Vedic Maths Tutorial

Vedic Maths is based on sixteen sutras or principles. These principles are general in nature and can be applied in many ways. In practice many applications of the sutras may be learned and combined to solve actual problems. These tutorials will give examples of simple applications of the sutras, to give a feel for how the Vedic Maths system works. **These tutorials do not attempt to teach the systematic use of the sutras.** For more advanced applications and a more complete coverage of the basic uses of the sutras, we recommend you study one of the texts available.

N.B. The following tutorials are based on examples and exercises given in the book 'Fun with figures' by Kenneth Williams, which is a fun introduction some of the applications of the sutras for children.

If you are having problems using the tutorials then you could always read the instructions.

Tutorial 1

Use the formula ALL FROM 9 AND THE LAST FROM 10 to perform instant subtractions.

- For example **1000 - 357 = 643**

  We simply take each figure in 357 from 9 and the last figure from 10.

  1 0 0 0 - 3 5 7
  from 9 from 9 from 10
  = 6 4 3

  So the answer is **1000 - 357 = 643**

  And thats all there is to it!

  This always works for subtractions from numbers consisting of a 1 followed by noughts: 100; 1000; 10,000 etc.

- Similarly **10,000 - 1049 = 8951**

  1 0 , 0 0 0 - 1 0 4 9
  from 9 from 9 from 9 from 10
  = 8 9 5 1

- For 1000 - 83, in which we have more zeros than figures in the numbers being subtracted, we simply suppose 83 is 083.

  So **1000 - 83** becomes **1000 - 083 = 917**

Try some yourself:

1) 1000 - 777 = ☐

2) 1000 - 283 = ☐

3) 1000 - 505 = ☐

4) 10,000 - 2345 = ☐

5) 10000 - 9876 = ☐

6) 10,000 - 1101 = ☐

7) 100 - 57 = ☐

8) 1000 - 57 = ☐

9) 10,000 - 321 = ☐

10) 10,000 - 38 = ☐

Total Correct = ☐

Reset Test

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Tutorial 2

Using VERTICALLY AND CROSSWISE you do not need to the multiplication tables beyond 5 X 5.

- Suppose you need **8 x 7**

  8 is 2 below 10 and 7 is 3 below 10.
  Think of it like this:

  8 2

  7 3

  5 6 **answer**

  The answer is 56.
  The diagram below shows how you get it.

  8 2
  × 1
  7 3

  5 6 **answer**

  You subtract crosswise 8-3 or 7 - 2 to get 5,
  the first figure of the answer.
  And you multiply vertically: 2 x 3 to get 6,
  the last figure of the answer.

  That's all you do:

See how far the numbers are below 10, subtract one number's deficiency from the other number, and multiply the deficiencies together.

- **7 x 6 = 42**

  7 3
  × 1
  6 4
  3 12 **= 42**

  Here there is a carry: the 1 in the 12 goes over to make 3 into 4.

Multply These:

1) 8	**2)** 9	**3)** 8	**4)** 7	**5)** 9	**6)** 6
8 x	7 x	9 x	7 x	9 x	6 x

Total Correct = Reset Test

Here's how to use VERTICALLY AND CROSSWISE for multiplying numbers close to 100.

- Suppose you want to **multiply 88 by 98**.

  Not easy,you might think. But with VERTICALLY AND CROSSWISE you can give the answer immediately, using the same method as above.

  Both 88 and 98 are close to 100.
  88 is 12 below 100 and 98 is 2 below 100.

  You can imagine the sum set out like this:

  88 - 12
  × 1
  98 - 2
  86 24

  As before the **86** comes from subtracting crosswise: 88 - 2 = 86 (or 98 - 12 = 86: you can subtract either way, you will always get the same answer).
  And the **24** in the answer is just 12 x 2: you multiply vertically.
  So **88 x 98 = 8624**

This is so easy it is just mental arithmetic.

Try some:

1) 87	**2)** 88	**3)** 77	**4)** 93	**5)** 94	**6)** 64	**7)** 98
98 x	97 x	98 x	96 x	92 x	99	97 x

Total Correct = Reset Test

Multiplying numbers just over 100.

- **103 x 104 = 10712**

  The answer is in two parts: 107 and 12,
  107 is just 103 + 4 (or 104 + 3),
  and 12 is just 3 x 4.

- Similarly **107 x 106 = 11342**

  107 + 6 = 113 and 7 x 6 = 42

Again, just for mental arithmetic

Try a few:

1) 102 x 107 =

1) 106 x 103 =

1) 104 x 104 =

4) 109 x 108 =

5) 101 x123 =

6) 103 x102 =

Total Correct = Reset Test

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Tutorial 3

The easy way to add and subtract fractions.

Use VERTICALLY AND CROSSWISE to write the answer straight down!

