TURN ON THE HUMAN CALCULATOR IN YOU!

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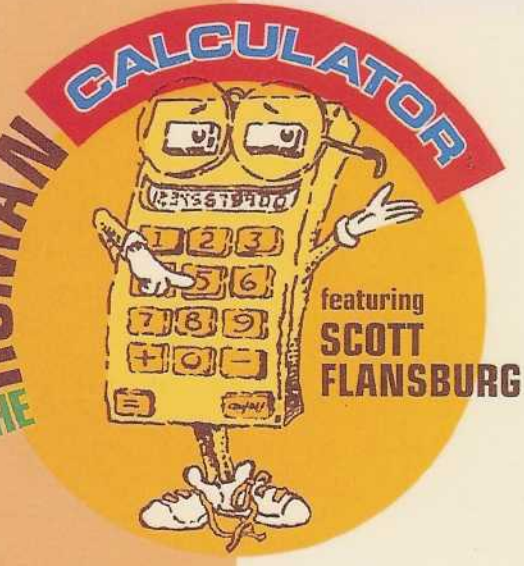

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By

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FOREWORD

Is math really that important in our day to day life? After all we do have calculators to do math for us, right?

Having calculators, small enough to carry in our shirt pocket, is not a good reason to discount the advantage of knowing how to do math in our head on a daily basis. We have become lazy in our daily routine as new inventions have been developed.

By using the strategies in this course you will begin to have an overwhelming feeling of how easy and fun math can be.

If you are a student, whether it be elementary, middle school, high school or college, you will be able to apply the strategies taught in this course to your life each and everyday. After a couple hours of practice with these strategies you will have a whole new way of looking at math and it will no doubt change the way you look at figures for the rest of your life. Your confidence to study and excell in all subjects after applying our strategies will be dramatically increased.

If you are a parent, you will see a more confident child which is something every concerned parent wishes for.

If you are not a parent read through this next example on your own, it will prove a strong point, that even the toughest of math problems can be made easy if it is approached differently.

Parents should consider this: Turn to the Squaring-Strategy #5 section of this workbook and read through it once, (that is all it takes). Call your child over, and ask him the answer to the following question:

What is the square of 45?
(or what is 45x45)

I know what you are saying. **"I don't know what the answer is"**.

Relax, once you have read and mastered the Squaring-Strategies, you will feel like a math genius. Now back to your child. When you ask him "to square 45" he will look at you either in confusion, embarrassment, or will more than likely shrug his shoulders and want to hide from you.

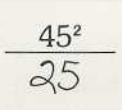
Remember, our system stimulates *creative thinking.* At this point your child might try every excuse in the book to avoid having to answer your question. **But be persistent.** Even very good math students have trouble squaring numbers with calculators. Imagine how confident they will be when they see they can square numbers in their head! Almost 99.9% of the time your child will have trouble with "squaring 45" regardless of age.

But ask him to work out the equation using our strategy. Work it out with him verbally at first. Here it is again:

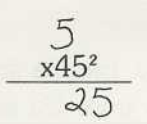
What is the square of 45?

After reading the strategy you will know that all squared numbers which end in '5' have an answer which will end in '25'.

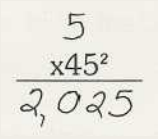
Explain this to your child and write the equation down on a piece of paper like this:



Now tell your child in order to get the first part of the answer he will need to add 1 to the first digit of the number to be squared, which is 4+1=5. Add this to the equation on the paper like this:



Now ask your child to multiply 4x5 to get 20. Add the answer to the number 25, which is the last part of the answer, making the total answer 2,025. He will now know that 45^2 is 2,025!



Without doubt at this point you and/or your child will be smiling. He will ask "how did you know how to figure this problem out?" Explain it to him. He will have the same thought running through his mind as most people do when they are taught this method, "I never would have thought I could do that. So what else can I do now that I thought I couldn't do before? "

Automatic confidence builder.

Next: *Practice, Practice, Practice.* Confidence and self esteem are the two best tools you or your child can have to live a more successful life.

I would like to touch on this last statement concerning confidence and self esteem. It is because of confidence in ourselves and the increased self esteem which comes with confidence that allows us to accomplish virtually anything we want.

Almost everyday, students and adults alike, are faced with making decisions which are directly related to our skill level (or confidence) in one way or another. We base our decisions on past experience, or on how successful *we feel we* would be making one decision or another.

Here is an example we can all relate to: Imagine watching a 1 year old baby. This child can do virtually nothing on it's own (other than what babies do best). The child needs it's mother or father to help it eat, dress and sleep. Virtually every decision is made for the child. However, there comes a day when the child is crawling across the floor and suddenly becomes aware of the couch. For one reason or another the child reaches up to the edge of the couch and pulls itself up, standing on its own. Granted the first time the child attempts to stand isn't pretty but the effect is the same, the child **is standing.** Mother or father happily see the child wobbling on its unsturdy legs and "out comes the camera" and cheers from the proud parents encouraging the child to stand.

Why is this important? It is positive reinforcement that all of us need, not only as children but as adults as well.

