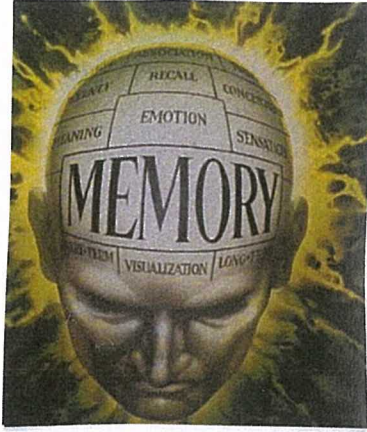


MATH & MEMORY



BARK'S DISCOVERY

METHOD

BOOK 1

FOR PRIMARY SCHOOLS

TEACHER

FREE RANGE LEARNING

THE **3RS** THE PROFESSIONAL WAY

**BARK'S DISCOVERY METHOD
FOR
PRIMARY MATHS**

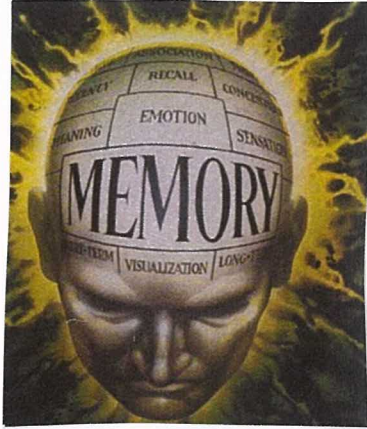
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ISBN 0949384 41 0

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**FREE RANGE LEARNING
THE **3RS** THE PROFESSIONAL WAY**

The **entire course** consists of only 60 pages!

Tasks and answers (4pages) ensure quick revision.

The **interval** between each lesson **depends entirely on ability.**

Only when students have been successful in completing the given tasks in a lesson, should they start the next one!

ISBN 0 949384 38 0 2017

BARK'S DISCOVERY METHOD

*I teach **Primary Maths***

*in **6 lessons,***

*thanks to **Number Patterns***

never noticed before

$$12=3 \times 4$$

$$56=7 \times 8$$

$$7 \times 3=21$$

$$8 \times 4=32$$

$$7 \times 6=42$$

$$8 \times 8=64$$

Private lessons in your home: \$40

P&C: The 3Rs Seminars in your school. \$200 on Monday nights.

Aart 0428 396 120

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THE PAST

Primary Maths mainly means Numeracy, the fundamental prerequisite for doing Secondary Maths.

Many people readily admit – often with a smile – that they were never good at it, obviously referring to their school days.

It's not finding the area of a triangle, calculating 5% of 200, 10×25.6 or finding x when $2x=12$; they are scared of numbers! They are instantly confused as soon as they see them; all rational thinking stops. Their reaction to numbers is like suffering from allergies. As far as Math is concerned, performance is obstructed by two **Conditioned Reflexes** (Pavlov). Many **students switch off** at the **sight** of numbers and at the **sound** of teachers. That's why the average mark of topic tests is only 45% for all levels.

School are like reject shops; they only measure failure. Numeracy and Spelling have never been taught; copying times tables and wordlists is a

useless **chore** because the brain cannot absorb pure data; it has to be seen through the spectacles of an idea (Edward de Bono). When interest is non-existent, there is no learning. Unfortunately, first people form a habit, but then the habit forms the people. Resistance to change is the result.

An inventive, inquisitive mind was needed to end the Scholastic Dreamtime.

THE FUTURE

Thanks to number patterns never discovered before and Bark's Discovery Method, Primary Maths can now be dealt with in 6 lessons instead of 6 years!

Education Ministers, major private schools and now Turnbull as well, have blatantly ignored my expertise because it is seen as an attack on cows that have earned the right to be sacred (Edward de Bono).

Chinese proverb: If someone says it can't be done, someone else has already done it.

Owing to the stranglehold of traditional teaching all students, regardless of age, must start at the beginning to foster looking and seeing because Numeracy is a visual subject; numbers are pictures.

The emphasis on understanding is causing the current casualties because it relies on unreliable intelligence instead of on reliable eyes. Besides, **up to the age of 10 or 11, a child's brain is only a quarter of an adult one!!**

(Um a História da Linguagem)

Bark's Discovery method fits in with the fact that **children are genetically wired to be curious.**

LEARNING BY EXAMPLE 2.

GIVEN

THE TASK

| | | | |
|-------------------------|-------------------------|------------|------------|
| 6x2 12 | 6x6 36 | 6x8 | 6x4 |
|-------------------------|-------------------------|------------|------------|

In this case, the **visual recipe** yields 4 answers; it beats rote learning because new knowledge is now acquired via an inner process, thus enhancing recall. Different examples and tasks follow in quick succession which suits the modern mind.

It is now possible to revise the entire Maths programme in a very short time because it only needs 6 pages at the end of the course to find **tasks** and **answers**. One of the very important techniques in Professional Memory Training is **Visualisation**. With eyes closed, students see an example in their mind's eye. Then they pull it apart and put it together again a couple of times.

Maths is no longer taught as an end in itself; it has become the **medium** to train the universal skills needed to perform an almost unlimited number of activities ranging from mowing lawns to landing on the moon.

Maths has now lost its traditional and arbitrary importance. **Paradoxically**, students will now no doubt be better at it.

The Win-Win Phenomenon

- Since Pythagoras, famous mathematicians like Euler, Fibonacci, Napier and Descartes discovered the **complexity** of numbers. After my death in a few years-definitely not before-I might be remembered as the one who discovered the **simplicity** of them.
- Together with my practical Discovery Method-not Piaget's philosophical one-this unique combination will **eliminate** Pavlov's conditioned reflexes that inhibit students to think clearly.
They now work at their own pace and ability (Free Range Learning). They are in a class but not of it; they each **contribute a positive energy!**
- They either leave a given task till another day for the already activated brain to find a solution or ask for assistance. Under no circumstances must assistants provide answers! They must only prompt; the students must do the thinking.

That requires a technique that can only be practised when teachers become learners themselves because you can only teach when the teacher is not. Likewise, you can only observe when the observer is not (Krishnamurty).

- Free Range Learning creates the opportunity to improve the intellectual education of children thus solving the world-wide problems caused by the traditional dogmatic, authoritarian ways of teaching culminating in writing lengthy reports and allocating fictitious marks.
- Work with children has already shown a sensational break through in learning because Maths has now become more accessible to the modern student addicted to commercial entertainment. Only electronic headgear could possibly produce similar results, but will turn children into robots, not students.

It's not the apes we come from, it's where we are going!

Beware!

Usually, adults decide what's good for children. As I said before many readily admit that they were not good at Maths so they baulk at having to discover answers themselves; they were so used to being told, that Pavlov's conditioned reflexes stops them from having a neutral judgement.

You can only judge when the Judge is not!

Resistance to change

- Animals readily accept food regardless of the provider.
- A new mobile phone or life-saving medication becomes an instant success regardless of the inventor or the producer.
- Maths teachers, however, won't be interested in having their hard earned professional status undermined by the inventive and inquisitive mind of an outsider who tries to demolish the unnecessary scaffolding of the

rigid classical structure of mathematics that, once upon a time, was only for the gifted.

- Politicians are powerless to stop modern commercial education, because they are manipulated marionettes in the global monetary circus. Those in Opposition use out-of-date bait to lure Constituents.

Fortunately-when united-parents have the numbers to protest and demand Free-Range Learning, including new discoveries and Professional Memory Training techniques that promote an alert mind. They have to protect their children from just becoming gullible consumers who can only read advertisements, cryptic text messages and newspapers. Metaphorically speaking, schools are like the parents of Hansel and Gretel. The poor kids can't see the wood for the trees. I use pebbles so that they won't get lost.

Uneducational Education

Schools are like Reject Shops.

There exists no other enterprise in the world where the quality of the product – the student – is measured in percentages ranging from 0-100. Survival of the fittest, the top 10. The recipients of scholastic Oscars are used to advertise the excellence of the school's performance.

