GOOD DESIGN TO HELP YOU...

Notes to help you revise
the facts and words you
need for the exam

Useful facts fill in gaps in
your knowledge with easy-
to-follow summaries

Topic Choice
for full
GCSE syllabus
coverage

Every Question Graded
so you know how you're
doing

Real Exam
Questions
Just like you'll
meet in the exam
— you are carefully
taken through
step-by-step

Interest, simple and compound, mortgages, insurance

The total premium to be paid for his property is as follows:

Household goods	= £4 × 12	= £48
Electrical goods	= £11.25 × 2	= £22.50
Jewellery and valuables	= £12.50 × 1	= £12.50
Total		= £83.00

For a sum insured of £25 000 the monthly premium is £12.50.

Therefore the annual premium for the life assurance policy is £150.00.

The combined total is £83.00 + £150.00 = £233.00.

Now that if Ralph had been any age between 30 and 34 the same sum of the table would have been used.

Topic: mortgages

Normal mortgage banks will not lend to people considering buying a house.

You can calculate what your maximum potential mortgage will be at the time you apply by multiplying your anticipated gross annual income by 25. In appropriate cases this can be increased by up to 11 times your partner's income.

Example: Remember, the actual mortgage available will always be limited to a maximum of 90% of the lower of valuation or purchase price of the property.

Mr B. Remember, the actual mortgage available will always be limited to a maximum of 90% of the lower of valuation or purchase price of the property.

Joy and Harry Black have seen a house they would like to buy. The purchase price is £44 000 but it is valued by the surveyor at only £38 000.

(a) What is the maximum mortgage that the bank would give on this house?

Harry expects his gross annual income to be £10 200. The bank has agreed to consider Joy's income for mortgage purposes and will make the maximum allowance on it. What is the maximum gross income that Joy must earn in order for the Blacks to be able to ask for the maximum mortgage on this house? (NEA)

(b) The maximum mortgage will be 90% of the valuation figure, which is lower than the purchase price.

$0.9 \times £38 000 = £34 200$

(c) Harry would be allowed $25 \times £10 200 = £255 000$.
Harry and Joy will need $£34 200 - £255 000 = £389 200$.
If Joy earns £x, then
 $x \times 25 = £389 200$
 $x = £15 568$
Hence Joy needs to earn at least £15 568 a year.

Topics: simple interest, investment

If £250 is invested at 12 per cent p.a. simple interest for 1 year 3 months. Find the total amount of money at the end of this time.

Using the formula $I = \frac{PRT}{100}$

$P = 250, R = 12, T = 1.25$
 $I = \frac{250 \times 12 \times 1.25}{100} = 37.5$
The total = £250 + 37.5 = £287.50.

Notes: Note that the table gives per £1000. We are only borrowing £250.

Properties of shapes

USEFUL FACTS

(i) Isosceles triangle: Base angles equal. Two sides equal. One axis of symmetry.

(ii) Equilateral triangle: All sides equal. Three axes of symmetry. Rotational symmetry of order 3.

PROGRESS TEST 2

1. A square field has an area of 900 m². Find the length of one side of the field, giving your answer to the nearest metre.

2. A tray of 12 plants costs a garden centre £7.50 to produce. The plants are sold at 75p each. Calculate the percentage profit made. (Give your answer to 1 decimal place.)

3. Solve the equations:
(i) $4x + 15 = 7x + 3$; (ii) $4 - 3x = 5$.

4. A set of books entitled 'The World of Science' can be bought cash for £79.95 or by paying in 8 equal monthly instalments of £13.20. How much is saved by paying cash?

5. Anne works in an office and earns £115 per week. She is allowed to earn £12 a week before paying tax at 20p in the £. How much money is she left with after paying tax?

6. A supermarket sells potatoes in 10 bags at 75p per bag, in 50 bags at 80p and in 200 bags at £3.40. Which is the best buy? Give a reason.

7. This menu on holiday in the U.S.A. for six was £228 and she spent \$800 while there. If the exchange rate was £1 = \$1.60, calculate the total cost of the holiday in the nearest £1.

8. Factorise completely:
(i) $4x + 8y$; (ii) $6x^2y - 4xy^2$.

9. Jenna wants to mount two pictures so that they are similar rectangles in shape. The smaller picture has a width 21 cm and height 29.1 cm. If she wants the larger picture to have width 35 cm, what should its height be? (Give your answer to the nearest 0.1 cm.)

Topic: wages

John works in a department store. He is paid at an hourly rate of £2.90. If he works on Saturday, he is paid 'time and a half', and on Sundays he is paid 'double time'. On Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, he worked the following hours:

Monday 8, Tuesday 7.5, Wednesday 4, Thursday 3.5, Friday 4, Saturday 5, Sunday 6.

Work out how much John earned during this week.

There are two ways of doing this question.

