheet 2**
- complete **section A** of the worksheet

Weight
1 kg = 1000 g

Examples

1. 7 kg = _____ g

   To change from kg to g we multiply by 1000

   7 x 1000 = 7000 , so

   7 kg = 7000 g

2. 0.6 kg = _____ g

   To change from kg to g we multiply by 1000

   0.6 x 1000 = 600 , so

   0.6 kg = 600 g

3. 4920 g = _____ kg

   To change from g to kg we divide by 1000

   4920 ÷ 1000 = 4.92 , so

   4920 g = 4.29 kg

You need **Measure Worksheet 2**
- complete **section B** of the worksheet

Volume
1 litre = 1000 ml

1.   12 litres = _____ ml

To change from litres to ml we multiply by 1000

12 x 1000 = 12000 , so

12 litres = 12000 ml

2.   0.02 litres = _____ ml

To change from litres to ml we multiply by 1000

0.02 x 1000 = 20 , so

0.02 litres = 20 ml

3.   500 ml = _____ litres

To change from ml to litres we divide by 1000

500 ÷ 1000 = 0.5 , so

500 ml = 0.5 litres (or $\frac{1}{2}$ litre)

You need **Measure Worksheet 2**
- complete **section C** of the worksheet.

Reminders

In industry, measurements have to be very accurate.

When the Channel Tunnel was being built one team of workers started in Britain and another team started work in France.
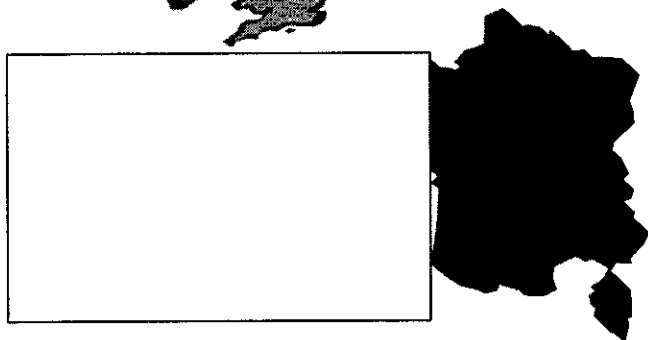
They worked their way in from both sides of the English Channel and had to meet up in the middle.

Even although the distance involved was quite long the measurements had to be done in very small units, e.g. millimetres (and even less!) to make sure that there were no disasters!

Lots of measures have to be very accurate and so, workers in the building trade, joiners and all sorts of other tradesmen have to use mm for measuring length.

Exercise 7
Practical Exercise

1. Choose six items of furniture in the room.

   Measure the length, breadth or height of each of the items, as carefully as you can and note your answers, in millimetres, in your jotter.

2. Ask your teacher for some brochures which give information about kitchen furniture and appliances.

   You have to choose the units and appliances (dishwasher, washing machine, cooker etc.) which you would like to have in the kitchen shown on **Measure Worksheet 3.**
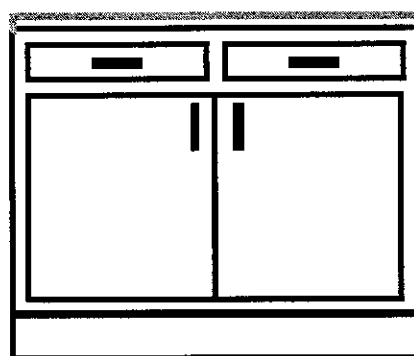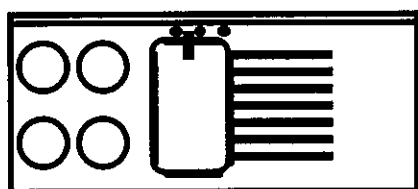
The dimensions of the kitchen are shown in the diagram on Measure Worksheet 3.

Once you have chosen the units etc. mark the diagram to show roughly where each unit will fit.
Remember to make sure that the total length of units does not add up to more than the length of a wall.