You will almost never hear a parent say. "Oh honey look at Joey, he's trying to stand. Joey you can't stand, stop trying. I don't think it's a good idea for you to stand now. Wait until you are 3 or 4 years old when your legs are much stronger. . ." and so on.

On the contrary! The parents are cheering the child on! "You can do it. You can stand! Go for it!"

The child's face beams with joy knowing it has accomplished something even as small as standing for the first time. The child will now see the world from a new perspective! The child has conquered a challenge all of us have faced at one time or another. But at the time it was a gigantic accomplishment.

As we grow older our parents are not as excited about seeing us walk. Can you imagine a mother talking to her husband about their 16 year old son, "Honey, look Joey is standing . . " Not so impressive, is it? But does Joey still need positive reinforcement of his accomplishments? **He sure does!**

You see, when we were young we were encouraged by our parents in almost all that we did, talking, walking, running, etc. We, as children knew little of failure. When we fell backwards onto the carpet, we simply tried to stand again and again, with encouragement from our parents. *We were* too young to know that we would have to walk someday, we just kept trying and the cheers from our parents supplied encouragement. Soon we would be running, talking and driving!

Sometime between learning to stand and learning to drive, something is lost in many of us. Learning new things is no longer worth getting "out the camera" for, although it should be. We should remember our past successes and look at our short comings as an opportunity to learn to improve on whatever it was that made us fail.

As a parent we should encourage our children to strive for the next rung on the ladder. We should tell our children they are doing well, and offer encouragement when they aren't doing so well. Our children's' confidence in themselves plays a great deal in determining whether they feel they will be a success or a failure.

If you, or your child is presented with a problem, whether it be a math problem or another problem of day to day life, and if you tell yourself you are not going to handle it well, what do you think the chances are for you to be successful? Not very good at all!

With confidence and high self-esteem, we are not afraid to fail because we know if we do fall short of success we will learn from that experience and will handle the situation differently in the future.

If we are successful we store that feeling of accomplishment in our subconscious and use that positive thought in the future.

Think for a moment of the look on a small child's face when they stand for the first time. Isn't it a look of enormous accomplishment? They know they have accomplished something great! They feel it and others around them are smiling, cheering, taking pictures and hugging them. Why does that feeling ever have to stop?

It doesn't, and it shouldn't!

Each time you accomplish something successfully, relish it. Think of what you did to make the situation a success and avoid failure. Write down the accomplishment and refer back to it when you are feeling down. If you are a parent, get involved with your child. On a daily basis you should ask them what they did that day. What was good about the day and what was bad.

You should compliment the good and work at improving the bad.

Try to say at least one positive thing to each of your children every day. For example, "I have been noticing how nice you have been looking lately," or "thank you for helping me this weekend in the yard" If you are a child say the same thing to your friends, classmates and parents. For example, "Mom, I really appreciate you helping me with my homework." or "Thank you for listening to me today"

Lack of communication plays a big part in losing self esteem for youngsters. If they are not told that they achieve something good, they will not feel good about themselves. As parents we should not assume that by not telling our children they have been bad that they should automatically feel good. Let them know they are special at least once a day.

I have provided you with some quotes I feel are very important in my own personal success and I would like to share them with you. I have these quotes in my office so I will see them each day. Try cutting them out and hang them in your office or in your room. Read them everyday and I guarantee you will feel better and be better!

— *Social success helps breed academic success. If we are to have the future of this country which we all want and deserve we have to begin planning and acting now. As parents and students we have to create an environment for desire to learn more and apply that added knowledge each day.*

WHETHER YOU THINK YOU CAN OR CANNOT BECOME SUCCESSFUL, YOU WILL BE RIGHT!

SETTING GOALS AND MAKING CERTAIN YOU REACH THEM WILL MAKE YOU RICH!

NO EXCUSES! YOU DETERMINE WHETHER OR NOT YOU WILL BE A SUCCESS TODAY!

IMAGINE YOURSELF ACHIEVING YOUR GOALS EACH DAY. THINK OF WHO WILL BENEFIT FROM THEM WHEN YOU ARE SUCCESSFUL!

IF A GOAL IS NOT IN WRITING AND IS NOT BELIEVED IN 100%, AND IF IT IS NOT READ EACH DAY, IT IS NOT A GOAL BUT RATHER A DREAM!

SUCCESS BEGINS WITH THE BELIEF THAT YOU CAN BE SUCCESSFUL ALL THE TIME!

BRING OUT THE HUMAN CALCULATOR IN YOU

INTRODUCTION

The primary goal for this program is to *motivate.* Students and adults alike who feel they are "poor at mathematics" often perform below their true ability level in other scholastic courses and in the work place, by avoiding math.

Our system will not make each person who studies it a genius, however, those who practice the strategies will look at math and all other courses of study in a more enjoyable and more confident light. You will be acquiring a more healthy self concept and attitude towards numbers and higher mathematics.

The "payment" for this system is your own time and practice of our strategies. The "pay back" will be the following:

- Experiencing a great deal of success with math and working with numbers.
- Seeing that your success is a reality due to your own efforts.
- Quick and accurate recall of basic facts.
- Application of a real understanding of place values.
- Ability to do mental calculations quickly.
- Skill in changing data into mentally manageable forms.
- Skill in applying the knowledge of order of operations and properties of numbers.
- ... and most importantly the confidence of seeing that you are a success in a field that was a wall of stalled success only a short time ago.