The writing on the wall

1. "Those who can, do. Those who can't, teach."
(G.B. Shaw 1856-1950). Consequently, those who can should teach(Charles de Gaulle)!
2. **Assumptions underlying Australian Education. 1955**
(Prof. Freeman Butts): The chance for new ideas, different backgrounds and widening experiences are limited in a system that breeds its own teachers in its own schools and then gives them professional training in its own teachers' colleges. I found relatively little concern among teachers or inspectors to re-examine fundamentally their practices or assumptions. I did not find a widespread eagerness to think hard and long about the theory of education."
3. **The Bulletin (15 May, 1976).** Australia's Educational Scandal: "We're turning out millions of dunces."
4. The Bark Report – about 600 pages – 1998 Compulsory Incompetence in Maths & English and what we can do about it.

5. Endangered Minds (Jane M.Healy, PHD) why children don't think what we can do about it.
6. The ability to remember has decreased by 10% (National Geographic) I suspect through the constant use of Internet, reminders and a myriad of warning signals. Sadly enough, in school, remembering has always been in the form of one negative, authoritarian command: "Don't forget!"

7. For whom the bell tolls.

The Daily Telegraph, March 15, 2017

The headlines: "Real reason our students are falling behind. School under Brat attack. The Federal Minister demands zero tolerance on bad behaviour to solve classroom crisis." He wouldn't have a clue how to satisfy that demand. He doesn't even see that the "Brats" haven't learnt to write like those mentioned before. Their protest is in the form of disruption, noise, drugs, drink driving, vandalism and setting schools on fire! The inmates of the Correctional Centres want better service. They're sick of scoring 40%. Teachers don't want to admit that such a dismal mark reflects the quality of their own performance as well. The yearly reports are as complex as those written by criminal profilers for the F.B.I. Maths tests always start with something akin to Court orders stating demerit points and penalties. Carl Rogers is the only person bold enough to suggest what has to be done to salvage the Educational Titanic

because it is sinking rapidly!

He writes: "If we did away with the expert, the certified professor, the certified professional and the licensed psychologist, we might open our profession to a breeze of fresh air, to a surge of creativity such it has not known for years. It took me 60 years to understand why! When schooling became compulsory in order to prepare young people for the workforce, the worst thing the Government did was to employ academics who were only able to teach the traditional subjects. In doing so these subjects became ends in themselves: Maths 45%, English 60%, French 50%...

After 200 years, the situation hasn't changed because first people form a habit and then the habit forms the people, in this case the static, self-satisfied untouchables suffering from tunnel vision.

Measuring failure cannot possibly be called education; it's more like a smiling bullet! For 12 years students are classified according to what they can't do.

When hopefuls apply for a job, employers want to know what they can do!

To avoid breeding mostly Centrelink customers, it should finally be obvious that this inbred system is due for a major overhaul in order to cater for the practically unlimited number of activities ranging from mowing lawns to landing on the moon. The pathetic invention of work experience for year 10 students is meant to give

teachers a break from controlling rowdy classes.

Forget about ADHD! Children labelled with this acronym are those who play for hours with their mobile phone; they have an enormous attention span!

Eighty years ago, the word dyslexia was unheard of; everybody could read. Traditional subject orientated lessons are inadequate to reach modern children. The time that they should be seen and not heard is long gone.

They are not necessarily more or less intelligent, but they are certainly smarter, outspoken and demanding because of TV exposure. They have become victims of modern technology and global commercial indoctrination.

It has now reached the stage that far too many students automatically switch off as soon as teachers start explaining.(Pavlov's conditioned reflexes!)

Unfortunately, new ideas are lured into a cul-de sac and then quietly strangled.

Change is no more difficult than the decision to implement it.

There are two opposite ways to improving a process.

Vertical thinking is digging an existing hole deeper;

lateral thinking is trying elsewhere. (Edward De Bono)

The Educational Hierarchy decided to opt for the first one. That meant that existing subjects remained ends in themselves because the decision makers didn't want to

become obsolete. They created a goose that would lay golden eggs. After all, change had to be seen. Under the guise of it, a committee with typical bureaucratic credentials introduced a procedure called Taxonomy, thereby emphasising the importance of the few subjects once more. Teaching remained the same, only the philosophy changed. If Moses had been a committee, the Israelites would still be in Egypt!

A simple index for a Maths book for instance, became a complete manual consisting of writing objectives to clarify the goals of instruction and to examine the different types of learning that take place. However, when students switch off, learning is non-existent; the cure is worse than the disease. Writing the outcomes of the cure is an even more deceiving ploy to make parents believe that all is well.

Example: At the completion of this course, students will have approached (hence the 40%) everyday mathematical problems confidently! Yes, because the cash registers do the missing 60%! Telling and testing instead of teaching; statistics are more important than the stunned students. Although you can take a horse to the water, you can't make it drink.

Owing to yearly changes and arbitrary non-essential additions, the book-exchange system was abandoned. Maths books increased in size from 200 to 700 pages crammed with subliminal advertising. They are

seductively selling a way of life. The use of multicultural names is part of the betrayal.

Simple calculations have become short stories about Mohammed wanting to buy an electric guitar with an amplifier. Fatima needs to buy balloons and ice cream for her birthday party (Maths in Society).

Like commercial magazines, the lay-out of these atrocities is based on the Pareto Principle; only 20% is dedicated to the lesson in question.

The Manufactures of Need have welcomed the heavier books because it created the opportunity to produce bigger and more expensive bags despite the back ache problems worldwide. As matter of fact, we don't need books at all because all Primary-and Secondary School subjects-will fit on one USB, thus saving the world's forests from extinction.

In order to eliminate resistance to change (Maxwell's 12 reasons), the Board of Studies has to be dismantled. As the very name implies, the impractical members of this PHD club are utterly incapable of finding a successful way to create a smooth transition from schools to universities or to a secure and steady employment. At the moment, students have to be recycled to fit in.

The performance of these educational generals are like those involved in the Gallipoli disaster.

These generals with their colourful distinctions and purely academic credentials must be replaced by

practical people like creative men and women in charge of large institutions and corporations.

We can keep the rank and file, the soldiers so to speak. Like the students, they deal with failure; disheartening to say the least.

The New Millennium School

Interest promotes learning; that's why all students get their driver licence!

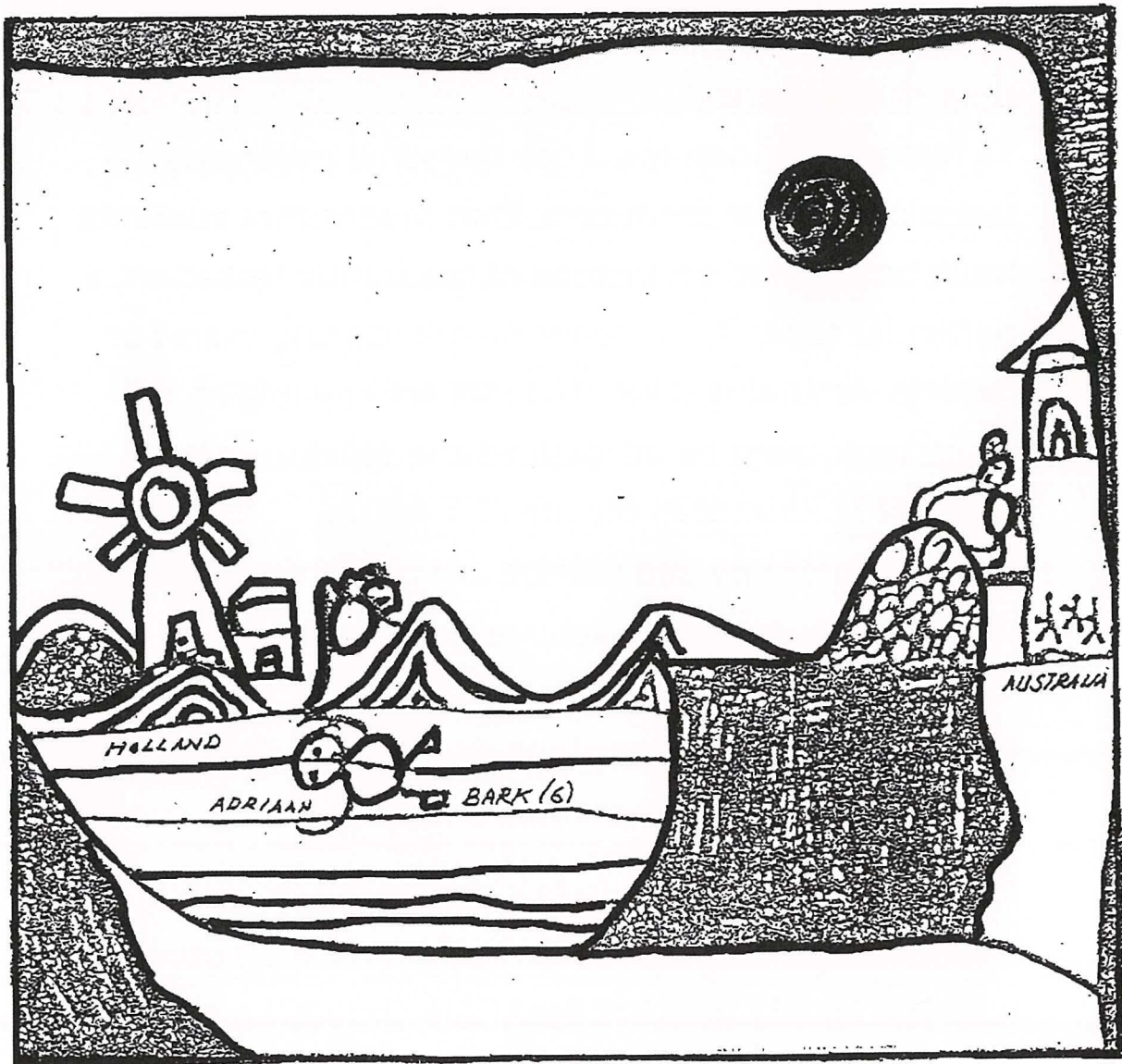
To foster it, schools must use the same psychological techniques as TV producers. That means that students must be exposed to, instead of constantly tested on, a particular topic. That means no homework, exams or reports. Assuming what students are capable of, and when topic must be introduced-the syllabus-is the greatest hindrance in the present set up.