Measure Worksheet 1
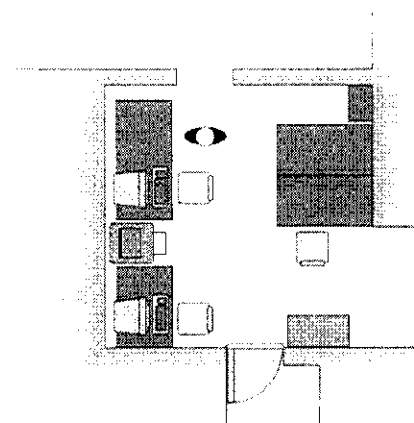
Complete:

About You

Surname

Firstname(s)

Age (in years and months)

Weight (in kilograms)

Height (in metres and centimetres)

Distance round forehead (in cm)

Arm length (in cm)

Handspan (in cm)

Waist (in cm)

Length of foot (in cm)

Measure Worksheet 1

- Look carefully at the measurements in the list

- Write an estimate in the first column

- Let your teacher see your estimates

- Now measure each item on the list and note your answers in the last column

	Estimate	Actual Measure
Length of classroom wall		
Breadth of this page		
Length of your shoe		
Height of your desk		
Weight of an empty bucket		
Weight of the largest book in the classroom		
Weight of the smallest book in the classroom		
Volume of a teacup		

Measure Worksheet 2

Section A

Complete :

a) 3 m = _____ mm

b) 3.5 m = _____ cm

c) 4200 mm = _____ m

d) 465 cm = _____ m

e) 2630 mm = _____ m

f) 1.32 m = _____ mm

g) 3680 cm = _____ m

h) 50 cm = _____ m

i) 400 mm = _____ m

j) 0.68 m = _____ cm

k) 1094 mm = _____ m

l) 0.76 m = _____ mm

Section B

Complete :

a) 3 kg = _____ g

b) 1.1 kg = _____ g

c) 4800 g = _____ kg

d) 8210 g = _____ kg

e) 0.5 kg = _____ g

f) 2000 g = _____ kg

g) 735 g= _____ kg

h) 0.26 kg = _____ g

i) 454 g = _____ kg

j) 0.002 kg = _____ g

Section C

Complete :

a) 9 litres = _____ml

b) 4.54 litres = _____ ml

c) 5000 ml = _____ litres

d) 1600 ml = _____ litres

d) 250 ml = _____ litres

f) 75 ml _____ litres

g) 10 ml = _____ litres

h) 10.2 litres = _____ ml

i) 0.75 litres = _____ ml

j) 0.005 litres = _____ ml

Measure Worksheet 3

Here is a plan of an empty kitchen with dimensions as shown.

Choose units and appliances from the brochures and check that they fit into the kitchen.

Think carefully about 'what should go where' e.g. washing machine near sink unit.

Take care with units which fit into corners - they take up space on two walls!

3.4 m (3400 mm)

2.8m (2800 mm)

door
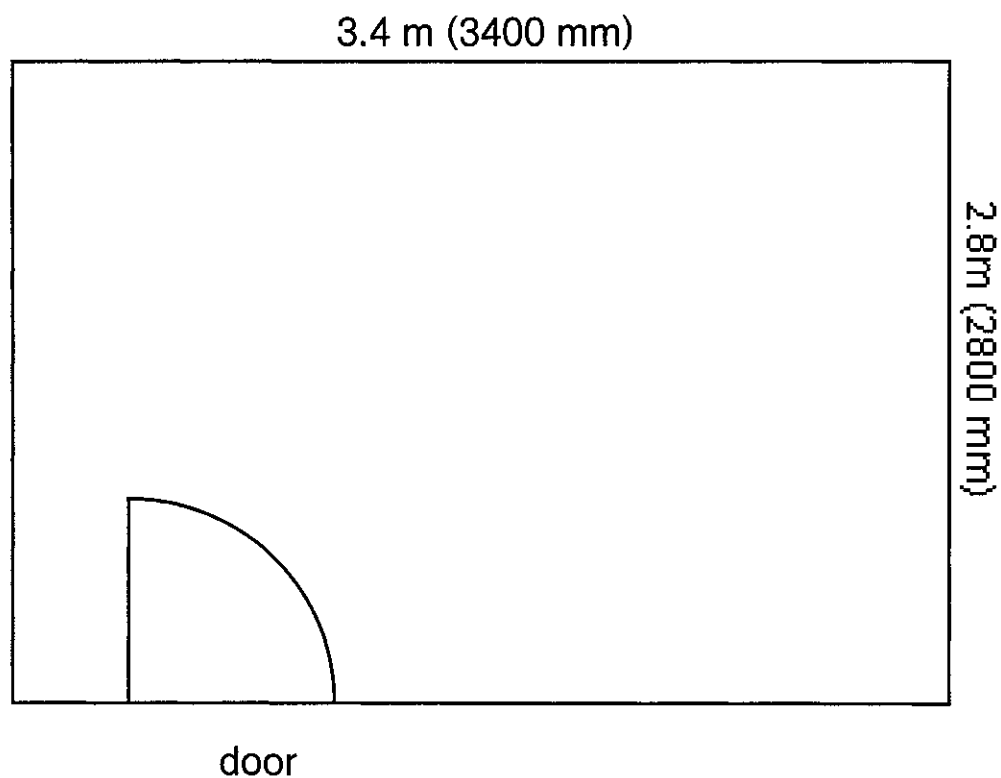
USING MATHEMATICS 2 (ACC 3)
Outcomes 1 & 2