— *One topic that cannot be replace by a calculator is the development and understanding of what numbers are.*

"Can I really become a human calculator?"

We are asked this question constantly, the answer is 'yes'. In fact you have all the equipment you need to become a human calculator now, **you just don't know it!**

The equipment you need is your brain and desire. Your brain is probably the one organ of our body that is used the least in regards to its capabilities. You have surely heard the statement that the average person uses only 10% of their brains capability. It is true.

Then would it be true to assume that someone who is considered a genius, or has a 140 I.Q. or higher must use 50% of their brain? Not at all!! In fact some of the smartest people, or those with measured higher I.Q.'s, use only 1-2% more of their brains capable functions than does the average person.

Can you think how your life would change if you used **only** 10% of any other organ in your body? How about using only 10% of our eyes capabilities? We would surely be considered legally blind. How about using only 10% of our legs capabilities? This would require us to use a wheelchair or a cane. Having either of these things happen to us would be tragic and we would be considered disabled by many standards. So what are we to assume from only being able to use only 10% of our brains capable functions?

Simple. **Use it more.** We should always do more to use our brain. Reading is a good stimulation for the brain. Using the strategies in our system are very good stimulation not to mention the scholastic and employment benefits you will create for yourself.

The brain is a very interesting part of our bodies. It can store things like a computer. When we learn something our brain simply files the information away and waits for a signal to bring the information up. For example, when we learn a new telephone number we do not have to continually repeat the number over and over until we have to use it. We simply have to file the number in our memory under the category in which the telephone number falls.

Our brain, also allows us to imagine, so when applying the strategies of our system we will ask that you visualize the numbers as you add, subtract and multiply them in your head. It is nearly impossible not to visualize the numbers even if you try not to. However we will encourage you to make a clear picture of the problem and then work out the problem in your head.

As you get more and more comfortable with our strategies you will soon see how your brain will produce the answers almost as quickly as you can verbalize the problem. It takes practice, but it will happen.

After a bit of practice you will master all of the strategies in this system and you alone will become a far better student than simply using more study time doing the conventional way of math.

However, there are other strategies you should add to your arsenal of math weaponry. For example, you should have a good understanding of certain math symbols.

Here are some easy ones:

+ means to add
− means to subtract
× means to multiply
÷ means to divide
( ) means to multiply (5) (4) means 5x4
/ means to divide one figure by another. Example: 10/5=2

A vertical line like '|' means 'when' or 'if'. Example: a = 20 | b = 30, means 'a' equals 20 when 'b' equals 30.

There are three factors which will improve your math ability and further do away with 'mathfobia'.

- Strategies
- Practice
- Memory

The strategies taught in our system will create a good base of self confidence and a willingness to learn other mathematical systems like calculus and algebra. There is such a huge wall of 'phobia' associated with math problems at an early age and it grows up with us into adulthood. When we see a math problem we tend to pull out a calculator or avoid the problem all together. Once you have a good understanding of our strategies you will look at math differently. You will have a much higher confidence level that will help you achieve higher levels of math.

Practice is vital

You cannot expect to read these strategies and forget about them and then hope to simply pull them out of memory at will. **You must practice!** However practicing our strategies can be very entertaining and have a socially rewarding aspect to them as well. Once you learn our strategies, as thousands of students and adults have, you will be able to add, multiply and subtract columns of numbers in your head!

After practicing our cube root strategy have someone ask you to cube a number. They may say "O.K. smarty, what is 87 cubed?" You will look at them without batting an eye and answer 658,503! They will be amazed, and you will be right! **But practice you must.**

Memory helps!

Memory is so natural to humans but we make such a big deal of it. For example, when someone tells me they have a bad memory, I tell them, if that is the case try to forget something they already know! It can't be done. The memorization of our strategies is vital, but very easy. In fact, once our students look at the strategies they seem a bit let down that there is not a mammoth formulation required to master them. Fortunately, there isn't a massive formulation and this makes memorizing the strategies that much easier. Our brain is very capable of retaining every bit of information we ask it to. We can retain, recall and replay every bit of information we put into our brain. It is simply a matter of assessing what we are wanting to memorize with something we already have memorized.

> – *Creativity cannot be taught, however, critical thinking can be taught and must be taught.*

DISTRIBUTIVE PROPERTY OF NUMBERS
STRATEGY #1

This strategy makes all our other strategies much easier to understand and operate. **Distributive Property of Numbers** is simply the understanding of numbers. Let's go through some of the obvious relations of numbers.

3,267

This number has four digits. Knowing the value of the column which each number falls into is very important. Let's go through this explanation.

Referring to the above number, we know that the number 3, is in the thousands column, representing three thousand. The number 2, falls into the hundreds column, making it two hundred. The number 6, falls into the tens column making it sixty, and the last digit 7, falls into the ones column making it seven.

Knowing the value of each column in which the numbers fall is extremely important in all of our strategies.

