Simple Calculator
Activities

These activities were developed with BRAC primary schools in mind but could be the basis for activities in any classroom where there is only one calculator. Each school will have one simple strong solar powered calculator and a set of activity sheets either in booklet form or printed on separate sheets.

About the Materials

The calculator activities are designed to:

- Help children learn on their own how to use the calculator starting with the four basic operations
- Encourage problem solving skills
- Encourage children to talk about how to do mathematical problems in groups
- Help them use the calculator to check answers
- Help them use the calculator to improve their mental mathematics and skills of estimation, prediction and approximation
- Learn more about number patterns
- Learn more about large numbers by using the calculator
- Learn more about decimals by using the calculator
- Learn about the connection between decimals and fractions using the calculator
- Introduce decimal notation and negative numbers for handling large numbers which often fascinate children
- Practice reading
- Allow children to work without the direct interference of the teacher

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References:
Calculator games. Retrieved 2 April 2008 from http://www.dr-mikes-math-games-for-kids.com/calculator-games.html
Calculator pattern puzzles. Retrieved 20 Mac 2008 from http://www.col-ed.org/cur/math/math06.txt
Simple calculator activities. Retrieved 25 Oct 2007 from http://www.cyffredin.co.uk/Calcultor%20Books/Calculator%20activities%20Index.htm.

A1   Learning to add on the Calculator

Pritti is learning to add on the calculator. She wants to add 36 and 57

First she checks that the calculator is clear. She presses C and the calculator shows 0

Next she presses 3 then 6. The calculator shows 36

Next she presses +. The calculator still shows 36

Next she presses 5 and 7. The calculator shows 57

Next she presses =   The calculator shows 93

Can you think what the calculator has done!

Now let everybody in your group try and do one of these each

27 + 67 =   45 + 28 =   36 + 39 =   58 + 89 =   67 + 89=

Use your calculator to find out which of these sums has been added correctly

78	65	34	123	4556
+45	+76	+87	+124	+8679
123	131	121	247	13225

Can you find out how to do these on the calculator?

123 + 34 +453 =   78 + 34 + 56 =   434 + 893 + 545 =

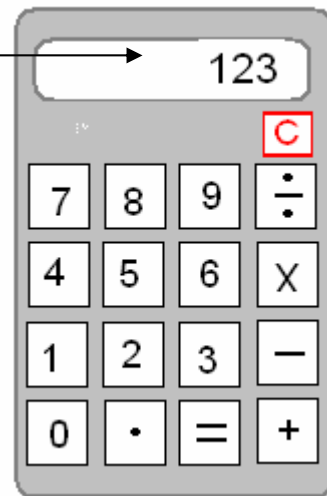# A1 Playing with the Calculator

Here is your calculator.

This is the display

These are the keys

This is the on/off key

This is the clear key

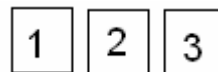You can discover for yourself how it works.
Can you find how to turn it on.?
What do you see when the calculator is on?

Now discover how to turn it off

Turn it on again.
Put 123 into the calculator by pressing

It is very important to know how to clear the calculator. Before you start each calculation press C and make sure 0 is showing.
Let everyone in the group practice putting in a number and clearing it.
Now try some simple calculations.

Can you do 12 + 35   ? Pressing 12 + 35 is not enough. There is a very important key that you must press at the end. You must press = after 12 + 35 to make the calculator work out the answer.

Let everybody try an addition. One person make up the sum and another works out the answer on the calculator. Make sure you check the answer. It is easy to hit the wrong key by mistake.

Now try subtraction.
145 – 56   Remember to press = at the end. Let every body try a subtraction.

Now discover how to do multiplication
27 x 35

Now try division
First try 144 divided by 48 Does it work? Now try these 150 divided by 25,   756 divided by 21, 5460 divided by 35

A2 Take Away   Place Value

Put this number on the calculator   4753

What will happen when you press $\boxed{-}$ $\boxed{3}$ $\boxed{=}$

Let everyone guess the answer.

Then press $\boxed{-}$ $\boxed{3}$ $\boxed{=}$

Were you right?

What will happen when you press $\boxed{-}$ $\boxed{5}$ $\boxed{0}$ $\boxed{=}$
All guess then press and see

What will happen when you press $\boxed{-}$ $\boxed{7}$ $\boxed{0}$ $\boxed{0}$ $\boxed{=}$

All guess and then press and see.

What will happen when you press $\boxed{-}$ $\boxed{4}$ $\boxed{0}$ $\boxed{0}$ $\boxed{0}$ $\boxed{=}$
All guess and then see.

Now you are ready for a game.