Exercise 1

1a)	£6.15	b)	£17	c)	£19.29
2.	£386.60	3.	£15.01	4.	£55.18
5.	£127.90	6.	£51.35	7.	£14.84
8.	£52.38	9.	£39.60			

Exercise 2

1.	£246.25	2.	£199.20	3.	£631.30
4.	£665.15	5.	£127.42	6.	£216
7.	£331.20	8.	£75.60	9.	£58.50
10.	£116.40				
11a)	£319.60	b)	£90.46	c)	£229.14
12a)	£269.39	b)	£73.74	c)	£195.65
13a)	£359.53	b)	£85.42	c)	£274.11
14a)	£267.58	b)	£59.70	c)	207.88

Exercise 3

1.	£8.50	2.	£33	3a)	£720	b)	£70
4.	£240	5a)	£9	b)	£4.20	6.	£12

Exercise 4

1.	9 cm	2.	6 cm				
3a)	5m	b)	72 kg	c)	12 cm		
d)	2 litres	e)	104 cm	f)	4 m		
g)	16 g	h)	5 tonnes	i)	47 ml		
4a)	£4.76	b)	£10.48	c)	£134.26		
d)	£29.33	e)	£12.92	f)	£45.68		
5a)	£5.79	b)	£34.72	c)	£166.67	d)	£5.99
6.	£0.29	7.	£0.92	8.	291 g		
9.	4 mins	10.	£2.10	11.	3 km		

Exercise 5

1a)	370 m	b)	9.6 kg	c)	£6.32
d)	12 cm	e)	£77.25	f)	252 yards
2.	15 kg	3.	68 tonnes	4.	68 pupils
5.	105 cm	6.	42	7.	£54
8.	4380	9.	£4.20	10.	18 hours

Exercise 6

1.	10%	2.	25%	3.	20%
4.	50%	5.	75%	6.	100%

Exercise 7

1a)	£5.60	b)	£4.25
2a)	£45	b)	£62
3a)	£110	b)	£62.50

Exercise 8

1.	£150	2.	£25.56	3.	75		
4.	£16.45	5.	£3.55	6.	125 ml		
7.	£55	8.	£62.25				
9.	£19						
10.	£18.54	11.	£1.46	12.	£2		
13a)	3	b)	4	c)	5	d)	20
14.	300cm						
15a)	12	b)	4	c)	48		
16a)	5 boxes	b)	£44.25				
17.	£826.10						
18.	£102						
19a)	3.6 km	b)	18 km				
20a)	28 days	b)	20 days				
21a)	143	b)	£14.30	c)	£100.10		

Worksheet Answers

Percentages Worksheet 1

a) 20 $\dfrac{20}{100}$ 20%

b) 25 $\dfrac{25}{100}$ 25%

c) 75 $\dfrac{75}{100}$ 75%

d) 10 $\dfrac{10}{100}$ 10%

e) 52 $\dfrac{52}{100}$ 52%

f) 20 $\dfrac{20}{100}$ 20%

Percentages Worksheet 2 - diagrams correctly shaded

Percentages Worksheet 3 - diagrams correctly shaded

Percentages Worksheet 4

1.	£35	2.	15 km	3.	£7
4.	4 m	5.	150 kg	6.	£9
7.	£3.10	8.	120 km	9.	750 people
10.	14 pupils	11.	28 stickers	12.	75 g
13.	5098 people				
14.	21 pupils				

USING MATHEMATICS 2 (ACC 3)
Outcome 3

Exercise 1

1.	3.00 p.m.	2.	6.30 a.m.	3.	9.15 p.m.
4.	1.20 p.m.	5.	4.50 p.m.	6.	11.05 a.m.