We will assume you know this for now and move on.

Look at the following problem:

24 x 99 = ?

At first you may be thinking, "Give me a calculator". There is nothing wrong with thinking this, but the whole purpose of the program is to teach you strategies which will do away with having to use the calculator you 'buy' and using the calculator you were born with, your brain.

Look again at the problem above. It sounds tough but let's look at the problem another way. Isn't 99 real close to 100? What if we used this strategy, 99 is really 100 minus 1 isn't it? So now we have:

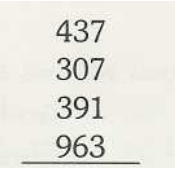
24x100 minus 24x1 = ?

Getting the answer to 24x100 simply takes adding two zeros to the first number to give us 2,400. Now 24x1 is easy, it's 24. So now we have 2,400-24. It still can be a bit difficult to work this strategy mentally, but let's try a little bit different approach.

Let's convert '2,400' to $24.00 and '24' to ,24 cent. Isn't this like having $24.00 minus almost ,25 cent? Sure it is. Any analogy you can use to make math easier should be used.

Now $24.00 minus ,25 cent would give us $23.75 but don't forget the penny you added to the ,24 cent to round it to a quarter, so subtract the penny back out. (,01 cent) and you get $23.76. Therefore, our answer is 2,376.

This may seem like a long way around to get an answer but by practicing this strategy you will be able to do this same type of problem in your head with four, three digit numbers like:



Now 100 is a great number to get familiar with. You can use it in mental manipulation a great deal. As long as you remember that half of 100 is 50 and half of 50 is 25, you can work many problems in your head very quickly.

– *According to the National Research Council, 1989: mathematics is the discipline for science and technology, far too many minority children leave school without acquiring the mathematical power necessary for productive lives; all children can learn mathematics; our children must learn a different kind of mathematics for the future from what was adequate in the past; confidence rather than calculation should be a chief objective of school mathematics and our nations economic future depends on the strength in mathematics education.*

Let's try another one. What if we had a problem like:

24x52

Make '24' your "base number" (the number you will use as a foundation to build your answer upon) and use '52' as your "manipulation number." 52 is very close to 50, which is half of 100, so if 24x100 is 2,400, what would 24x50, or half of 2,400 be? Right, 1,200. But remember, that is only 24x50, and we started with 24x52. Now we have to add 24x2 because 52 is really '50+2'. The easiest way to find the answer to 24x2 is to just double each number, the '2' is now a '4' and the '4' is now an '8', giving us an answer of '48'.

Now add '8' to 24x50 (or 1,200) and we get 1,28.

This seems a very difficult way to get your answer but when you are working with numbers like. . .

1,237
5,532
3,581
4,960

... and you want the answer in seconds, this strategy is very handy and it will make you feel like a genius, when in reality we are bringing out the **Human Calculator in you!**

— *It is proven that fewer than 40% of young adults can carry out a simple restaurant calculation such as a 15% tip, adding the cost of two items, etc. (Kirsch and Jungeblut, 1986)*

ADDITION
STRATEGY #2

Addition is the basic key to mathematics. With this strategy mastered you will see how easily the other strategies can be to learn. Below are some examples to show you a strategy that will work equations from left to right. Instead of starting with the ones column and carrying to the tens column and then to the hundreds, this strategy will teach you to start with the far left column and work to the right. By using this strategy, you will realize the place values of numbers better and have your answer quicker. This strategy may seem slow at first but remember, you have been taught a different way all these years and now you are learning a new and much faster way to do math and this is a great strategy to learn with.

Look at the following example:

$$\begin{array}{r} \underline{2}\mathbf{2}5 \\ \underline{1}\mathbf{2}4 \\ \underline{2}\mathbf{2}1 \\ +\,1\mathbf{1}5 \\ \hline \end{array}$$

The hundreds column is the underlined number, the bold numbers are the tens column and the right most numbers are the ones column. To begin, this strategy starts in the hundreds column by adding the 2 and the 1 (which is 200+100) which gives you 300. Now add the next number which is 2(200) to your base number of 300 (this is the number you are building on or adding to until we arrive at our answer) which gives you 500. Finally, add the last number of this column which is 1(100) to our base number to give us 600.

Now we are building on our base number of 600 so move on to the tens column starting with 2 (which represents 20) and add it to the base number of 600, giving you 620. Now add the next number which is 2, or 20 which gives you 640. And the next number 2, or 20 which gives you 660 and the next number which is 1, or 10 which gives us a new base number of 670.

Now go to the ones column and the first number is 5 which we know is 5, add the 5 to our base number of 670 which will give us 675, our new base number. The next number is 4 and added to our base number gives us 679, the next number is 1 which makes our base number 680, and finally we add the last number of the equation which is 5 to find our new base number and answer is 685!

You *need* to practice keeping the base number in your head at all times and simply add to it as you work your way through the equation. With this strategy you will only have to write down your answer when you are finished adding. Not only is this very impressive but you will soon discover getting the right answer is much faster!

This may seem a bit slow at first but the end result, after practicing this valuable strategy is a more confident math student. All the other math strategies will be much easier to work once you have this strategy mastered, so *practice!* It is fun and you will see results quickly.