A Group Game   **Take away**   **Place Value**

The group sit in a ring. The first player puts in any 5 figure number   eg 45389
She shows it to the whole group and they all say the number.
Then she passes the calculator to the next in the group. Now the challenge is to make the last figure, 9, change to a 0 so that 45389 becomes 45380
She should say aloud what she will do
        I will press – then 9 and =
        The calculator will now show 45380
All the group check to see if the new number has a zero in it

Now the calculator is passed to the next person. She must make another zero appear so that there is 00 at the end of the number
        I will press – and 80 and = .
        This will give 45300
Everybody checks that she is correct.

The next player must make 000 at the end of the number.

The next player must make 0000 at the end of the number.

Keep passing the calculator until the number is zero

Now a new player sets a new number and the game continues. Make sure every one in the group has a turn at setting the number.

Variations
    a) have a bigger number with 6 digits
    b) or play so that the children choose which figure should go
    eg 37865 is set. First player chooses which figure is to disappear.
        Make the 7 vanish and become 0
    so the next person has to make the 7 disappear and 0 come in its place
    eg she must press – 7000 = to give 30865. If she is correct she passes the calculator to the next person and chooses which figure is to go next
    eg *Make the 6 turn to 0.*
    The next player has to make the 6 disappear, by pressing – 60 =
    Continue until just zero is on the calculator

A3   Add Up   Place Value

Set 56471 on the calculator

What will happen when you press | + | 9 | = |

Can you work out the answer before you press the keys?
Now press and see if you were right.

What will happen when you press | + | 2 | 0 | = |
Do you all agree?
Now press and see if you were right.

What will happen when you press | + | 5 | 0 | 0 | = |
Do you all agree?
Now press and see if you were right

What will happen when you press | + | 3 | 0 | 0 | 0 | = |
Do you all agree?
Now press and see if you were right.

Now go on to play the Add Up game

A Group Game   Add Up   Place Value

Aim of the game
Each player tries to make a new O appear by adding.

The first player sets any 5
figure number

> *Example*
> *The first player sets*
> *85634 on the calculator.*

The calculator is passed to the
next player. She must make
a 0 come at the end of the
number

> *Example*
> *The next player presses*
> *+ and 6 and =*
> *The calculator will show 85640*

Pass the calculator to the next
person. She must make another
0 appear so the number ends 00

> *Example*
> *The next player presses*
> *+ and 60 and =*
> *The calculator shows 85700*

Pass the calculator to the next
person. She must make the
number end 000

> *Example*
> *The next player presses*
> *+ and 300 and =*
> *The calculator shows 86000*

The calculator is passed to the
next person. She must make
0000 at the end of the number

> *Example*
> *The next player presses*
> *+ and 4000 and =*
> *The calculator shows 90000*

Now choose another number to start with. Play the game again.
Let everyone have a turn at setting the first number.

> Can you change the rules of the game to make a new game?
>
> Perhaps you could start with a six figure number.
>
> Perhaps you could try and make 9's appear instead of 0.

A3   Make 99   Mental Addition

Neena and. her friends are playing the "Make 99 Game" on the calculator

Neena puts 43 on the calculator. She passes it to Hamid and says "Make 99"

Hamid takes the calculator. He thinks what number to add. What number do you think he will press? He decides to press + 56 =
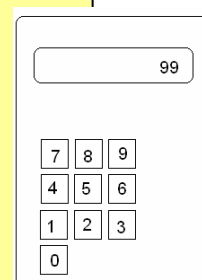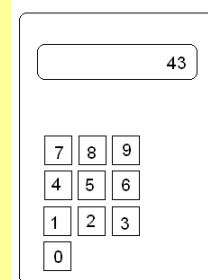
Now the calculator shows 99. He was right!

Now Hamid clears the calculator and enters 27.

Hamid passes the calculator to Nashid and says "Add a number to make 99"

Nashid presses + 62 = and now the calculator shows 89. She was wrong!

What should Nashid have entered?

Now play this game with your calculator.

The Rules of "Make 99"

One person in the group sets a number less than 50 on the calculator. He shows everyone the number and passes the calculator to another child and says "Make 99". She has to add a number so that the calculator shows 99.

Other similar games

Have a different target number. For example play the game "Make 100" or "Make 999"

Play a subtraction game. One player sets a three figure number greater than 100. The other player has to take away to make the calculator show 100.

Neena set 346 on the calculator. She passed it to Hamid and said "Make it into 100 by a subtraction"

Hamid pressed – 246 =

The calculator shows 100

A3 Target Addition - 1

123	245	67
48	141	
246	59	114
32	50	

Pankash is the group leader. He has the calculator . He chose two numbers from the box and secretly adds them. Then he shows the answer to the group. The calculator shows 109.
Pankash says, "Which two numbers did I add?"
Meetu calls out, "59 + 50."
Pankash says, "Well done" and passes the calculator on to a new leader.