Thought, memory and routine are the fundamental prerequisites to do any activity successfully.

When exact subjects become catalysts to develop them, they will lose their stereotype importance, thus making it more accessible to a resistant mind.

Something compulsory-in this case going to school-automatically leads to rules, regulations and authority with the rigidity of Ayers Rock! We already know from 200 years' experience that it is not possible to teach a class in which all students score 100% no matter how many levels and progressive stages within these levels are used. The retarded system will never ever yield the

stated outcomes. The only way to solve the problem of attending to each individual level of intelligence is to adopt "Free Range" learning, similar to the once popular SRA reading and comprehension system.



THE 3R's THE Professional Way

$$63 + 1 = 64$$

$$1 + 24 =$$

| | | | |
|---|--|---|--|
| 2 | | 6 | |
|---|--|---|--|

| | | | |
|---|--|---|--|
| 1 | | 5 | |
|---|--|---|--|

DISCOVER THE PATTERNS

1.

$$2 + 5 = 7$$

$$5 + 2 = 7$$

$$2 + 17 =$$

$$17 + 2 =$$

THE 9-PARTNERS

| | |
|------|------|
| 1, 8 | 2, 7 |
|------|------|

| | |
|------|------|
| 3, 6 | 5, 4 |
|------|------|

| | | | |
|------|------|------|------|
| 65+4 | 93+6 | 82+7 | 78+1 |
|------|------|------|------|

THE FIRST 9-RECIPE

$6 + 9$

5 TEEN

$8 + 9$

7 TEEN

$7 + 9$

$4 + 9$

THE SECOND 9-RECIPE

$$23 + 9$$

$$32$$

$$89 + 5$$

$$94$$

$$85 + 9$$

$$29 + 7$$

THE 10-PARTNERS

2, 8 | 3, 7

4, 6 | 5, 5

42+8 | 57+3 | 96+4 | 75+5

| | |
|--------------------|--------------------|
| $9 + 10$ 9 TEEN | $7 + 10$ 7 TEEN |
|--------------------|--------------------|

| | |
|----------|----------|
| $6 + 10$ | $4 + 10$ |
|----------|----------|

| | |
|-----------------|-----------------|
| $14 + 10$ 24 | $39 + 10$ 49 |
|-----------------|-----------------|

| | |
|-----------|-----------|
| $51 + 10$ | $84 + 10$ |
|-----------|-----------|

DOUBLES

3

6

4

8

5

10

6

12

7

14

8

2 eights
16 sixteen

← HALVES

| | |
|--------|----------------|
| HALF 9 | $4\frac{1}{2}$ |
|--------|----------------|

| | |
|---------|----------------|
| HALF 15 | $7\frac{1}{2}$ |
|---------|----------------|

| | |
|--------|--------|
| HALF 7 | HALF 3 |
|--------|--------|

| | |
|---------|---------|
| HALF 11 | HALF 17 |
|---------|---------|

STEPPING STONES

| | | | |
|---------|----------|----------|----------|
| IF | IF | IF | IF |
| $3+3=6$ | $5+5=10$ | $6+6=12$ | $7+7=14$ |
| $3+4=7$ | $5+6=11$ | $6+7=$ | $7+8=$ |

| | | | |
|--------|----------|----------|----------|
| FOUR | IF | IF | IF |
| SEVEN | $4+7=11$ | $4+7=11$ | $4+7=11$ |
| ELEVEN | $5+7=12$ | $4+8=$ | $3+8=$ |

— SAY ALOUD —

| | |
|----|----------|
| 8 | $3+5=8$ |
| 6 | $5+8=13$ |
| 14 | |

SEE & SAY

$15 + 7$

22

$63 + 8$

71

$26 + 8$

$45 + 6$

$57 + 8$

$76 + 7$

| | | | | | |
|------|------|------|------|-------|-------|
| 12+9 | 16+4 | 15+7 | 16+6 | 17+3 | 15+9 |
| 16+8 | 14+6 | 17+6 | 18+2 | 17+4 | 18+7 |
| 12+8 | 18+9 | 17+8 | 13+7 | 17+5 | 18+6 |
| 19+7 | 19+3 | 19+9 | 18+8 | 17+7 | 15+6 |
| 18+5 | 16+9 | 18+4 | 19+5 | 11+9 | 14+8 |
| 16+7 | 17+9 | 15+8 | 14+7 | 13+9 | 19+4 |
| 16+5 | 13+8 | 18+3 | 14+9 | 19+2 | 19+6 |
| 19+8 | 15+5 | 39+4 | 45+9 | 26+17 | 38+18 |
| 22+9 | 36+4 | 25+7 | 36+6 | 47+3 | 55+9 |
| 46+8 | 24+6 | 37+6 | 32+8 | 27+7 | 36+6 |

$$34 + 49$$

70

83

$$58 + 13$$

60

71

$11 + 19$

$64 + 16$

$55 + 37$

$66 + 19$

$12 + 28$

$74 + 17$

$15 + 18$

$17 + 27$

$22 + 19$

$14 + 18$

$25 + 29$

$27 + 38$

$33 + 27$

$24 + 19$

$36 + 16$

$37 + 49$

$43 + 28$

$35 + 25$

$46 + 17$

$48 + 19$

$53 + 39$

$45 + 36$

$56 + 18$

$59 + 29$

ALGORISMS

$$34 + 52$$

$$\begin{array}{r} 34 \\ + 52 \\ \hline 86 \end{array}$$

$$46 + 33$$

$$74 + 15$$

THE RELAY METHOD

WITH VERBAL REHEARSAL

SAY & DO

TYPE 1.

$$\begin{array}{r} 37 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \end{array}$$

EYES

SEE 7+8

SAY 15

PUT DOWN THE 5,

CARRY THE 1'n 3's 4

NUMBER FLUENCY

NOW

INVENT YOUR OWN

ALGORITHMS

ALGORITHMS

TYPE 2

STAGE 1

$$\begin{array}{r} 29 \\ + 37 \\ \hline 66 \end{array}$$

SEE $9+7$

SAY 16

PUT DOWN THE 6.