After you have tried the three digit numbers, try doing some of the four digit numbers. Do not write out your work, but try to work the equations in your head and write only your answer. Once you have completed each equation, go back and check your answers by working them out. Try not to use a calculator.

ADDITION

225	345	516	125	348
124	116	237	234	223
221	214	132	121	117
+116	+123	+175	+216	+432

486	615	845	615	287
243	142	432	348	164
121	352	136	261	352
+214	+113	+215	+486	+173

258	376	789	368	472
192	268	456	412	256
468	515	123	618	382
+523	+372	+246	+231	+914

1,416	2,385	4,685	3,615
2,315	3,214	3,219	4,408
1,174	1,416	3,207	5,721
+3,113	+2,132	+1,148	+8,317

MULTIPLICATION
STRATEGY #3

This strategy is a fun one because people think multiplication is so difficult and when it is mastered you can amaze your friends, teachers, and coworkers. Multiplication is the most fascinating of all operations to explore with numbers because you can do so much more with this process mentally.

There are many strategies to use to break down a problem making it easier for you. Below are some of the easier strategies to try.

The first strategy begins from the right with the one's column and moves to the far left to the hundreds column (in this case) in a crisscross fashion. Do not let the explanation fool you, it is a much easier strategy than it may sound. Let's try one slowly. (Write the work down as we work through this equation).

Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
621	621	621	621	621
x584	x584	x584	x584	x584

The mental process goes as follows: Refer to Fig. 1 1x4 equals 4: we write the 4 as the right most digit in our answer. Next in Fig. 2 we cross multiply 2x4 and add it to 1x8, making it 8+8, or 16. We write the 6 as the next digit in our answer (writing from right to left) and carry the 1 to be used in Fig. 3.

In Fig. 3 we will multiply 6x4 and add it to 5x1 and then add 2x8, giving us 24+5+16, or a total of 45, plus the 1 we carried from Fig. 2 to give us a total of 46.

Write the 6 as the next digit in the answer and carry the 4 to Fig. 4. In Fig. 4- multiply 6x8 an add it to 5x2, giving us 48+10, or 58, and adding the 4 that we carried from Fig. 3 will give us 62. Write the 2 as the next digit in the answer and carry the 6 to Fig. 5.

In Fig. 5 multiply 6x5, giving us 30, and adding the 6 which we carried from Fig. 4, giving us a total of 36. Write 36 and there you will have the answer, 362,664.

Try these next problems on your own: (Write the work down as you work through this equation.)

Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
733	733	733	733	733
x367	x367	x367	x367	x367

The second multiplication strategy is much quicker in finding the answer with a little practice. Like the addition strategy, you start from the left side of the problem and work your way back to the right or ones column. Let's use the example below to illustrate how this strategy works.

Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
621	621	621	621	621
x584	x584	x584	x584	x584

Starting from the left, which is the hundreds column, multiply the 6x5, but realize that you are multiplying 600x500, or 6x5 and just add 4 zeros: which would give you 300,000. Remember to keep track in your head of the base number, which at this point is 300,000.

Now multiply the 600x80 which is 8,000 and add it to the base number (300,000) which will give you a new base number of 38,000. Now multiply 500x20, which is 10,000, add this to the base number, which will give you 358,000.

The next step is to multiply the 6x4, which is 600x4, giving us 2,400, add this to our base which is now 360,400. Next multiply the 5x1 (500x1) giving us 500 and add it to the base giving us 360,900. Now we multiply 2x4 (20x4) giving us 80 which we to add to our base giving us 360,980 and then multiply 8x1 (80x1) giving us 80 and add that to our base number which gives us 361,060.

Finally we multiply the 2x8 (20x80) giving us 1,600 and that brings our base number to 362,660. Then multiply 1x4 (which is 1x4) giving us 4 and add that to our base number to give us a new base number which is also our answer of 362,664. It sounds a little tough but once you practice this strategy you will see how quickly you can do it in your head.

Try these next examples on your own.

– Second only to English, Mathematics is the most dominant, most expensive and most influential subject taught in schools today. The teaching of math involves 25 million students including 10 million secondary students and 3 million college students. Math courses account for 20 percent of all school instruction and 10 percent of all course credits in higher education. Math also accounts for nearly two thirds of total precollege instructional effort devoted to science. Even higher education, math credits account for nearly one-third of the total devoted to science and engineering.

MULTIPLICATION

13 x24	16 x32	24 x42	63 x21	85 x27	62 x58
43 x21	38 x16	46 x52	87 x91	62 x93	84 x93
123 x321	246 x125	342 x152	618 x128	417 x252	
12 x14	24 x12	16 x13	18 x12	24 x16	32 x22
26 x16	42 x18	26 x19	37 x23	54 x27	28 x31
321 x123	456 x215	483 x316	267 x132	418 x269	

COMPLIMENTARY MULTIPLICATION
STRATEGY #4

To teach this strategy we will be working with the following equation:

$$\begin{array}{r} 96 \\ \times 94 \\ \hline \end{array}$$

To work this equation using this strategy, start with how far from 100 each number is. Now subtract the difference of one number from the original number. That gives you the first part of the answer. Then simply multiply the two differences and put it to the right of the answer.