Now play this game in your group.

Here are the rules

The Rules of Target
All the group look at the numbers in the box. One person chooses a pair to add on the calculator. She does not let the others see what she is doing. She shows them the answer on the calculator and asks "Which numbers did I add?" The first to answer correctly is the winner. Then the calculator is passed to the next person in the group who makes up a sum… and so on.

A3 Target Addition – 2

More boxes to use with Target addition. Always chose the two numbers from the same box

26	30	14
17	10	
20	41	8

21	35	4
33	20	
7	16	10

100	50	20
11	21	
15	42	80

A4　Missing Signs

Salima and Neena are looking at this puzzle.

27 ☐　5　☐　63 = 198

Salima says "I wonder what goes in the ☐?"

Salima tries 27 + 5 + 63 = using the calculator.
This gives 95

Then Neena tries 27 x 5 + 63= on the calculator.

Do you think this is right. Try it on the calculator.

Now try these together with your friends and use the calculator to check who is correct.

24 ☐ 16 ☐ 7 = 3897

13 ☐ 25☐ 23 = 7475

56 ☐ 64 ☐ 75 = 195

23 ☐ 8 ☐ 18 = 202

12 ☐ 20 ☐ 10 = 2400

45 ☐ 30 ☐ 17 = 58
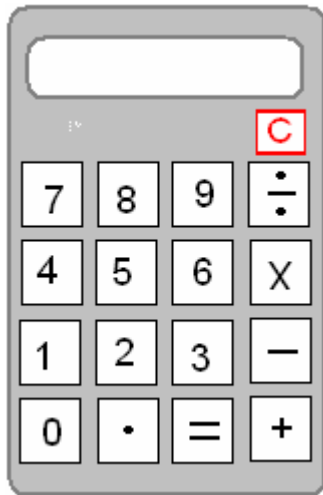
B1 Getting to know your calculator

Some interesting decimals

Neena knows how to find fractions on the calculator.
She changes them to decimals!

" Neena, please can you tell us how to change 1/9 into
a decimal on the calculator?"

Neena says

*1/9 is a fraction.
To find it on the
calculator we
must change it to*

1 ÷ 9 =
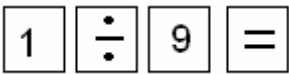
What do you find when you do this?

Write on your slate
1/9 =

Now use Neena's method to change these
fractions to decimals.
Copy the answers on your slate.

2/9   3/9

4/9   5/9

Can you guess what 6/9 will be. Talk with your group and write
down your guess and then use the calculator to find out if you
were correct.

Now try and guess what all these will be.
Then check on the calculator and ✓ if you were right.

6/9   7/9

8/9   9/9   oops!!

Now try these with the calculator.

1/11   2/11

3/11   4/11

Can you see a pattern? Talk to other members of your group.
If you can see a pattern then try and do these in your head first
and then use the calculator to check to see if you were correct.

5/11   6/11
7/11   8/11
9/11   10/11

………………………………………………………………

Try these with the calculator
1/10   2/10
3/10   4/10

Now do these in your head and check with the calculator

5/10   6/10
7/10   8/10
9/10   10/10 oops
………………………………………………………………………

Try these with the calculator
1/100   2/100
5/100   7/100

And do these in your head first and then do with the calculator

8/100   9/100
15/100   23/100
45/100   77/100

B1   Checking with the Calculator
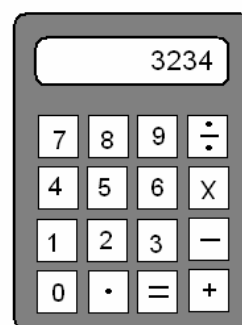
Even with a calculator it is easy to make a mistake.
Hamid used the calculator to multiply
23 x 147

Look at the calculator to see his answer
Is it correct?

Use your calculator to check.

Hamid put in the wrong number. Instead of 23 he put another number.
Can you find out what it was?

Here is a way to check multiplication.

First find the answer to 143 x 45 on the calculator.

To check your answer just divide it by 143. No need to clear. What
should you see on the calculator? Try it.

Now try these multiplications. Make sure you check your answer each
time by division.

     37 x 65 =   78 x 23 =

     234 x 657 =   1,245 x 564 =
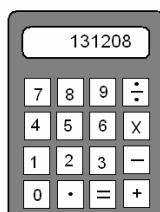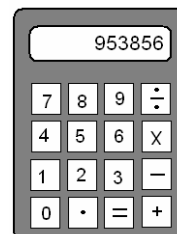
     2,347 x 3472 =   67,542 x 3,688 =

Now try these;
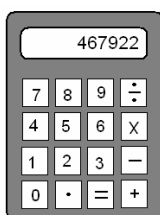
Here is Neena's calculator Can you check her x by using
division? This is the problem she was doing.
857 x 546

Here is Afroza's calculator. She was doing
             5888 x 162 =
   Check her answer.