CARRY TH $1+2+3$ WRITE 6

STAGE 2

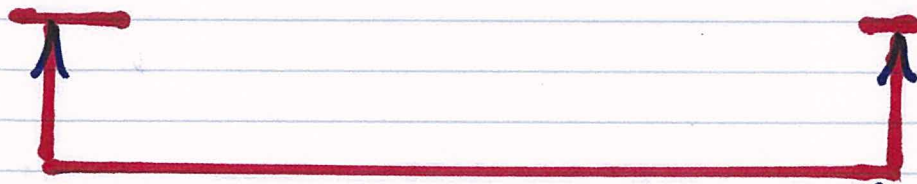
$$\begin{array}{r} 256 \\ + 789 \\ \hline 1045 \end{array}$$

SEE THE ANSWERS

WRITE
THE SUM

THE 9-REMAINDER

$$21 = (2 \times 9) + 3$$



$$2 + 1 = 3$$

∴

THEREFORE

$$11 - 9 = 2$$

$$12 - 9 = 3$$

$$13 - 9 = 4$$

REDUCING A NUMBER TO 1 ^{FINGER} DIGIT

31 BECOMES 4

46 BECOMES 1

18 BECOMES 0

SOLVE →

IGNORE 9

5 2 7 3 6 BECOMES 5

123

456

789

1874

CHECKING ANSWERS

| | | | | | | |
|-----|-----|------|---|-----|-----|------|
| 21 | 3 | 725 | 5 | 15 | | 373 |
| +37 | 1 | +367 | 7 | +26 | | +484 |
| 58 | 4 | 1092 | 3 | | | |
| 13 | ✓ | | ✓ | | | |
| SEE | SAY | | | | | |
| 3 | | 4 | | 10 | 83 | 74 |
| 5 | 8 | 6 | | 17 | 75 | 63 |
| 6 | 14 | 7 | | 23 | 66 | 57 |
| 7 | 21 | 8 | | 28 | 57 | 42 |
| 8 | 29 | 9 | | 31 | 38 | 31 |
| +9 | ↓ | +3 | ↓ | | +20 | +25 |
| 38 | | | | | 339 | |

EVENTUALLY SILENTLY
MENTALLY

NO CRUTCH FIGURES! PRACTISE YOUR BRAIN NOT YOUR PEN.
OTHER WISE THEY BOTH RUN OUT!

SUBTRACTION

$43 - 1 = 42$

$74 - 1$

$17 - 16 = 1$

$70 - 69$

$15 - 2 = 13$

$41 - 2$

$15 - 13 = 2$

$41 - 39$

$24 - 2 = 22$

$38 - 2$

$24 - 22 = 2$

$38 - 36$

THESE EXERCISES ARE **NOT** ABOUT **RULES**

INSTEAD: THEY ARE ABOUT SEEING!

THE 9-PARTNERS

$$9 - 2 = 7$$

$$9 - 1$$

$$9 - 3$$

$$9 - 5$$

$$9 - 7 = 2$$

$$9 - 8$$

$$9 - 6$$

$$9 - 4$$

$$69 - 4 = 65$$

$$79 - 6$$

$$89 - 5$$

$$19 - 3$$

$$12 - 9 = 3$$

$$14 - 9$$

$$17 - 9$$

$$13 - 9$$

$$12 - 3 = 9$$

$$14 - 5$$

$$17 - 8$$

$$13 - 4$$

$$72 - 9 = 63$$

$$84 - 9 = 75$$

$$53 - 9$$

$$66 - 9$$

$$39 - 4 = 35$$

$$29 - 3 = 26$$

$$49 - 2$$

$$79 - 5$$

$$62 - 31$$
$$= 31$$

$$24 - 12$$

$$36 - 18$$

$$48 - 24$$

In the example above, students **SEE**
that **31** is Half **62**!

It avoids the traditional influences
that **inhibit** learning.

$$\text{HALF } 52$$

DISCOVER
THE
ROUTINE

$$26$$

$$\text{HALF } 34$$

$$\text{HALF } 76$$

$$\text{HALF } 98$$

USING THE **10**-PARTNERS

STAGE 1 : 2 STEPS

$$14 - 8$$

$$2 + 4 = 6$$

$$12 - 7$$

$$13 - 5$$

$$11 - 6$$

$$15 - 7$$

$$42 = 7 = 40 - 5$$

$$53 - 6$$

| TYPE 1 | 2 | 3 | 4 | 5 |
|--------|------|------|------|------|
| 10-8 | 13-8 | 14-9 | 14-5 | 12-6 |
| 10-1 | 11-3 | 12-5 | 13-7 | 14-9 |
| 11-2 | 12-3 | 13-8 | 14-5 | 10-2 |
| 15-9 | 10-7 | 11-5 | 12-6 | 10-4 |
| 11-8 | 12-9 | 13-5 | 14-7 | 16-9 |
| 10-5 | 11-6 | 12-8 | 13-6 | 14-8 |
| 11-7 | 10-8 | 16-8 | 15-7 | 13-9 |
| 10-3 | 11-4 | 12-7 | 13-4 | 16-7 |
| 11-9 | 12-4 | 10-9 | 15-8 | 10-6 |
| 14-6 | 15-6 | 17-8 | 18-9 | 17-9 |

ALGORITHMS

$$\begin{array}{r} 72 \\ - 17 \\ \hline 55 \end{array}$$

$$\begin{array}{l} D \bullet 12 - 7 = 5 \\ 6 - 1 = 5 \end{array}$$

$$\begin{array}{r} 43 \\ - 8 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 52 \\ - 9 \end{array}$$

$$\begin{array}{r} 76 \\ - 8 \end{array}$$

$$\begin{array}{r} 64 \\ - 6 \end{array}$$

$$\begin{array}{r} 300 \\ - 176 \\ \hline 124 \end{array}$$

$$\begin{array}{r} 700 \\ - 246 \end{array}$$

$$\begin{array}{r} 803 \\ - 555 \\ \hline 248 \end{array}$$

$$\begin{array}{r} 506 \\ - 177 \end{array}$$

MULTIPLICATION

THE 9-RECIPE

"8 FOR THE PRICE OF 1"

9×2

$= 18$

9×3

$= 27$

9×4

$= 36$

9×5

$= 45$

9×6

9×7

9×8

9×9

5×2

10

5×6

30

5×4

5×8

6×2

12

6×6

36

6×8

6×4

$12 = 3 \times 4$

$= 7 \times 8$

$7 \times 3 = 21$

$8 \times 4 =$

$7 \times 6 = 42$

$8 \times 8 =$

8

x

2 3 4

THE MIND

IS A PATTERN MAKING

AND A PATTERN USING

SYSTEM

$15 = 3 \times 5$

$35 = 5 \times 7$

$25 = 5 \times 5$

^{14 NIGHTS}
 $2 \times 7 \text{ DAYS} = \text{FORTNIGHT}$

$4 \times 7 \text{ DAYS} = 28 \text{ DAYS}$

^{SHORTEST MONTH}
FEBRUARY

^{2ND MONTH 8 LETTERS}

$7 \times 7 \text{ DAYS} = \text{FORTNINE}$

•••
•••
•••
CHANNE 9

2 FOURS 8

4 FOURS 28 SSSS SIXTEEN

2 X 9

2 X 2

3 X 9

3 X 2

6 X 6

2 X 6

9 X 5

7 X 8

9 X 5

3 X 7

7 X 9

8 X 4

8 X 9

6 X 7

9 X 9

8 X 8

5 X 2

2 X 6

4 X 5

4 X 6

5 X 6

9 X 4

5 X 8

6 X 8

3 X 3

3 X 5

3 X 6

7 X 5

3 X 8

5 X 5

2 X 7

4 X 2

4 X 7

2 X 8

7 X 7

4 X 4

ALGORITHMS

$$\begin{array}{r}
 \overset{12}{3} \overset{20}{5} \\
 \times 4 \\
 \hline
 140
 \end{array}$$

$$\begin{array}{r}
 \overset{6}{2} \overset{12}{4} \\
 \times 3 \\
 \hline
 72
 \end{array}$$

$$\begin{array}{r}
 \overset{12}{4} \overset{21}{7} \\
 \times 3 \\
 \hline
 141
 \end{array}$$

YOU MUST

SEE

20 & 12

BEFORE YOU START

55

$\times 2$

85

$\times 6$

1 2 3 4 5 6 7 8 9

$\times 2$

2 4 6 9 1 3 5 7 8

1 2 3 4 5 6 7 8 9

$\times 3$

13579

x 46 = 6+40

81474
+ 543160

624634

235

x 123 = 3+20+100

705
4700
+ 23500
28905

1234

x 56

7404
+ 61700

69104 (ii)