For example:

$$\begin{array}{r} 96 \\ \times 94 \\ \hline \end{array}$$

SUBTRACT

$$\begin{array}{rr} 96 & 4 \\ \times 94 & 6 \\ \hline 90 & 24 \end{array}$$

The answer is 9,024

96 4 = the difference from 100
94 6 = the difference from 100
90 = subtracting 6 from 96 or 4 from 94

4x6 multiply the difference

If the difference product is over 99, add the hundreds unit to the right digit of the first part of the answer.

If the numbers are over 100, instead of subtracting the difference, just add the difference.

For example:

ADD

$$\begin{array}{rr} 103 & 3 \\ \times 107 & 7 \\ \hline 110 & 21 \end{array}$$

The answer is 11,021

COMPLIMENTARY MULTIPLICATION

96 x94	93 x91	92 x94	95 x91
88 x93	89 x88	85 x91	92 x86
103 x107	106 x104	108 x102	
112 x108	106 x107	110 x108	

SQUARING
STRATEGY #5

This is the easiest and quickest way to square a number under 100, and above 51. Using this strategy you simply figure how far from 100 the number you wish to square is. Subtract this difference from the number being squared, write this answer as the first digits in your answer. For example we will be squaring 96, so we need to determine, how far from 100 is 96? The answer is 4, so our strategy will look like this:

$$\begin{array}{r} 96^2 \\ -4 \\ \hline 92 \end{array}$$

Now to get the second part of the answer, simply square the difference that the original number was from 100 and put the answer to the right of your digits you already have written down and that is your answer.

4^2 (or 4x4=16)

The answer to 96^2 is:

9216

If the squared difference is larger than 99, as in the case of 88^2, simply add the hundreds unit to the second digit of the first half of the answer.

For example:

$$\begin{array}{r} 88^2 \\ -12 \\ \hline 76 \end{array}$$

$$\begin{array}{r} 76 \\ +144 \\ \hline 7744 \end{array}$$

Try these numbers using this new strategy.

SQUARING

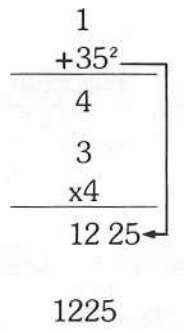
96^2	95^2	91^2	94^2	92^2
93^2	88^2	85^2	89^2	90^2
104^2	106^2	108^2	110^2	112^2
103^2	105^2	107^2	109^2	101^2

SQUARING NUMBERS THAT END IN FIVE

Whenever you have a number in which the last digit is five, we have a very easy technique for squaring it. First because the last digit in the number is a '5' the answer will automatically end in '25' because 5x5=25. In order to get the first part of the answer simply take the first digit and add '1' to it and multiply the two numbers together.

For example: squaring 35 could be worked out quickly using this strategy because 35 ends in a 5, so we know the answer will end in '25'. To arrive at the first part of the answer you would take 3 + 1 which is 4, multiply them together (3x4), giving you 12 for the answer.

Our strategy would look like this when written out:



So the answer to 35^2 is 1,225. Look at the following equations to see how they are worked out using this exciting strategy:

(8)	(4)	(6)	(3)
75^2	35^2	55^2	25^2
56 25	12 25	30 25	6 25

EXPLANATION OF CUBING
STRATEGY #6

This strategy is good to show off with because no one would believe you could figure these equations in your head! It is also one of the easiest strategies because it is based on the memorizing of only nine numbers. To be able to extract the cube of a cube root you have to know the following chart from memory.

$1_3 = \underline{1}$

$2_3 = \underline{8}$

$3_3 = 2\underline{7}$

$4_3 = 6\underline{4}$

$5_3 = 12\underline{5}$

$6_3 = 21\underline{6}$

$7_3 = 34\underline{3}$

$8_3 = 51\underline{2}$

$9_3 = 72\underline{9}$

Notice the last digit in each answer shown above is underlined, and notice that each answer ends in a different digit. What this means is that no answer when numbers 1-9 are cubed will end in the same digit. Now with this bit of information let's look at this example:

$$56_3 = 175{,}616$$

Split the answer in half, always at the comma, to get 175 | 616.

The last digit in the second part of the answer is a 6. Look at the chart on the top of the page, and tell me which number when cubed ends in a 6?

The answer is 6 because 6_3=216. Now you know the second half of the answer is '6'.

To figure the first part of the answer, just look at the whole number to the left of the comma. In this case it is 175. Now look at the answers to 1-9 cubed. Between what two numbers does the number 175 fit? Right, between 125 and 216. You always use the smaller of the two numbers which the whole number falls between, so in this case it would be 5.

Figure out these next cubed roots for yourself. Use the chart on the first three problems and try the remaining problems without the chart.

Memorizing this chart is easy and very useful.