Here is Hamid's answer to 994 x 122 =
What did he do wrong?

B2 Dividing by 10

The calculator can help you learn how to divide by 10.

Try the red sums using the calculator

$230 \div 10 =$ $570 \div 10 =$ $890 \div 10 =$

Then do the blue sums in your head and use the calculator to check you were correct

$440 \div 10 =$ $870 \div 10 =$ $1230 \div 10 =$

Now try these with the calculator

$18 \div 10 =$ $64 \div 10 =$ $73 \div 10 =$

And these in your head, checking with calculator afterwards

$16 \div 10 =$ $45 \div 10 =$

$93 \div 10 =$ $155 \div 10 =$

Can you use the calculator to help you learn how to divide by 100?

B2 Fractions on the Calculator   A Half

Meena and Afroza are looking at the figures on the calculator.

Neena says "Its strange there are no fractions on the calculator. There is no ½ or ¼"

Afroza says "Lets change some fractions to decimals using the calculator. ½ is the same as 1 divided by 2. Lets see what we get on the calculator if we press

$$1 \div 2 =$$

Try this with you calculator and see what happens

Meena said. "I wonder if we can get the same answer any other way?"

Afroza tried $2 \div 3 =$

Did this work? Use your calculator to find out!

Meena tried $2 \div 4 =$

What did she get.?

Afroza said " I think I can see now how to make 0.5 in many ways"
She took the calculator and pressed $3 \div 6 =$

Try this to see what number Afroza had made

Now everybody in your group should take it in turn to try and find other ways to get 0.5 on the calculator by dividing two numbers. Make a list of all the ways you find. Who can use the biggest numbers!

B2 Guessing Game

Rashid, Majid and Reika are playing a game. Rashid has the calculator. She secretly picks a number from the upper yellow box and then one from the lower blue box.
Using the calculator she multiplies them.

32	42	62
48	78	88

Now she shows the calculator to Majid and Reika.

Rashid says "Can you find which numbers I used?"

Reika and Majid look at the number on the calculator. It is 5456

Can you think which numbers Rashid used?

Reika says " I think you used 32 x 48"

Majid says " I think 32 x 48 is too small. 32 is close to 30 and 48 is close to 50.
The answer to 32 x 48 will be close to 30 x 50. Now I can do 30 x 50 in my head!
3 x 5 is 15 and there will be 00 on the end. So 30 x 50 is 1500. That's much too small!"

Reika says " Oh that is a clever way to try and find the answer. Lets try another pair in our heads. Lets try 62 and 78! 62 is close to 60 and 78 is close to 80. I think 62 x 78 will be close to 60 x 80. What is 60 x 80"

Can any one in your group help Reika?

Can you use Reika and Majids method to work out which pair to choose?

Talk about this in your group. Agree which pair Rashid used. Then you can use the calculator to check your answer.

Now you can play the game in your group.

Guessing Game 2

Here are some more boxes to use in the game.
Make sure you decide which box you are going to pick your numbers
from and tell the rest of the group which it was.

21	.51	71
.16	36	66

15	45	95
65	75	85

24	44	84
84	44	24

B2 Multiplication Puzzle

Neena and Trishna are looking at this puzzle.

Can you work out in your head which is the right answer?

19 x 31 =   319   or   589   or   899 or 1219?

Neena says "*Lets try and do this in our heads first and then check later with the calculator*"

Trishna " *I think we can take numbers that are easy to multiply to get an estimate of the right answer*"

Neena " *An answer which is close but not exact! What a good idea. What number shall we use instead of 19?*"

Trishna "*Lets use 20 instead of 19. Its close and it is easy to multiply with*"

Neena   " *and lets use 30 instead of 29!*"

Trishna " *So if we multiply 20 x 30 we will get an answer close to 19 x 31 and we can see which answer to chose!*"

Neena " *I can do 20 x 30 in my head. 2 x 3 is 6 and there will be 00 on the end. 20 x 30 is 600!*"

Trishna "*Now lets look for the answer which is closest to 600*"

Which number do you think they pick; 319   or   589   or 899 or 1219 ?

When you have chosen your answer use the calculator to check if you were right.

Multiplication Puzzles for you to do

Now in your group try these. Make sure you talk with your friends before you chose your answer. When everybody has agreed then use the calculator to check the answer.

19 x 41 =

229   or   499   or 779   or 999

…………………………………………………………………

32 x 18 =

126   or   226   or 336   or 576

………………………………………………………….

11 x 59 =

349   or   649   or   859   or   999

………………………………………………………….