7. various answers (a.m.)
8. various answers (probably p.m.)
9. various answers
10. various answers

11.	i	12.	e	13.	j	14.	h
15.	f	16.	b	17.	d	18.	g
19.	a	20	c				

Exercise 2

1.	3.15 a.m.	2.	7.27 p.m.	3.	9.45 p.m.
4.	5.20 a.m	5.	6.50 a.m.	6.	3.25 p.m.
7.	12.35 p.m.	8.	4.40 a.m.	9.	1.45 p.m.
10.	5.35 a.m.	11.	9.20 p.m.	12.	11.59 p.m.
13.	17 25	14.	01 15	15.	20 05
16.	10 40	17.	16 30	18.	02 55
19.	18 30	20.	03 50	21.	14 15
22.	23 00	23.	19 45	24.	10 05
25.	12 00				

Exercise 3

1.	06 55	2.	14 45	3.	08 42
4.	7.35 p.m.	5.	3.10 p.m	6.	2.15 p.m
7.	6.20 a.m.	8.	5.35 p.m.	9.	40 mins
10.	35 mins	11.	25 mins	12.	45 mins
13.	45 mins	14.	20 mins	15.	8 p.m.
16.	15 mins	17.	45 mins	18.	5.15 p.m.
19.	1 hr 25 mins				
20.	6.30 p.m.				

Exercise 4

1. 12 30   2. C or D   3. 14 35
4. A or C   5. 17 25
6. 20 30
7a) 23 30   b) 00 15
8. 05 45
9. 23 40
10. 3 hrs 10 mins
11. A & B   12. B, C & D 13. B
14. C
15. 10 42
16a) 2 hr 48 mins   b) 2 hr 45 mins
  c) A   d) 3 mins more
17. various answers

Exercise 5

1ai) 26 p   ii) 66 p   iii) 26 p
iv) £1.45   v) £1.14   b) 20 p
2a)   Lithuania   b)Czech Republic
  c)   Faroe Islands   c)Czech Republic
  e)   Estonia   f) Czech Republic

g)   Czech Republic7   7   0   0   <u>17</u>   3   <u>21</u>
  Scotland   <u>6</u>   2   2   2   <u>9</u>   <u>9</u>   8

3a)   Aqua Aerobics   b)   Studio 2
  c)   12 30   d)   1 hour
  e)   19 00 - 20 00 class
4a)   £3.65   b)   £5.35
  ci)   £3.50   ii)   60 p   iii)   £4.10
  d)   £6.55

Exercise 6

1a)   £499   b)   £998   2a)   £374.25   b)   £748.50
  3.   £1746.50   4.   £39   5.   10.20 a.m.
  6.   1.45 p.m.   7.   £194
8a) 42   b)   39½

USING MATHEMATICS 2 (ACC 3)
Outcome 4

Exercise 1

Questions 1 - 4   various answers

                                                      Exercise 2

1a)   kg   b)   g   c)   kg   d)   g

Questions 2 & 3   various answers

Exercise 3

1a)   ml   b) litres   c) ml

Questions 2 & 3 various answers

Exercise 4

1.   grams   2.   metres   3.   kilograms
4.   millilitres 5.   millilitres 6.   metres
7.   grams   8.   litres   9.   kilometres 10.   millilitres

Exercise 5

Questions 1 - 4   various answers

Exercise 6

Measure Worksheet 1 various answers
Measure Worksheet 2 see copy of worksheet with answers
Measure Worksheet 3 various answers

Measure Worksheet 2 - Answers

Section A

Complete :

a) 3 m = **3000** mm

b) 3.5 m = **350** cm

c) 4200 mm = **4.2** m

d) 465 cm = **4.65** m

e) 2630 mm = **2.63** m

f) 1.32 m = **1320** mm

g) 3680 cm = **36.8** m

h) 50 cm = **0.5** m

i) 400 mm = **0.4** m

j) 0.68 m = **68** cm

k) 1094 mm = **1.094** m

l) 0.76 m = **760** mm

Section B

Complete :

a) 3 kg = **3000** g

b) 1.1 kg = **1100** g

c) 4800 g = **4.8** kg

d) 8210 g = **8.21** kg

e) 0.5 kg = **500** g

f) 2000 g = **2** kg

g) 735 g = **0.735** kg

h) 0.26 kg = **260** g

i) 454 g = **0.454** kg

j) 0.002 kg = **2** g

Section C - Answers

Complete :

a) 9 litres = **9000** ml

b) 4.54 litres = **4540** ml

c) 5000 ml = **5** litres

d) 1600 ml = **1.6** litres

d) 250 ml = **0.25** litres

f) 75 ml = **0.075** litres

g) 10 ml = **0.01** litres

h) 10.2 litres = **10200** ml

i) 0.75 litres = **750** ml

j) 0.005 litres = **5** ml

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USING MATHEMATICS 2 (ACC 3)

Some calculations which are the same can be described in different ways. Some of these are listed below.