1

x 2

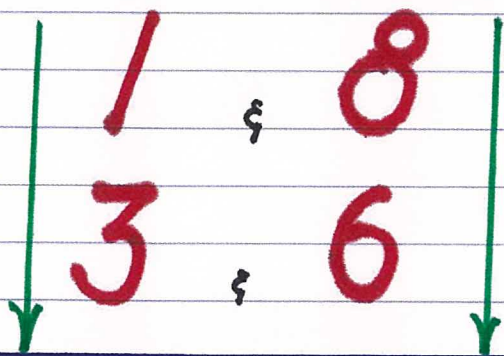
2 ✓

567

x 32

DIVISION CLUES

THE 9-PARTNERS



A VISUAL

1. 36 MULTIPLICATIONS

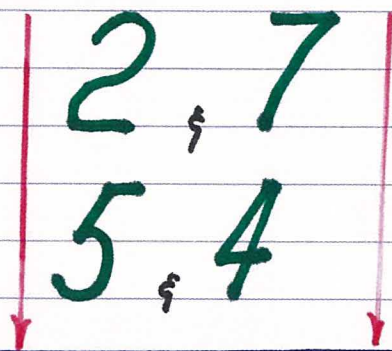
18 RECIPES

2. HALF 36 IS 18

3. $3 \times 6 = 18$

$$18 \div 6 = 3$$

$$18 \div 3 = 6$$



A VISUAL

1. $2 + 7 = 5 + 4 = 9$

2. HALF $54 = 27$

DIVISION

IS

MULTIPLICATION

IN REVERSE

BREAK THROUGH IN LEARNING NUMERACY

FROM THE KNOWN TO THE UNKNOWN

TIMES

$$9 \times 6 = 54$$

← DIVISION

VISUALISE

— SEEING IN YOUR MIND'S EYE —

$$54 \div 6 = 9$$

$$54 \div 9 = 6$$

$$9 \times 2 = 18$$

$$9 \times 3 = 27$$

$$9 \times 4 = 36$$

$$9 \times 5 = 45$$

$$9 \times 6 = 54$$

$$9 \times 7 = 63$$

$$9 \times 8 = 72$$

$$9 \times 9 = 81$$

— VISUALISE —

$$6 \times 2 = 12$$

$$6 \times 4 = 24$$

$$6 \times 6 = 36$$

$$6 \times 8 = 48$$

$$5 \times 2 = 10$$

$$5 \times 4 = 20$$

$$5 \times 6 = 30$$

$$5 \times 8 = 40$$

$$\overleftarrow{12} = 3 \times 4^x$$

$\overrightarrow{12} \div$

$$\overleftarrow{56} = 7 \times 8^x$$

$\overrightarrow{56} \div$

$$7 \times 3 = 21$$

$$7 \times 6 = 42$$

$$8 \times 4 = 32$$

$$8 \times 8 = 64$$

$$3 \times 5 = 15$$

8

$$5 \times 5 = 25$$

2 3 4

$$7 \times 5 = 35$$

$$2 \times 7 = 14$$

WEEK WEEK

$$7 \times 7 = 49$$

$$4 \times 7 = 28$$

A FORTNINE

LONG DIVISION

AN OLD-FASHIONED EXERCISE
TO CONSOLIDATE NUMBER DEXTERITY

$$123 \div 2 = 61 \frac{1}{2}$$

$$\begin{array}{r} -12 \\ 3 \\ -2 \\ \hline 1 \end{array}$$

MENTALLY

$$2345 \div 2 = 1172 \frac{1}{2}$$

$$12345 \div 3 =$$

ALGEBRA WITH PRO NUMERALS

$$x + 10 = 15$$

$$x = 5$$

$$y - 2 = 14$$

$$y = 16$$

$$2x - 10 = 2$$

$$x = 6$$

$$4a = 12$$

$$a = 3$$

$$x \div 5 = 4$$

$$x = 20$$

$$\frac{a}{6} = 2$$

$$a = 12$$

$$x + 2 = 10$$

$$y + 3 = 12$$

$$x \div 6 = 5$$

$$3x + 3 = 18$$

$$4y - 5 = 15$$

$$2x \div 2 = 13$$

$$4x - 2 = 14$$

$$5y + 2 = 27$$

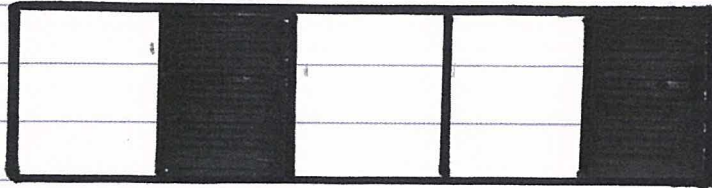
$$3x \div 6 = 2$$

$$\frac{x}{5} = 3$$

$$\frac{2x}{4} = 3$$

$$\frac{3a}{7} = 3$$

FRACTIONS



SHADED

2 OUT OF 5

WRITE

START → $\frac{2}{5}$ ↓

SAY

TWO FIFTHS

NOT SHADED

$$\frac{3}{5}$$

$$\frac{5}{5} - \frac{2}{5} = \frac{3}{5}$$

5 FIFTHS - 2 FIFTHS = 3 FIFTHS

$\frac{4}{7}$ NUMERATOR
DENOMINATOR
NAME

SPECIAL NAMES

$\frac{1}{2}$ HALF

$\frac{1}{3}$ A THIRD

$\frac{1}{4}$ A QUARTER

$$1 - \frac{3}{7} = \frac{4}{7}$$

$$1 - \frac{5}{8} =$$

$$3 - \frac{4}{5} = 2 \frac{1}{5}$$

$$3 - \frac{2}{9} =$$

$$5 - 2 \frac{1}{7} = 2 \frac{6}{7}$$

$$4 - 1 \frac{2}{11} =$$

PROPER FRACTION

$$\frac{5}{9}$$

IMPROPER

$$\frac{9}{5}$$

MIXED

$$\frac{11}{5} = 2\frac{1}{5}$$

NUMERAL

$$\frac{13}{7} =$$

THE REVERSE

$$2\frac{4}{9} = \frac{22}{9}$$

$$5\frac{3}{4} =$$

$$2 + 5\frac{5}{6} = 7\frac{5}{6}$$

$$3 + 3\frac{1}{4}$$

THE 4 BARK RECIPES

$$\frac{4}{7} + \frac{1}{3} = \frac{19}{21}$$

$$\frac{4}{7} - \frac{1}{3} = \frac{5}{21}$$

$$\frac{3}{7} + \frac{1}{2}$$

$$\frac{1}{2} - \frac{3}{7}$$

$$\frac{4}{7} \times \frac{1}{3} = \frac{4}{21}$$

$$\frac{3}{7} \times \frac{1}{2}$$

$$\frac{4}{7} \div \frac{1}{3} = 1 \frac{5}{7}$$

$$\frac{3}{7} \div \frac{1}{2} =$$

$$1\frac{3}{5} + 3\frac{1}{6}$$

$$4\frac{23}{30}$$

$$2\frac{3}{7} + 5\frac{1}{4}$$

$$1\frac{1}{5} - 1\frac{1}{6} =$$

$$\frac{6}{5} - \frac{7}{6} = \frac{1}{30}$$

$$1\frac{1}{6} - 1\frac{1}{7}$$

$$3\frac{2}{3} \times 2\frac{1}{5} = \frac{11}{3} \times \frac{11}{5} =$$

$$8\frac{1}{15}$$

$$1\frac{3}{7} \times 1\frac{4}{5}$$

$$3\frac{2}{3} \div \frac{1}{5} = \frac{11}{3} \div \frac{1}{5} =$$

$$\frac{55}{3} = 18\frac{1}{3}$$

$$2\frac{1}{4} \div \frac{1}{7}$$

$$\frac{1}{2} \text{ OF } \frac{3}{5} \text{ OF } 40 = \frac{3}{10} \times 40 = 12$$