(i) $8 \times 1.5 \times 2.90 = 35.24$
 $7.5 \times 1.5 \times 2.90 = 32.66$
 $4 \times 2 \times 2.90 = 23.20$
 $3.5 \times 2 \times 2.90 = 20.30$
 $4 \times 2 \times 2.90 = 23.20$
 $5 \times 2 \times 2.90 = 29.00$
 $6 \times 2 \times 2.90 = 34.80$
Total earned = £108.40

(ii) Total earned = $(108.40 \div 1.5) \times 1.5 = £144.53$

3 hours at double time = $3 \times 2 \times 2.90 = 17.40$
4 hours at double time = $4 \times 2 \times 2.90 = 23.20$
5 hours at double time = $5 \times 2 \times 2.90 = 29.00$
6 hours at double time = $6 \times 2 \times 2.90 = 34.80$
Total earned = £144.53

Questions to try

The Happy Fryer
Home & Garden Assistant
Hours: Friday 5.30 p.m. to 10.30 p.m.
Saturday 10.30 a.m. to 11.00 p.m.
Wages: £2.50 per hour

This advertisement appeared in a local newspaper. Calculate:

(a) the total number of hours to be worked each week;
(b) the total wage earned each week.

(L.E.A.G.)

The following is a gas bill for the second quarter of 1992.

Date of reading	Value reading	Gas supplier
1st April	6277 cubic feet	British Gas
1st May	6343	British Gas
1st June	6408	British Gas

Gas costs 41.00 pence per therm.
Complete the bill to show:

(i) the amount of gas used (in hundreds of cubic feet);
(ii) the number of therms used if 1 cubic foot = 0.008 therms;
(iii) the cost of the gas;
(iv) the total amount due.

Progress Tests
4 Progress Tests to tell
you what grade to
expect: the marking
scheme tells how you
are doing and advises
points to watch and
revise further

Hints on
Solutions
Where you need
them to get it right
— as the question
develops

Questions to Try to give you
practice with new material. Of
course, answers are in the back

IN THIS BOOK...

Success Step by Step

STEP
1	You have bought your copy of <i>Work Out Maths GCSE</i> .	STEP
6	Try the problems with answers at the back of the book. GCSE exams are much less predictable than exams used to be – you'll benefit from experience of new problems.
STEP
2	Work through the sections of the book, making sure you don't miss out any topics that you are weak at. Do not try sections that are beyond the grade you are capable of.	STEP
7	Check your grade with a Progress Test: see where you need to do more work!
STEP
3	Make full use of the three sections of Notes in each chapter: you need to be certain that you know the important words as well as the methods.	STEP
8	You may be taking an aural or mental arithmetic test. In unit 15, you will find out how best to answer the questions. Some tests are provided for you to try. You will need someone to help read the questions to you. Take them seriously, it is important that you get the highest possible score on these tests.
STEP
4	Choose a selection of the Worked Examples to do – make full use of the problem solving material. Cover up the solution and check your answer against the correct one.		
STEP
5	If you find gaps in your knowledge, look at the pages headed "Useful Facts".		
-

TIPS ON COURSEWORK

Coursework is a vital part of all GCSE Maths exams. The amount you have to do varies from exam group to exam group, and every school has its own way of organising the work. Here are some useful tips which you might find a help. Your work will be marked according to a fixed scheme, but the examiners are particularly on the look out for

T I P **Your overall strategy:**

1

- Make sure that you have a good explanation of your aims at the beginning of a piece of work.
- Try and describe why you have used a particular method, and make the methods you use as clear as possible.

T I P **Your presentation:**

4

- Although marks may not be given for neatness, you must use good diagrams if you need them.
- If your handwriting is not very good, why not use a typewriter or word processor, the results should be much easier to read.

T I P **The mathematical content:**

2

- You must use a variety of methods in any submission, and they must be appropriate to the level of entry.

T I P **Your summary:**

5

You must try and tie up all loose ends at the end of your work: this is what a summary is. Give some general formulae if you find them. If you can't find a general formula, then state your conclusions clearly – this is what the examiner wants to see.

T I P **Your accuracy:**

3

- This really speaks for itself.
 - Check your working thoroughly.
-

WHAT

THE EXAM

BOARDS WANT...