- $\frac{2}{3} + \frac{1}{5} = \frac{10+3}{15} = \frac{13}{15}$

  Multiply crosswise and add to get the top of the answer:
  2 x 5 = 10 and 1 x 3 = 3. Then 10 + 3 = 13.
  The bottom of the fraction is just 3 x 5 = 15.

You multiply the bottom number together.

So:

- $\frac{5}{7} + \frac{3}{4} = \frac{20+21}{28} = \frac{41}{28}$

Subtracting is just as easy: multiply crosswise as before, but the subtract:

- $\frac{6}{7} - \frac{2}{3} = \frac{18-14}{21} = \frac{4}{21}$

Try a few:

1) $\frac{4}{5} + \frac{1}{6} =$ ☐/☐

2) $\frac{1}{3} + \frac{1}{4} =$ ☐/☐

3) $\frac{2}{7} + \frac{2}{3} =$ ☐/☐

4) $\frac{4}{5} - \frac{1}{6} =$ ☐/☐

5) $\frac{1}{4} - \frac{1}{5} =$ ☐/☐

6) $\frac{8}{3} - \frac{9}{5} =$ ☐/☐

Total Correct = ☐ Reset Test

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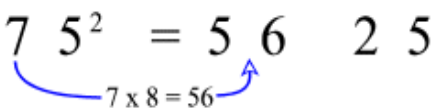
Tutorial 4

A quick way to square numbers that end in 5 using the formula BY ONE MORE THAN THE ONE BEFORE.

- **75^2 = 5625**

75^2 means 75 x 75.
The answer is in two parts: 56 and 25.
The last part is always **25**.
The first part is the first number, 7, multiplied by the number "one more", which is 8:
so 7 x 8 = **56**



- Similarly **85^2 = 7225** because 8 x 9 = 72.

Try these:

1) 45^2 = ☐

2) 65^2 = ☐

3) 95^2 = ☐

4) 35^2 = ☐

5) 15^2 = ☐

Total Correct = ☐ Reset Test

Method for multiplying numbers where the first figures are the same and the last figures add up to 10.

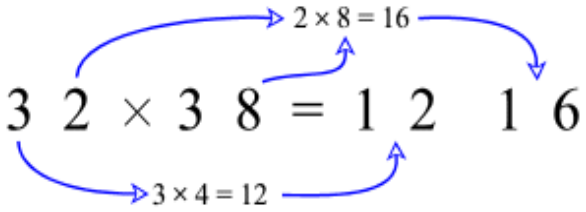
- **32 x 38 = 1216**

  Both numbers here start with 3 and the last figures (2 and 8) add up to 10.

  So we just multiply 3 by 4 (the next number up) to get **12** for the first part of the answer.

  And we multiply the last figures: 2 x 8 = **16** to get the last part of the answer.

  Diagrammatically:



- And **81 x 89 = 7209**

  We put 09 since we need two figures as in all the other examples.

Practise some:

1) 43 x 47 = ☐

2) 24 x 26 = ☐

3) 62 x 68 = ☐

4) 17 x 13 = ☐

5) 59 x 51 = ☐

6) 77 x 73 = ☐

Total Correct = ☐ Reset Test

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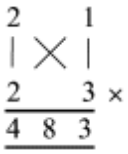
Tutorial 5

An elegant way of multiplying numbers using a simple pattern.

- **21 x 23 = 483**

  This is normally called long multiplication but actually the answer can be written straight down using the VERTICALLY AND CROSSWISE formula.

  We first put, or imagine, 23 below 21:

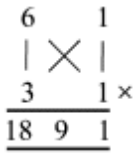


  There are 3 steps:

  a) Multiply **vertically on the left**: 2 x 2 = **4**.
  This gives the first figure of the answer.
  b) Multiply **crosswise and add**: 2 x 3 + 1 x 2 = **8**
  This gives the middle figure.
  c) Multiply **vertically on the right**: 1 x 3 = **3**
  This gives the last figure of the answer.

And thats all there is to it.

- Similarly **61 x 31 = 1891**



- 6 x 3 = **18**; 6 x 1 + 1 x 3 = **9**; 1 x 1 = **1**

Try these, just write down the answer:

1) 14 x 21 = ☐ **2)** 22 x 31 = ☐ **3)** 21 x 31 = ☐ **4)** 21 x 22 = ☐ **5)** 32 x 21 = ☐

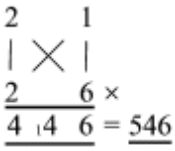
Total Correct = ☐ Reset Test

Multiply any 2-figure numbers together by mere mental arithmetic!

If you want 21 stamps at 26 pence each you can easily find the total price in your head.

There were no carries in the method given above. However, there only involve one small extra step.

- **21 x 26 = 546**



The method is the same as above except that we get a 2-figure number, 14, in the middle step, so the 1 is carried over to the left (4 becomes 5).

So 21 stamps cost £5.46.