$$\frac{1}{3} \text{ OF } \frac{4}{5} \text{ OF } 45$$

$$\frac{1}{3} \text{ OF } 15 = 5$$

$$\frac{1}{4} \text{ OF } 12$$

$$\frac{2}{3} \text{ OF } 15 = 10$$

$$\frac{3}{4} \text{ OF } 12$$

$$\frac{1}{4} \text{ OF } 60 = 15$$

$$\frac{1}{3} \text{ OF } 24$$

WHICH IS

$$\frac{1}{3} \text{ OF } 45$$

IS

$$\frac{1}{4} \text{ OF}$$

$\frac{1}{3}$ YEAR 10 PLAYS TENNIS

$\frac{1}{2}$ PLAYS SOCCER

NO SPORT 18

SPORT $\frac{1}{3} + \frac{1}{2} = \frac{5}{6} \therefore$

$\therefore \frac{1}{6} x = 18$

$\therefore x = 108$

| | | |
|---|----------------------------------|----------------------------------|
| $\frac{1}{2} x$ TENNIS | $\frac{2}{5} x$ SOCCER | NO SPORT 10 |
| $\frac{1}{8} + x = \frac{3}{4}$ | $\frac{1}{6} + x = \frac{5}{12}$ | $\frac{2}{7} + x = \frac{5}{14}$ |
| $x = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$ | $x =$ | $x =$ |

$$40 \div (1 - \frac{3}{7})$$

$$40 \times \frac{7}{4} = 70$$

$$30 \div (1 - \frac{1}{6})$$

$$18 \div (1 - \frac{1}{3})$$

$$\frac{2}{7}x = 12$$

$$2x = 84$$

$$x = 42$$

$$\frac{3}{5}x = 15$$

$$\frac{2}{9}x = 4$$

RECIPROCAL

OF

$$2\frac{1}{5} \text{ is } \frac{5}{11}$$

RECIPROCAL

OF

$$3\frac{1}{4} \text{ is}$$

RECIPROCAL

OF

$$2\frac{3}{5} \text{ is}$$

THE AVERAGE OF 5, 6, 7, 3 IS
 $(5 + 6 + 7 + 3) \div 4 = 5\frac{1}{4}$

THE AVERAGE OF 4, 8, 3, 5 IS

$$4 \times \frac{1}{7} = \frac{4}{7}$$

$$3 \times \frac{1}{8}$$

$$6 \times \frac{1}{3} = 2$$

$$5 \times \frac{4}{5}$$

$$2 \times \frac{3}{16} = \frac{3}{8}$$

$$3 \times \frac{2}{9}$$

How many HALVES IN 1 2

How many 2 THIRDS IN 4 6

How many THIRDS IN 1

How many 2 FIFTHS IN 4

How many THIRDS IN 2 6

$$\frac{3}{4} \text{ OF } 1\frac{7}{9} = \frac{3}{4} \times \frac{16}{9} = 1\frac{1}{3}$$

How many FIFTHS IN 4

$$\frac{2}{3} \text{ OF } 1\frac{1}{3}$$

$\frac{5}{8}$ OF 1 LITRE

$$\frac{5}{8} \times 1000 = 625 \text{ ml}$$

$\frac{3}{8}$ OF 1 km

$\frac{3}{5}$ OF 1 DOLLAR

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{5}{6} + \frac{1}{4} = 1\frac{1}{12}$$

$$\frac{1}{2} + \frac{2}{3} + \frac{3}{4}$$

$$\frac{4}{5} - \frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{2} + \left(\frac{1}{3} \times \frac{1}{4} \right) + \frac{1}{6} = \frac{1}{12} + \frac{2}{3} = \frac{3}{4}$$

$$\frac{1}{2} + \left(\frac{1}{5} \times \frac{1}{2} \right) + \frac{1}{3}$$

$$\frac{1}{2} + \left(\frac{1}{3} \div \frac{1}{4} \right) + \frac{1}{6}$$

PROTOTYPE
WHAT FRACTION IS THIS OF THAT

24 cm of 1 m

$$\frac{24}{100} = \frac{6}{25}$$

4 WEEKS OF YEAR

450 g of 1 Kg

FRACTION TO DECIMAL DECA=10 (DECADE)

SHORT HAND

$$5 + \frac{7}{10} + \frac{2}{100} = 5.72$$

↑
DECIMAL POINT

$$3 + \frac{5}{100} + \frac{3}{10000} = 3.0503$$

$$4 + \frac{3}{10} + \frac{7}{1000} + \frac{9}{10000}$$

RECURRING

$$\dot{.6} = .666\dots$$

$$\dot{.18} = .1888\dots$$

$$\ddot{.18} = .1818\dots$$

$$10 \times 2.34 = 23.4$$

$$10 \times 5.67 =$$

$$100 \times .123 = 12.3$$

$$100 \times 5.67 =$$

$$1000 \times 123 = 123000$$

$$1000 \times 5.67 =$$

$$234 \div 10 = 23.4$$

$$567 \div 10 =$$

$$234 \div 100 = 2.34$$

$$567 \div 100 =$$

$$340 \div 10000 = .034$$

$$560 \div 10000 =$$

ALGORITHMS

$$\begin{array}{r} 56.78 \\ + 12.11 \\ \hline 68.89 \end{array}$$

$$34.56 + 88.44$$

$$27.7 + 13.18$$

$$\begin{array}{r} 12.345 \\ \times .002 \\ \hline 24690 \\ \bullet 02469 \end{array}$$

$$3456 \times .003$$

$$1234.5678 \div .02$$

WRITE AS

$$123456.78 \div 2 =$$

$$61728.39$$

$$54.321 \div .003$$

FOLLOWING INSTRUCTIONS
ORDER OF OPERATION

1. BRACKETS FIRST [{ (
2. THEN \times & \div FROM L TO R
3. POSITIVES & NEGATIVES

$8 + 9 - 13 = 4$

$13 + 15 \div 3 = 18$

$20 - 3 \times 4 = 8$

$10 + 2 - 13$

$6 + 12 \div 4$

$24 - 2 \times 7$

$6 + 10 \times (4 - 2)$

$(81 \times 5) + (19 \times 5)$

$- 24 \div - 8$

26

500

3

$7 + 5 \times (6 - 2)$

$(75 \times 4) + (25 \times 4)$

$- 21 \div - 7$

CALCULATOR: IN THE ORDER GIVEN

$$-21 \div 7 = -3$$

$$21 \div 7 = 3$$

$$-4 \times 9 \div 6 = -6$$

$$-36 \div 9$$

$$36 \div 9$$

$$6 \times 8 \div -4$$

$$25 \times 4 = 100$$

$$-25 \times 4 = -100$$

$$-25 \times -4 = 100$$

$$20 \times 5$$

$$-20 \times 5$$

$$-20 \times -5$$

PER CENT
FRENCH
PER 100

SYMBOL
%

CONVERT TO DECIMAL

$$5\% = .05$$

$$12\% = .12$$

$$175\% = 1.75$$

$$6\%$$

$$13\%$$

$$234\%$$

6% of 200

12

12% of 7000

840

20% of 60

12

7% of 300

5% of 7000

40% of 70

IN GENERAL

CALCULATOR
OR
ALGORITHM

24% of 85

• 24 X 85

18% of 38

25% of 75

WHAT %

IS OF

THIS

THAT

34 of 1700

2%

54 of 80

$54 \div .8 = 6.75\%$

460g of 2Kg

$460 \div 20 = 46 \div 2$

23%

32 of 1600

36 of 70

240g of 2Kg

51.

IF 20% ^{OF A NUMBER} OF x IS 30, $x = 150$

IF 25% OF y IS 20, $y =$

IN GENERAL BY CALCULATOR

IF 14% OF $x = 98$

$$x = 98 \div 0.14 = 700$$

IF 22% OF $y = 44$, $y =$

21% ^{AUSTRALIAN} POPULATION IN SYDNEY

79% ELSEWHERE

CATFOOD: 20% FISH
75% CEREAL, OTHER $x\%$

$$7\frac{1}{2}\% \text{ OF } 1\text{M} = 7\frac{1}{2} \text{ CM}$$

13% OF \$1 =

DECREASE 400 BY 25%

INCREASE 560 BY 20%

$$560 + 112 = 672$$

COST \$60, SELL \$80

PROFIT: $33\frac{1}{3}\%$ OF COST

25% OF SALE

COST \$100

SELL FOR \$150

COST \$2680

PROFIT 22%

SELL FOR 122%

$$= 2680 \times 1.22$$

$$= \$3269.60$$

COST \$2400

PROFIT 30%

SELL FOR.....