38 x 21 =

198   or   469   or   798   or   1058

…………………………………………………………

49 x 31 =

519   or   1519   or 1829 or   1949

………………………………………………………….

21 x 59 =

849   or   949   or   1039 or   1239

………………………………………………………….

B3 <u>Multiplication Challenge</u>

In this problem there is a missing number. It is shown by *. Try to guess the missing figures.
Then use the calculator to check. Score one point for each correct guess.

```
  *2
x 21
 882
```

Hamid an Neena are looking at this problem.
One of the figures is missing.

Hamid says "I don't know how to find the number that is shown by * ?"

Neena says   "I think it must be 4.   2 x 4 is 8"

Hamid says   "That's clever, Neena. Let's check that with the calculator."

Hamid takes the calculator and puts in 42 x 21=. Use your calculator to find if he gets 882 as the answer.

Now here are some Challenges for your group.
Write out the problem on your slates. Talk about each one and decide in your group what is the missing number. When you have decided then let everyone use the calculator to check the answer. If you were wrong try again until you find the right answer!

```
   *6
 x 72
 1872
```

```
   43
x   *1
  903
```

```
   62
x   *7
 2294
```

```
  *5
x 23
 805
```

```
   *3
 x 43
 1849
```

```
   *8
 x 81
 3076
```

```
   *4
 x 52
 2288
```

B4   Odd and Even

Do you remember about odd and even numbers?

Odd numbers are 1,3, 5, 7, 9, 11……… Can you add some more?

Even numbers are 2,4,6,8,10, ……………..Can you add some more?

Even numbers divide exactly by 2. No remainder!
Odd numbers do not divide exactly by 2.

Try dividing odd numbers by 2 on the calculator
7/2   11/2   13/2   33/2
What do you notice about the answers?

Now try and find if these are ODD or EVEN. Decide if they are odd and even by looking at the numbers and then use the calculator to check..

111   234   76   55   60   672   233   4687   34,658
23,567   46,989   123,654

Can you finish these two sentences?

Odd numbers end in …….
Even numbers end in…..

> Hamid and Neena are looking at some multiplications. They are trying to decide if they answers will be ODD or EVEN
>
> 12 x 34   13 x 65   26 x 17   19 x 44
>
> Neena looks at the first one, 12 x 34. She says "If we multiply 2x4 we get 8. I think the last digit in the answer will be 8"
> Hamid says " Well if it ends in 8 then it will be even. Let's try with the calculator"

Talk with your friends about Neena's idea. Do you think she I right?
What do you think the answers will be? ODD or EVEN? Look at each one. Check with the calculator.

Odds and Evens Game

11	24	17
13	50	54
12	19	8
44	15	66

Each Person in the group picks a pair of numbers from the box.
They must say if the answer when multiplied is ODD or EVEN
For example Hamid picks 17 and 13 and says the answer to 17 x 13 will be odd.
Is he right? Check with calculator. Now everyone in the group must try.

Calculator Activities for BRAC Schools

B4 Quick Mental Addition

Neena and Hamid are
looking at this problem

Hamid   "I can't do this in my head. It's too difficult!"
Neena   "Yes, it is hard. I have an idea. Let's just get a rough answer.
             48 is close to 50. 51 is close to 50.   79 is close to 80. So
             let's add 50 and 50 and 80. I can do that in my head."
Hamid   "So can I! 50 + 50 + 80 = 180"
Neena   "Oh dear! 180 is not in the answers."
Hamid   "But the only number in the answers close to 180 is 178.
             That must be the right answer!"
Neena   "Let's use the calculator to check!"

Now use the calculator and see if Neena and Hamid chose the right
answer.

Here are some more Puzzles for you to try in your group. Every one should try and
pick the right answer by THINKING. Then one person in the group checks using the
calculator

29 + 61 + 11 =   41, 61, 81, 101

22 + 19 + 51 =   62, 92, 112, 132

31 + 28 + 32 =   61, 71 , 81, 91

19 + 22 + 23 +18 =   82, 92, 102, 112

63 + 39 + 59 =   131, 141, 161, 171

19 + 22 + 31 + 48 =   110, 120, 130, 140

21 + 18 + 22 + 17 + 23 =   91, 101 , 121 , 131

C1 <u>Fraction Fun</u>   Using the calculator to compare fractions

Hamid and Neena are using the calculator to find out which fraction is bigger, 2/7 or 3/8 ?