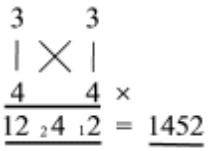
Practise a few:

1) 21 x 47 = ☐ **2)** 23 x 43 = ☐ **3)** 32 x 53 = ☐ **4)** 42 x 32 = ☐ **5)** 71 x 72 = ☐

Total Correct = ☐ Reset Test

- **33 x 44 = 1452**

There may be more than one carry in a sum:



Vertically on the left we get 12. Crosswise gives us 24, so we carry 2 to the left and mentally get 144.

Then vertically on the right we get 12 and the 1 here is carried over to the 144 to make 1452.

6) 32 x 56 = ☐ **7)** 32 x 54 = ☐ **8)** 31 x 72 = ☐ **9)** 44 x 53 = ☐ **10)** 54 x 64 = ☐

Total Correct = ☐ Reset Test

Any two numbers, no matter how big, can be multiplied in one line by this method.

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Tutorial 6

Multiplying a number by 11.

To multiply any 2-figure number by 11 we just put the total of the two figures between the 2 figures.

- **26 x 11 = 286**

Notice that the outer figures in 286 are the 26 being multiplied.

And the middle figure is just 2 and 6 added up.

- **So 72 x 11 = 792**

Multiply by 11:

1) 43 = ☐

2) 81 = ☐

3) 15 = ☐

4) 44 = ☐

5) 11 = ☐

Total Correct = ☐ Reset Test

- **77 x 11 = 847**

This involves a carry figure because 7 + 7 = 14 we get 77 x 11 = $7_{1}47$ = 847.

Multiply by 11:

1) 88 = ☐

2) 84 = ☐

3) 48 = ☐

4) 73 = ☐

5) 56 = ☐

Total Correct = ☐ Reset Test

- **234 x 11 = 2574**

  We put the 2 and the 4 at the ends.
  We add the first pair 2 + 3 = 5.
  and we add the last pair: 3 + 4 = 7.

Multiply by 11:

1) 151 = ☐

2) 527 = ☐

3) 333 = ☐

4) 714 = ☐

5) 909 = ☐

Total Correct = ☐ Reset Test

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Tutorial 7

Method for diving by 9.

- **23 / 9 = 2 remainder 5**

  The first figure of 23 is 2, and this is the answer.
  The remainder is just 2 and 3 added up!

- **43 / 9 = 4 remainder 7**

  The first figure 4 is the answer
  and 4 + 3 = 7 is the remainder - could it be easier?

Divide by 9:

1) 61 = ☐ remainder ☐

2) 33 = ☐ remainder ☐

3) 44 = ☐ remainder ☐

4) 53 = ☐ remainder ☐

5) 80 = ☐ remainder ☐

Total Correct = ☐ Reset Test

- **134 / 9 = 14 remainder 8**

  The answer consists of **1,4** and **8**.
  1 is just the first figure of 134.
  4 is the total of the first two figures 1+ 3 = 4,
  and **8** is the total of all three figures 1+ 3 + 4 = 8.

Divide by 9:

6) 232 = ☐ remainder ☐

7) 151 = ☐ remainder ☐

8) 303 = ☐ remainder ☐

9) 212 = ☐ remainder ☐

10) 2121 = ☐ remainder ☐

Total Correct = ☐ Reset Test

- **842 / 9 = $8_1$2 remainder 14 = 92 remainder 14**

  Actually a remainder of 9 or more is not usually permitted because we are trying to find how many 9's there are in 842.

  Since the remainder, 14 has one more 9 with 5 left over the final answer will be **93 remainder 5**

Divide these by 9:

1) 771 = ☐ remainder ☐

2) 942 = ☐ remainder ☐

3) 565 = ☐ remainder ☐

4) 555 = ☐ remainder ☐

5) 777 = ☐ remainder ☐

6) 2382 = [ ] remainder [ ]

7) 7070 = [ ] remainder [ ]

Total Correct = [ ] Reset Test

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Instructions

for using the tutorials

Each tutorial has test sections comprising of several questions each. Next to each question is a box (field) into which you can enter the answer to the question. Select the first question in each test with the mouse to start a test. Enter the answer for the question using the numeric keys on the keyboard. To move to the answer field of the next question in the test, press the **'TAB'** key. Moving to the next question, will cause the answer you entered to be checked, the following will be displayed depending on how you answered the question :-

 Correct

 Wrong

 Answer has more than one part (such as fractions and those answers with remainders). Answering remaining parts of the question, will determine whether you answered the question correctly or not.

Some browsers will update the answer on **'RETURN'** being pressed, others do not. Any problems stick to the 'TAB' key. Pressing **'SHIFT TAB'** will move the cursor back to the answer field for the previous question.

The Reset Test button will clear all answers from the test and set the count of correct answers back to zero.

N.B. JavaScript is used to obtain the interactive nature of these tutorials. If you cannot get this to work then try the text/picture based version of this tutorial.

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