COST \$400

DISCOUNT 15%

$$\text{PAY } 4 \times 85 = \$340$$

COST \$300

DISCOUNT

20%

\$2.10 FOR 3 Kg

$$2.10 \div 3 \times 5 = \$3.50$$

FOR 5 Kg

\$2.40 FOR 4 Kg

FOR 7 Kg

$$\frac{3}{4} = 3 \div 4 = .75$$

$$\frac{5}{6} = 5 \div .06 = 83\% \cdot .075 = 7.5\%$$

$$\frac{4}{5} =$$

$$\frac{4}{5} =$$

$$.063 =$$

$$2.013 = 2 \frac{13}{1000}$$

$$3\% = \frac{3}{100}$$

$$140\% = 1.4$$

$$5.017$$

$$7\%$$

$$125\%$$

$$3\frac{1}{2}\% = \frac{7}{200}$$

$$3\frac{1}{3}\% = \frac{10}{300} = \frac{1}{30}$$

$$2\frac{2}{3}\% = \frac{8}{300} = \frac{2}{75}$$

$$4\frac{1}{2}\%$$

$$4\frac{1}{3}\%$$

$$1\frac{1}{3}\%$$

RATE: A PLANT GROWS FROM 4 TO 11 cm IN / WEEK

DAILY GROWTH RATE: 1 cm

POPULATION FROM 10 700 TO 12 100 IN 5 YEARS

ANNUAL GROWTH RATE: x

INSURANCE PREMIUM \$3.50 PER \$100 P.A.

\$10 000 WORTH WILL COST \$ x P.A.

54.

BRICK LAYING:

180 IN 60 MINUTES

$$18 \div 6 \times 40 = 120 \text{ IN } 40$$

120 IN 1 HOUR

HOW MANY IN 10 MINUTES

$$\frac{3}{5} x = 9$$

$$3x = 45$$

$$x = 15$$

$$\frac{4}{7} y = 12$$

CALCULATOR

108 Km ON 9 L

360 ON x

SET IT UP AS:

$$\frac{108}{360} = \frac{9}{x} \quad \text{VISUALISE TO REMEMBER}$$

$$x = 30$$

EVENTUALLY

$$360 \times 9 \div 108$$

64 Km ON 8 L

72 ON x

BY CALCULATOR

AS A ROUTINE

$$72 \times 8 \div 64$$

OR HERE, MENTALLY

8 km ON 1 L

$$x = 72 \div 8 = 9$$

55.

$$3\% \text{ of } X = 12$$

As A ROUTINE ^{A VISUAL}

$$X = 12 \div 3$$

$$7\% \text{ of } X = 21$$

$$6\% \text{ of } Y = 24$$

THE POWER OF VISUALISATION!

THE EYES PREVENT MENTAL BLACKOUT ^{AGAIN}

COMPARE WITH

$$9 \times 6 = 54$$

$$54 \div 6 = 9$$

$$54 \div 9 = 6$$

$$\frac{2}{7}x = 6$$

$$x = 21$$

$$\frac{1}{3}x = 7$$

$$\frac{2}{9}x = 4$$

$$\frac{1}{3}x =$$

RATIO & PROPORTION

CONCRETE MIX

1:3:4

TO TO

CEMENT: SAND: AGGREGATE

FOR 1m^3 (CUBIC METRE)

$\frac{1}{8}\text{m}^3$ CEMENT

$\frac{3}{8}\text{m}^3$ SAND

$\frac{1}{2}\text{m}^3$ GRAVEL

DUTCH MEAL

3:1:2

POTATOES: ONIONS: CARROTS

3Kg

SIDES TRIANGLE

2:3:4

PERIMETER 8/cm

ANGLES TRIANGLE

2:3:4

ANGLE SUM 180°

57.

TREE: HEIGHT 6m
SHADOW 2m

BUILDING Hm
SHADOW 7m

$$\frac{6}{H} = \frac{2}{7} \quad H = 21m$$

VISUALLY

POLE HEIGHT 4m
SHADOW 1m

BUILDING Hm
SHADOW 3m

5, 8, x, 32

ARE IN PROPORTION

$$\therefore 8x = 160, x = 20$$

3, 7, x, 21

ARE IN PROPORTION

DIVIDE 56

RATIO 3:5
8 PARTS

$$x = 21, y = 35$$

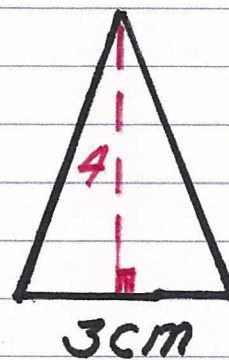
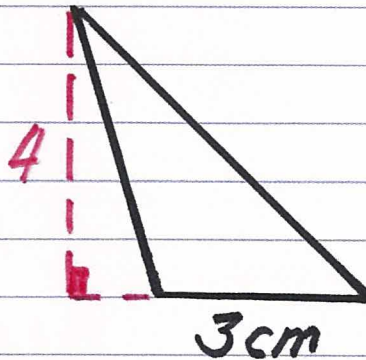
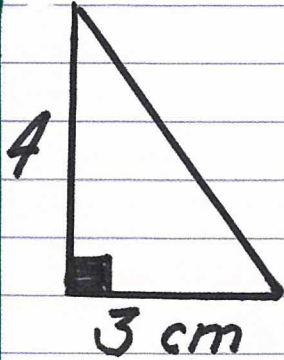
DIVIDE 81