Hamid says " I think we can change them to decimals."
Neena says " Then it will be easy to see which is bigger."
Hamid asks Neena "How do we change 2/7 to a decimal using the calculator? *Do you know?"*
Neena says "That's easy 2/7 is 2 divided by 7 so with the calculator press:

| 2 | ÷ | 7 | = |

Hamid takes the calculator and finds 2/7.
Hamid " What a long number that gives! 0.2857142"
Neena " Now try and find 3/8. Do you know how to do this?
Hamid " Yes! 3 divided by 8."
So then Hamid presses

| 3 | ÷ | 8 | = |

Neena " Look the answer is 0.375. This is bigger than 0.2857142! So 3/8 is bigger than 2/7"
Neena and Hamid write   3/8 > 2/7 on their board.

```
Neena's board

2/7 = 0.2857142
3/8 = 0.375

3/8 > 2/7
```

Now in your group use the calculator to find out which is bigger

2/5 or 3/7   4/5 or   5/7

3/8 or 2/3   ¾ or   4/5

4/9 or 3/5   2/5 or 4/9

Now make up two fractions of your own and find which is bigger.
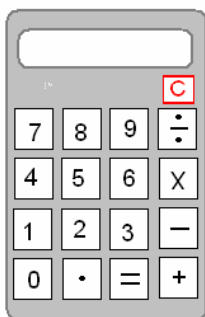
C1 The Magic of 101

Hamid and Neena are learning about the magic of 101. They are using the calculator to work out the answers to multiplications.
Here are the problems that Hamid and Neena are doing.

101 x 5511
101 x 1155
101 x 3311
101 x 2277

Do these with the calculator and everyone writes the answers on a piece of paper.

Then read this.

Hamid says	"I think something strange happens when you multiply these numbers by 101.
Neena	"Yes I think I can do them with out the calculator. I can do them in my head!"
Hamid asks Neena	"What do think the answer will be to 101 x 2233?
Neena says	"That's easy 225533. Let's check on the calculator."

Now can you check if Neena is right. Can you see how she did it in her head? Talk about it in your group. Make sure everyone understands. Then try these in your head and check them afterwards with the calculator.
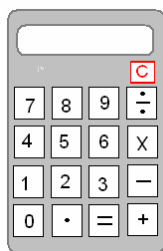
101 x 2244   101 x 6633

101 x 5522   101 x 4411

101 x 3355   101 x 1188

Some more Magic with 101

Neena and Hamid have found some more problems with x by 101. They wonder if they will able to these in their heads!

First they try these using the calculator

101 x 2424
101 x 3535
101 x 2020
101 x 4141

Try these yourself and write the answers on a piece of paper.

Hamid says " I think I can see a quick way to get the answer in my head"

Can you do this? Talk in your group about a way of multiplying these numbers in your head.
Try and write the answers first then use the calculator to check your answers.

101 x 3131   101 x 2323
101 x 4343   101 x 4242
101 x 2525   101 x 3636

C2 **Multiplying Decimals**

Neena and Hamid are learning about multiplying decimals. This is the question they are trying to answer.

3.6 x 2.7   Which is the right answer?   0.972   9.72   97.2   972

Neena says. "I think the answer will be about 9"
Hamid says; "I think the answer will have two numbers after the decimal point"
Neena asks "Why? "
Hamid says "Because each of the numbers has 1 figure after the decimal point and 1 = 1 is 2."
Hamid and Neena chose 9.72 as the right answer.
Check using the calculator to see if they were right.

Now try and answer these in you group. Think and talk with the others in your group. Decide which you think is the right answer then check with the calculator.

4.2 x 4.1 =	1.722	17.22	172.2	1722
5.1 x 6.3 =	3.213	32.13	321.3	3213
2.9 x 7.1 =	2.059	12.59	20.59	40.59
6.1 x 10.2=	0.6222	6.222	33.22	62.22

Did you get them all right?

Now here are some multiplications to match with the answers.
Take it in turn to try and match a question and answer. Make sure you check after guessing with the calculator.

5.1 x 3.1

7.2 x 4.2

4.9 x 8.1

6.1 x 9.9

1.9 x 1.1

Possible answers
60.39   30.24   2.09   15.81   39.69

C2 Mystery Multiplication

Hamid has the calculator in his hand. He multiplies two numbers together and shows the answer to Neena. On the calculator is 221.

Hamid asks Neena "Can you find the numbers I multiplied to get this answer? They are both less than 20."

Hamid gives the calculator to Neena. First she tries 11 x 11 but this doesn't work.

Can you discover using the calculator which numbers work?

Here are some more Mystery Multiplications

What two numbers under 20 multiply to give 192?

What two numbers under 20 multiply to give 240?

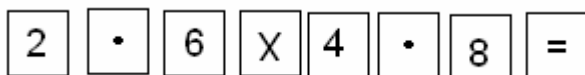What two numbers under 20 multiply to give 323?

Can you find a way to solve these problems using division?