CUBED ROOTS

704,969	778,688	85,184	5,832	287,496
753,571	46,656	9,261	24,389	97,336
10,648	421,875	405,224	79,507	262,144
91,125	357,911	1,331	551,368	681,472
59,319	185,193	148,077	970,299	314,432
226,981	117,649	21,952	35,937	531,441
24,389	912,673	681,472	636,056	4,913

CALENDAR
STRATEGY #7

This formulation is not only handy because you will use it virtually everyday but your friends and associates at work and school will be blown away when you ask them what is the year, month and date of their birth and within seconds you can tell them which day of the week it was on!!

They will have to check it out, but sure enough you will be right using this formula. Not only is this strategy great for figuring out the calendar but uses a very simple algebra strategy! Don't be afraid, it is very easy.

Here is the formula you will need.

$$\frac{\text{year} + \frac{\text{year}}{4} + \text{day} + \text{SV}}{7}$$

Let's go through each variable.

Year: This variable requires the numbered year, not the whole number which in this case is 63 not 1963.

Year | 4: This variable requires the year from above divided by 4, so in this example it would be 63 | 4. Remember to drop off the decimal, do not round up the number. The reason for this step is to calculate the number of leap years.

Day: This variable requires the actual day of the month that you are working with. In this case it would be 28, December 28th).

SV: This variable stands for "Significant Value" and will be used instead of the number of the month in question. Below are SV's for each month.

January-0	July-6
February-3	August-2
March-3	September-5
April-6	October-O
May-1	November-3
June-4	December-5

So in this example of December 28, 1963 the SV of December will be 5.

* **If the year is a leap year subtract 1 from the SV if the month is January or February**

Now let's substitute the variables for numbers to figure out this equation.

$$\frac{63}{\frac{63 + 4 + 28 + 5}{7}}$$

The 7 under a series of numbers means we will be dividing the top number by the bottom number. The reason we use 7 is that is the number of days in a week. So first we have to figure what 63 4 is. The answer is 15.3 but remember we drop the decimal so we have 15 leap years.

So we now have this equation to work with.

$$\frac{63 + 15 + 28 + 5}{7}$$

So what's 63 + 15 + 28 + 5? That's right 111. Now we have to divide by 7, but here's an easy way. Figure how many 7's will go into 111, then see how much of a remainder you have left. In this case there are 15-7's in 111, so you have 6 left. Now translate that to a day of the week like this.

0 - Sunday
1 - Monday
2 - Tuesday
3 - Wednesday
4 - Thursday
5 - Friday
6 - Saturday

You are right the answer is Saturday.

Try these dates below and see how well you can do.

January 19th, 1967
March 20th, 1956
April 17th, 1943

– The fastest growing segment of our population are those that are most likely to drop out of the math pipeline.

SUBTRACTION
STRATEGY #8

We approach math in a positive way, therefore we like to solve subtraction problems as *addition in reverse.* For example, when someone asks "what is 74 - 35?", the first thing to think of is "what number added to 35 equals 74?" This is a much easier and faster way to get the answer. By the way this is your first introduction to algebra `our way'!

So from now on when you see this:

$$\begin{array}{r} 76 \\ -53 \\ \hline \end{array}$$

Don't think of "76 minus 53." This is the process we have been taught since we were children and it is simply not the best or the fastest way to get the right answer.

The correct way to get a subtraction answer is to reverse the question. For example:

$$\begin{array}{r} 76 \\ -53 \\ \hline \end{array}$$

To figure out this equation you should ask yourself what number added to 53 equals 76? The answer is 23.

ALGEBRA
STRATEGY *#9*

Algebra is really very simple once you have a solid understanding of basic math skills, as they are essential in mastering algebra. Algebra is really basic math with complex mathematical terminology.

> — *As science and society have become more mathematical, demand for mathematics in colleges has doubled. But because the students who need further math development enter college weak in math, high demand has significantly diminished the quality of undergraduate math.*

Help your kids maximize their mathematical and general learning ability using these powerful techniques.

- Build a home library and give books as gifts.
- Subscribe to magazines that are of interest to your children.
- Hang a map of the world on the wall and have your children make a game of locating the countries on the map where news is being made each day.
- Have a set of encyclopedias or reference books always available for your children to use.
- Use mathematics to solve everyday problems. What percentage of your weekly money goes for gasoline. How much does your utility bill break down in daily usage?
- Have your children teach you what they learn each day at school.
- Look over your children's text books and be certain that you are aware of what they are learning.
- Have at least a half hour each evening where the whole family sits and discusses the things that went on that day.
- Ask your child what they would do in the same situation as those in the daily news. Build a high moral value with your children.
- Read a book they have read and then ask them questions about it.
- Substitute fruit for candy bars as treats.
- Place a calendar of chores and family events on the refrigerator for all to see.
- It is important that your children understand the mistakes they make on tests and papers, go over the corrected papers with them.
- Create a study space for your children. Make certain it is clear of games, television and telephones. Let this be their office to do homework in, but also make it a pleasant place to work in.
- Praise your children's efforts not just accomplishments.
- Stress positive values concerning caring, loving, ethics, morals, truth, etc.
- Show your child you are interested in their daily lives, ask questions about their friends and school activities.
- Involve your children in your work. Let them know what goes on at your job each week.
- Try and have your child come to work with you one day or even a portion of the day. Let them know what you do for a living each day.