RATIO 2:7

SCALE 1f/cm
REPRESENTS 1m.
SCALE IS 1:100

IF 1mm REPRESENTS
1m. SCALE IS

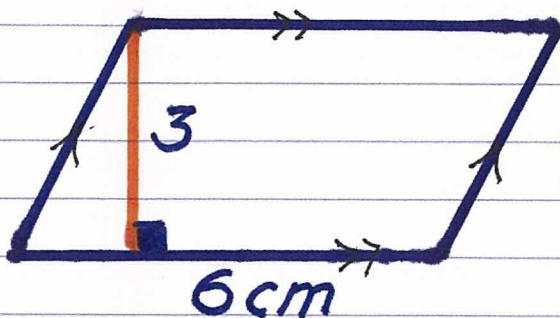
AREA



$$A = 6 \text{ cm}^2$$

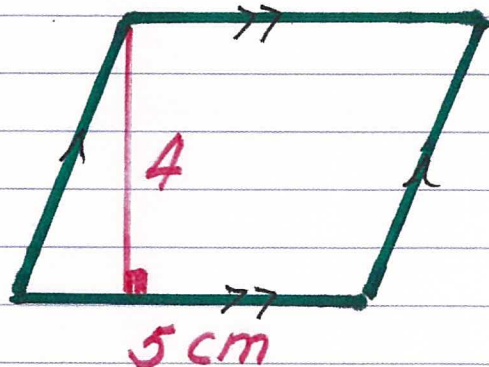
6 cm SQUARE

TRIANGLE: $B = 7 \text{ cm}$, $H = 5$

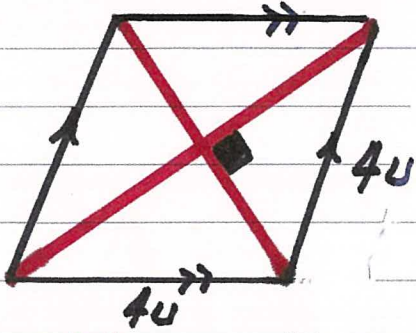


PARALLELOGRAM

$$A = 18 \text{ cm}^2$$



$$A =$$



RHOMBUS

DIAGONALS 5 & 6 u

ACROSS ANGLE 5

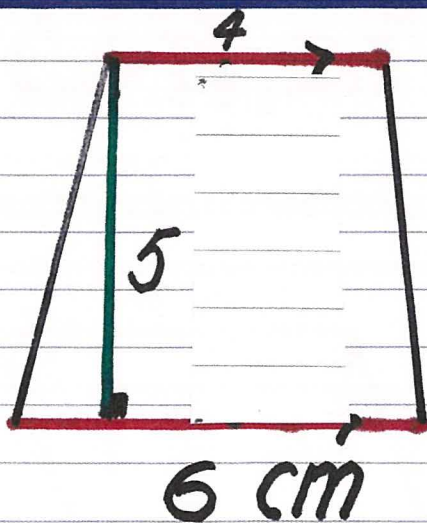
$$A = 15 u^2$$

UNITS SQUARE

RHOMBUS

DIAGONALS

4 & 8 u



TRAPEZIUM

PARALLEL

SIDES

$$A = 25 \text{ cm}^2$$

TRAPEZUM

6 & 8 cm

HEIGHT 4



RECTANGLE 4

6 cm

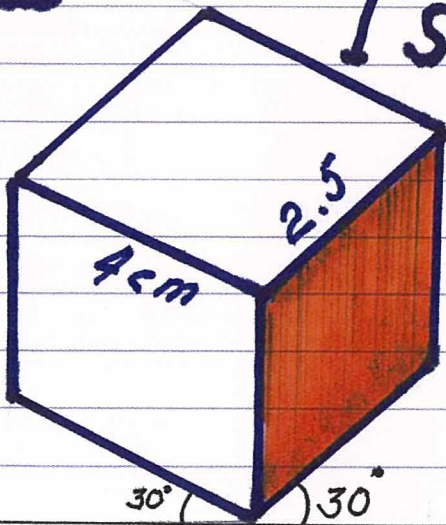
AREA = 24 cm²

RECTANGLE

7 BY 9

A =

3D



SAME (REAL) MEASUREMENTS
ISOMETRIC DRAWING

VOLUME 30 cm³ CUBE

SURFACE AREA

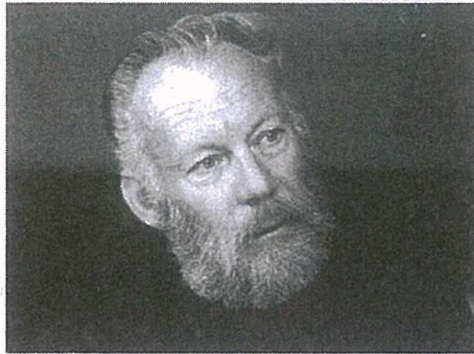
(2x10) + (2x12) + (2x7.5)

= 59 cm²

RECTANGULAR PRISM

PRISM 4x5x6 cm

V & SA



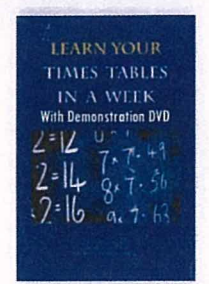
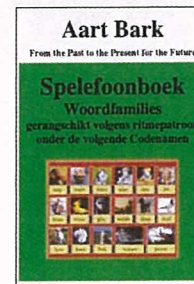
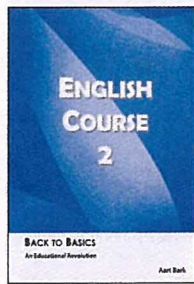
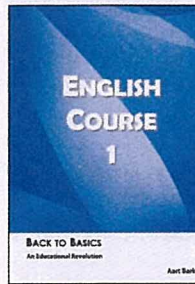
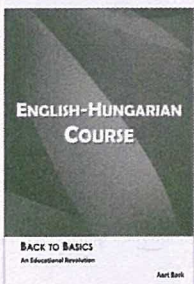
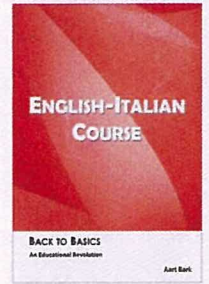
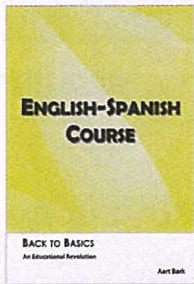
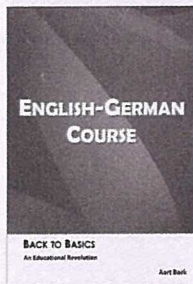
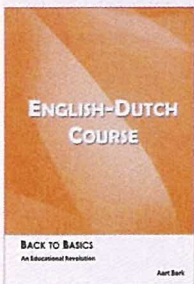
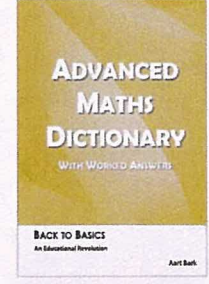
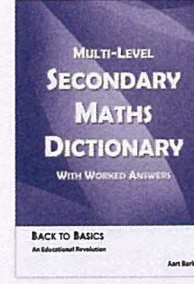
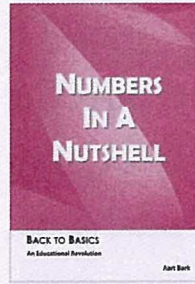
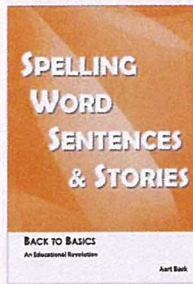
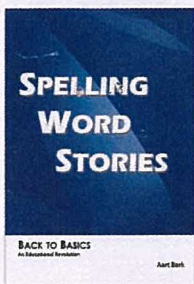
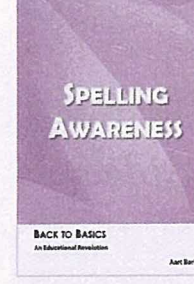
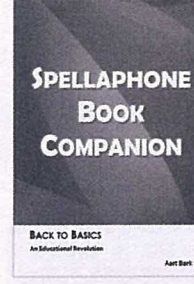
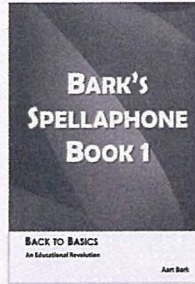
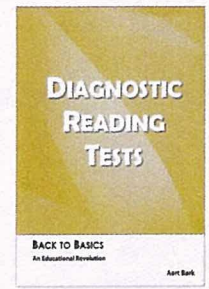
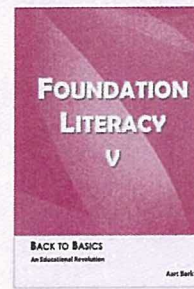
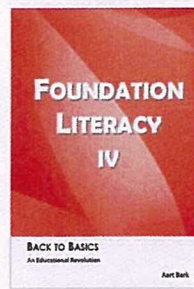
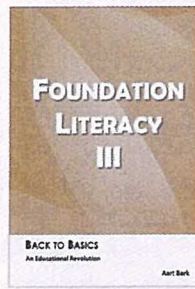
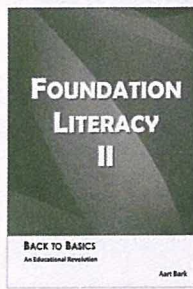
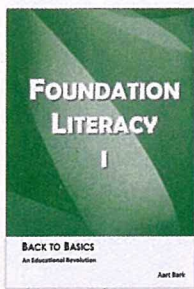
Author's Background

Born 20.12.1928

1. **H.S.C. (HOLLAND)** 1947
 4 Unit Maths, Mechanics, Technical Drawing
 Physics, Chemistry, Biology, Political Economy
 History, Geography, Dutch, English. French
 German, Art, P.E.
 2. Certificate of Ability, Nautical College Holland. 1949
 3. Diploma 3rd. Mate, Sea Going Trade Holland 1951
 4. Diploma 2nd. Mate, Sea Going Trade Holland 1954
 5. Spanish Commercial Correspondence Holland 1954
 6. French Commercial Correspondence Holland 1958
 7. English Commercial Correspondence Holland 1961
 8. Language Studies: Friesian, Italian, B.A. French
 9. High School Teacher: English & French Holland 2 yrs
 10. High School Teacher Australia 14 yrs
- De La Salle, Ashfield**
 Latin, French & English.
- St. Dominic's, Kingswood**
 Creative Writing, English, Subject Master Technical Drawing
- Patrician Brothers, Granville**
 Creative Writing, Mathematics, Subject Master Music
- Oakhill College, Castle Hill**
 Creative Writing, Mathematics, Subject Master Technical
 Drawing, French & Art
11. Insurance & Real Estate Agent (Finance)
 12. Owner Builder (Rammed Earth)
 13. Hawkesbury Adult Education Creative Writing, Spanish.
 14. Professional Musician Accordion, Flamenco Guitar.
 15. Author of Textbooks English & Mathematics
 16. Private Tutor since 1976: K-12
 17. Soccer Coach

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