C2 Multiplication with decimals

Hamid and Neena used the calculator to find
2.6 x 4.8
They pressed the keys like this

| 2 | • | 6 | X | 4 | • | 8 | = |

2.6 x 4.8 = 12.48
26 x 48 = 1248
2.6 x 48 = 124.8
26 x 4.8 = 124.8

The answer came up on the calculator 12.48
Hamid said " I think I can do some other multiplications in my head"
And he wrote down
26 x 48 = 1248
Neena said "That's clever. I think I can do one as well!"
Meena wrote
2.6 x 48 = 124.8
And then Hamid wrote
26 x 4.8 = 124.8
Meena said the numbers are always the same!

Were they correct? Use your calculator to check.

Now use you calculator to work out
3.5 x 4.7

Now can you do these in your head and write the answers on your board?
3.5 x 47
35 x 47
35 x 4.7
Check with the calculator

Now try this one
Use the calculator to find 14 x 72
Now in your head try. Write down the answers then check with the
calculator.
1.4 x 72
1.4x7.2
14x7.2
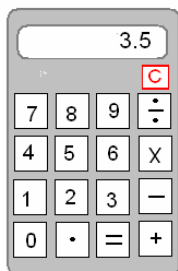

Now try one more. Use the calculator to work out
6.7 x 5.9
What other multiplications can you now do in your head?
Write them down and use the calculator to check your answers.

C2   <u>Some Strange Divisions</u>

On the calculator try 7 divided by 2
Look at the answer. It is quite strange. The calculator cannot give a remainder.
Discuss with your group what is happening.
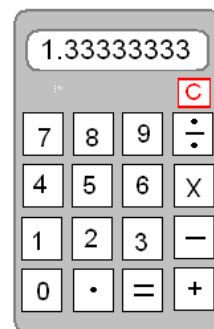Then try 11 divided by 4
Try 13 divided by 8

Try 23 divided by 16

Now try 4 divided by 3. Wow!
Try other numbers divided by 3 and see what happens.

Try 5 divided by 3, 6 divided by 3, 7 divided by 3.

These are some decimal numbers that never end. Even if we had the biggest calculator in the world we would never see all the number. You have found some of them!

Did you notice that there were three kinds of answer when we divide by 3?

Some go exactly like 12 divided by 3

Some give .3333333333 after the decimal point like 4 divided by 3

Some give .6666666666 after the decimal point. For example 5/3 gives 1.666666666

Now see what happens to other numbers when divided by 3. Put your answers on your slate like this;
Let everyone in the group chose a number, divide it by 3 on the calculator and decide where it goes in on the slate.

Divides Exactly	3, 6
Gives ?.333333	4,
Gives ?.666666	5,

Can you think what kinds of answers these will have?

30, 31, 32   66, 67, 68   300, 301, 302

Check with the calculator after you have decided.

C3   **Magic Adding**

Hamid and Neena are learning about a very special magic of the calculator

Neena presses   2   +   +   on the calculator

Then she gives the calculator to Hamid.

Neena says " Hamid , press =   What do you get on the calculator?"
Hamid presses =
Hamid says " I see 4"
Neena says " Now press = again"
Hamid presses = again. This time he gets 6 on the calculator
Now he presses = again. This time he gets 8
He presses = again and again and gets 10 then 12 then 14 then 16

Neena says "Look the calculator has learned to count in twos!"

Now see if you can make the calculator count in twos like this.
Let everyone have a turn at pressing =.
Can you say before you press what the new number is going to be?

Now make the calculator count in 3s

Press   3   +   +

Try and guess what you will get each time you press =

Now teach the calculator to count in 5

Or in any number you like!

All calculators have a constant factor property but it is sometimes different on different calculators

Sometimes pressing
2x= = is enough to generate powers of 2   2,4,8,16, etc
sometimes you need
2xx= to set up the constant factor

Check what is needed on the calculators you are using.

C3 Mystery problems with brackets

Neena and Hamid are
looking at this puzzle

(24 O 34) O 6 = 810

Hamid asks Neena "What do we have to do, Neena?"
Neena tells Hamid "We have to find what to put in the circles O
to make the sum correct."
Hamid "I think we need to put a x in the first circle and a + in
the second one"
Neena "Lets try"
Neena presses   24 x 34 + 6 =
Does she get the right answer.
Can you find the correct answer?

Use your calculator and your mathematical skills to find what
signs need to go in the circles. Talk about each one with your
group and see if you can get the answer in your head before
using the calculator.

(32 O 17) O 9 = 553

(34 O 6) O 7 = 280

(322 O 14) O 17 = 40

(68 O 15) O 6 = 318

(14 O 21) O 6 = 300

(14 O 6 O 5) O 11 = 275

(255 O 15) O 5 = 12

(17 O 26 O 3) O 4 = 1330

Can you make up your own puzzles like these?

D1 <u>Patterns in Numbers</u>

Let's discover the beauty of mathematics ...