GRADE	G	F	E
AT2 NUMBER Units 1, 2, 3, 4	a) solve problems without the aid of a calculator considering the reasonableness of the answer b) demonstrate an understanding of the relationship between place values in whole numbers c) use fractions, decimals or percentages as appropriate to describe situations d) solve number problems with the aid of a calculator interpreting the display e) make sensible estimates of a range of measures in relation to everyday objects	a) use an appropriate non-calculator method to multiply or divide two numbers b) find fractions or percentages of quantities c) refine estimations by 'trial and improvement' methods d) use units in context	a) calculate with fractions, decimals, percentages or ratio as appropriate b) use estimation to check calculations
AT3 ALGEBRA Units 5, 9, 11, 12	a) make general statements about patterns b) use simple formulae expressed in words c) use coordinates in the first quadrant	a) follow instructions to generate sequences b) express a simple function symbolically	a) explore number patterns using computer facilities or otherwise b) solve simple equations c) use and plot Cartesian coordinates to represent mappings
AT4 SHAPE AND SPACE Units 6, 7, 8, 9, 12, 13, 14	a) construct 2-D or 3-D shapes and know associated language b) specify location c) recognise rotational symmetry d) find perimeters, areas or volumes	a) use accurate measurement and drawing in constructing 3-D models b) use properties of shape to justify explanations c) use networks to solve problems d) use accurate measurement and drawing in constructing 3-D models d) find areas of plain shapes or volumes of simple solids	a) use 2-D representation of 3-D objects c) understand and use bearings to define direction b) transform shapes using a computer, or otherwise d) demonstrate that they know and can use the formulae for finding the area and circumference of circles
AT5 HANDLING DATA Units 4, 10, 12	a) interrogate and interpret data in a computer database b) conduct a survey on an issue of their choice c) use the mean and range of a set of data d) estimate and justify the probability of an event	a) use a computer database to draw conclusions b) design and use an observation sheet to collect data c) interpret statistical diagrams d) use an appropriate method for estimating probabilities	a) design and use a questionnaire to survey opinion b) understand and use the basic ideas of correlation c) identify all the outcomes of combining two independent events d) know that the total probability of all the mutually exclusive outcomes of an event is 1

All GCSE syllabuses must use the National Curriculum for the content. The grid below indicates what is required for each grade. You should work through the questions in the book up to the level you are aiming at. Twenty per cent of your marks are obtained from coursework (AT1).

You should always have access to a copy of the syllabus for your exam. Ask your teacher, or write to the exam board.

C/D	B	A	A*
a) multiply and divide mentally single-digit multiples of any power of 10 b) use a calculator efficiently when solving problems	a) calculate with numbers expressed in standard form b) evaluate formulae including the use of fractions or negative numbers c) solve numerical problems checking that the results are of the right order of magnitude	a) distinguish between rational and irrational numbers b) understand the significance of approximations	a) determine the possible effects of errors on calculations
c) recognise that measurement is approximate and choose the degree of accuracy appropriate for a particular purpose			
			a) use a calculator or computer to investigate sequences
a) use symbolic notation to express the rules of sequences b) solve equations or simple inequalities	a) manipulate algebraic formulae, equations or expressions b) solve inequalities	a) express general laws in symbolic form	b) manipulate algebraic expressions where necessary when solving problems
	c) interpret graphs which represent particular relationships	b) solve equations using graphical methods c) use the gradients of graphs found by constructing tangents	c) find the approximate area between a curve and the horizontal axis between two limits, and interpret the result d) sketch and compare the graphs of functions
	a) use mathematical similarity to solve problems		a) solve problems in 2-D or 3-D
a) use co-ordinates (x, y, z) to locate position in 3-D b) determine the locus of an object which is moving subject to a rule		b) use vector methods to solve problems	
c) use Pythagoras' theorem d) carry out calculations in plane and solid shapes	b) use sine, cosine or tangent in right-angled triangles c) distinguish between formulae by considering dimensions	a) carry out more complex calculations in plane or solid shapes c) use sine, cosine or tangent with angles of any size	
a) organise and analyse data	a) design and use a questionnaire or experiment to test a hypothesis		
	b) construct and interpret a cumulative frequency curve	a) use diagrams, graphs or computer packages to analyse a set of complex data b) use sampling to investigate a 'population'	a) describe the dispersion of a set of data b) interpret diagrams such as those used in critical path analysis or linear programming
b) understand and use relative frequency as an estimate of probability c) given the probability of exclusive events calculate the probability of a combined event	c) calculate the probability of a combined event given the probabilities of independent events	c) use conditional probabilities	c) calculate the probability of any two events happening

CONTENTS

The relevant attainment targets (AT) are noted for each chapter.

1	Number (AT2)	8	9	Coordinates (AT3/4)	142
2	Calculation (AT2)	24	10	Statistics (AT5)	161
3	Units (AT2)	37	11	Algebra 2 (AT3)	186
4	Personal finance (AT2/5)	50	12	Graphs (AT3/4/5)	211
5	Algebra (AT3)	67	13	Shape and space (AT4)	232
6	Measure (AT4)	86	14	Transformations (AT4)	249
7	Angle (AT4)	106	15	Mental arithmetic and aural tests	264
8	Trigonometry (AT4)	128		PROGRESS TESTS	272
			Answers and hints	Progress tests	286
				Questions to try	291
				Mental arithmetic tests	298

WORK OUT MATHS GCSE

Geoff Buckwell

Illustrated by Colin Prior

Well done! You chose Work Out for its complete coverage

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