– It is safe to say that unless we improve the attractiveness of math at all levels of schooling and for all groups, we will never be able to attract enough young people into the science and engineering careers to retain our competitive edge into the next century.

GAMES TO KEEP YOUR MATH SKILLS SHARP

Three Digit Reversal

Pick any three digit number (do not use the same number twice) then reverse that number, placing the larger of the two numbers on top. Then subtract and the answer will always have a 9 in the middle and the other two numbers will always add up to 9.

For example:

Your number is: 321
Reversed: −123
198

Notice that 9 is in the middle and the other two numbers (1 & 8) equal 9.

Try these numbers

741 −147 = 594

532 −235 =

861 −168 =

521 −125 =

Talking calculators?

We all know calculators can't talk but try these number tricks on your friends and they will be convinced that calculators talk to you!

1. Hand a friend a calculator. Tell the friend to think of a date like his or her birthday. Punch the 3 or 4 digit number into the calculator. For example February 14th would be punched in as 214. December 4 would be 1204.

2. Next, have your friend use the calculator to:
   - Multiply the number by 2.
   - Add 7.
   - Multiply that number by 50.
   - Add in his or her age.

3. Now the magic begins! Take the calculator back and subtract 350 from the number on the screen. The first three or four digits of the new number is the date your friend is thinking of. The last one or two digits are your friends age.

> – *One of the most important stages of any learning experience is for the trainee to constantly keep in mind what it is they are not only to learn but they must have perception of knowing what this skill will do for them.*

Pick A Number Any Number .. .

- Pick any 1 or 2 digit number. Just make sure it isn't `0'.
- Multiply it by 99.
- Add up the digits in your answer.
- You should get 18 as your answer each time!

Example: 89x99 = 8,811
8 + 8 + 1 + 1 = 18

Find The Secret Number

The number is less than 100.
The number is more than 8x7.
The number is *even.*
The number is less than 6x10.
What is the number?
What is not necessary?

Here's a hard one!!

The sum of the digits adds up to 6.
The number is less than 5x11.
The number does not have a 3 in it.
The number is even.
The number is not devisable by 4.
The number does not have a 4 in it.
The number is more than 3x12.
What is the number?
What is not necessary?

– *New, higher paying jobs of the future will be in the service sectors of the economy. The fastest growing job areas require highly skilled workers. The small number of qualified people who will be available for these jobs support the view that more women and minorities must be more fully educated if for no other reason than enlightened self interest.*

WHO IS SCOTT FLANSBURG?

Scott Flansburg - The Human Calculator, was born in a small town of Herkimer, New York on December 28, 1963.

It was in the public schools in New York where Scott discovered a new and exciting way to work out math problems. At first he was discouraged from using his new found methods, because they were not the 'right way' to do math. However, Scott persisted and excelled in math. Fellow students began learning from Scott. After he saw his fellow students scoring much higher on math tests by using his system, Scott knew he had developed something every student and adult alike could use.

After graduation from high school, Scott enlisted in the United States Air Force working for Special Investigations for three years in Yokota, Japan. Scott now speaks fluent Japanese.

After leaving the Air Force Scott decided to do what he does best, teaching others to overcome their fear of math, which he calls 'mathfobia'.

Scott has *been* featured on many national radio and television talk shows and a book on Scott's life is in the works.

– Industry is having to spend literally billions of dollars each year re-teaching our students due to lack of preparation by our schools. We are teaching reading, writing and math all over again to young adults who are entering the work force.

- The trainee must have a good working knowledge of the theory behind what is being taught because problem solving is not possible without some understanding and appreciation of the way elements of the task work hand in hand.

MOTIVATION THRU MATHEMATICS

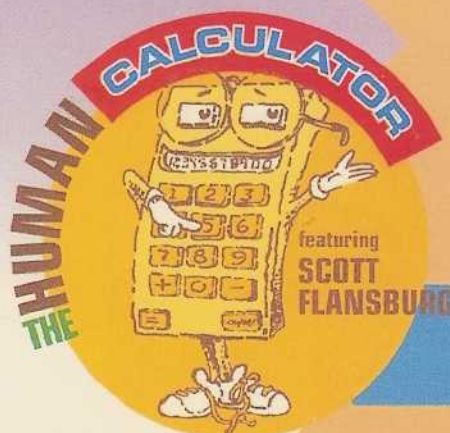
Media Arts International brings you Scott Flansburg... the "Human Calculator™." This exciting program is designed to reach students, parents, teachers and anyone experiencing math anxiety with the simple message... math can be fun! Scott offers unique and enlightening approaches to overcoming math anxiety, for a program that helps renew self-confidence... not only in math but in all areas of life!

"Scott offers young people an insight into mathematics and the powerful role that it plays in their life. Students become encouraged that mathematics is an area in which they can become successful."

Larry McBiles, Deputy Associate Superintendent
Arizona Department of Education

"Scott's compelling energy and love of mathematics are infectious. Through various activities, Scott instills a sense of mathematical empowerment that helps defuse math anxiety."

Mary Hatfield, Ph. D., Mathematics Educator, ASU
Director, National Council of Teachers of Mathematics



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