Addition
+

add

the sum of

the total of

altogether

the value of

how much

Subtraction
-

subtract

take away

the difference between

how many more

how many less

how much left

Multiplication

✗

multiply

times

total

altogether
(you can sometimes multiply instead of doing lots of additions)

Division

÷

divide

share

how many per

how much each

add	+
altogether	in total; usually means **add**
a.m.	used with 12-hour time for morning times (between midnight and midday)
arr.	short for arrival, means for example, the time that a train gets to a station
basic pay	pay before any extra money has been added (e.g. for overtime) and before deductions are taken off
bonus	extra money added to basic pay
centimetre (**cm**)	unit of length - for measuring small lengths
column	in a table (or grid) a column goes up and down the way (i.e. vertically)
decimal point	a dot used between numbers to separate the whole numbers from the fractions
deductions	money taken off gross pay e.g. Income Tax
dep.	short for departure; means for example, the time that a train leaves a station
difference between	**take away**; subtract
digit	number
discount	money taken off a price e.g. in a sale; usually **subtract**
divide	÷
equal share	**divide** a quantity into smaller equal amounts

estimate	a guess, a 'rough' answer
fewest	least; lowest number
figures	numbers; digits
fraction	part of a whole; e.g. $\frac{1}{2}$
full price	normal price paid (i.e. when not in a sale; before discount) the full price includes VAT
grid	table; list
gross pay	total amount earned (before deductions are taken off)
half board	term used by hotels, means the price includes bed, breakfast and an evening meal each day
hour	unit of time; 1 hour = 60 minutes; 24 hours = 1 day
including	and extra amount which has already been added on
income tax	a deduction from pay; a tax paid to the government to help pay the costs of running the country
key	used with a pictograph; explains what each picture 'stands for'
kilogram (kg)	unit of weight - for measuring heavier items e.g. a bag of potatoes or a person
kilometre (km)	unit of length - for measuring longer distances e.g. Dundee to Perth
least expensive	cheapest; costs the least amount of money
less	take away; subtract

litre	unit of volume for measuring large amounts of liquid e.g. amount of water in a bucket
loss	the difference between cost price and selling price when the cost price is higher
metre (m)	unit of length - for measuring longer distances e.g. the length of a room
metre stick	a ruler which is one metre long
midnight	12 o'clock in the middle of the night
mile	unit of length - for measuring longer distances e.g. Dundee to Perth (1 mile = 1.6 km)
millilitre (ml)	a unit of volume for small amounts of liquid e.g. amount of coffee in a cup
millimetre (mm)	unit of length - for measuring small lengths
minute	unit of time; 60 minutes = 1 hour
most expensive	dearest; costs most money
most frequent	most often; largest number
multiply	x ; times
National Insurance	a deduction from pay; a tax paid to the government to go towards sickness and unemployment benefits
net pay	take-home pay; gross pay less deductions
noon	12 o'clock in the middle of the day
overtime	extra hours worked, often for a higher rate of pay
pay slip	a paper record of earnings and deductions
pay rise	increase in pay; **add**

per	each e.g. 'per week' means 'each week'
percentage	a fraction out of 100
pictograph	a type of graph using pictures to show information
p.m.	used with 12-hour times for times between midday and midnight
profit	the difference between cost price and selling price when the selling price is higher
reduced price	sale price; full price 'take away' discount
reduction	amount to be 'taken away'
remainder	amount left over after sharing out; **divide**
row	in a table (or grid) a row goes across the way (i.e. horizontally)
sale price	reduced price; full price 'take away' discount
share	**divide** into equal parts
subtract	- ; take away
sum of	total of; **add**
supplement	an extra charge; a supplement is added to the cost
table	chart; list; grid
take away	- ; subtract
take home pay	net pay; gross pay less deductions
tape measure	used for measuring e.g. a person's waist
12-hour time	time given using a.m. and p.m. e.g. 4.15 p.m.

24-hour time	time given using 4 digits e.g. 1615
times	**x** ; multiply
tonne	a unit of weight for weighing very heavy items e.g. a lorry
total	altogether; usually **add** but can be **multiply**
total deductions	amounts taken away from gross pay (e.g. Income Tax, National Insurance, Pension)
trundle wheel	used for measuring distances along the ground
value	amount; answer
VAT	Value Added Tax; a tax paid to the government; an extra cost; **add**
volume	the amount of space inside a solid shape or the amount of liquid which can be put into a container
weight	used to describe how heavy (or light) something is