Get the answers fast from your calculator:

1 x 8 + 1 =
12 x 8 + 2 =
123 x 8 + 3 =
1234 x 8 + 4 =
12345 x 8 + 5 =
123456 x 8 + 6 =
1234567 x 8 + 7 =
12345678 x 8 + 8 =
123456789 x 8 + 9 =

Do you see a pattern?
How can you rearrange the numbers/equations to see the pattern more clearly?

Now try this:

1 x 9 + 2 =
12 x 9 + 3 =
123 x 9 + 4 =
…

And this:

9 x 9 + 7 =
98 x 9 + 6 =
987 x 9 + 5 =
…

And more of this:

1 x 1 =
11 x 11 =
111 x 111 =
…

Isn't Maths beautiful ?
Mathematics is the Science of Patterns, (Devlin, 1996)

D2 Upside-down calculator word game
   – enhance creative thinking

Here's a nice calculator game that will attract the word-lovers in your math class back to their arithmetic. You'll need a calculator. It should be a calculator with a so-called "7 segment" display - something like what is shown below :

The trick is, when this is turned upside down, the numbers look like certain letters (especially with a little imagination thrown in). So the number 17246 above becomes the letters ghZLI below.

On the calculator I use, the digit 0 becomes O, 1 becomes I, 2 becomes Z, 3 becomes E, 4 becomes h, 5 becomes S, 6 becomes g, 7 becomes L, 8 becomes B, and 9 becomes G. Of course, turning the calculator upside down also reverses the digits, so 1234 would be hEZI, not IZEh. With a little effort, one can easily find numbers that correspond to words. And then, to construct formulas that give those numbers.

1. Try this:

- enter 6.2
- multiply this by itself
- add 0.23
- divide by 50
- turn the calculator upside down, and you have a friendly greeting!

2. Or how about a nice breakfast? Try this:

- multiply 17 by 2
- multiply by 1000
- divide by 6
- throw away the part to the right of the decimal
- subtract 3

Mmm! Delicious! But be sure to throw the (68 x 68 - 7) x 5 x 5 x 5 + 220 in the trash!

3. Now some questions for animal lovers : Does the (19 + 19 - 1) x 19 + 2 x 3 x 5 have (47 x 47 + 10 x 10) x 5 x 5 - 3 x 3 or (47 x 10 + 47 x 10 + 47 x 10 + 47 x 10 - 1) x 3 ? or lay 7 x (800 + 9)? Is there one in your neighborhood 1 / 50 ? What about the 2 x 13 x 13 ? Or the 3 x 3 x 3 x 3 x 101 - 3000? The (50 x 50 x 3 + 1) x 6 - (50 x 50 x 4)? (Of course, the plural of (50 x 50 x 3 + 1) x 6 - (50 x 50 x 4) is (8 - 1) x 8 x (8 x (8 x (8 + 1 + 1) - 1) - 1), isn't it.)

If you'd like some help to create more such puzzles, I've provided a [list of words, and the numbers that create them](http://www.dr-mikes-math-games-for-kids.com/calculator-word-game-upside-down-list.html) (http://www.dr-mikes-math-games-for-kids.com/calculator-word-game-upside-down-list.html). Let your brain's verbal cogs spin and you'll be able to generate dozens of puzzles just like these ones.

4. Here's one last puzzle to decode : a whole sentence, one word per formula...

- "1   5x67   17x17+13   1+7x7+1   3x(2x2x2x2x2x2x2x2+1)", (3x4x7x13+3/10)x100/2 (4x6x4x6-7)x(5x5x5x5-8), "3/6 (3x17/2+1/5)x3 3/5 4.7x3/20"

I really hope you and the kids you care for will enjoy this calculator word game!

D3 <u>Magical Birthday Math Trick</u>

Do you know want to appear as a maths whiz?

You, the future math whiz, start by giving your friend a calculator. Then, you issue the following sequence of instructions. Make sure your friend presses the equals button (=) after each step!

- Enter the number 7
- Multiply by the month of your birth
- Subtract 1
- Multiply by 13
- Add the day of your birth
- Add 3
- Multiply by 11
- Subtract the month of your birth
- Subtract the day of your birth
- Divide by 10
- Add 11
- Divide by 100

And, amazingly, your friend's birthday will appear on the calculator screen! For example, let's suppose your friend was born on February 29. Below, I repeat the sequence of instructions, showing the result at each step in red.

- Enter the number 7 (7)
- Multiply by the month of your birth (7x2=14)
- Subtract 1 (14-1=13)
- Multiply by 13 (13x13=169)
- Add the day of your birth (169+29=198)
- Add 3 (198+3=201)
- Multiply by 11 (201x11=2211)
- Subtract the month of your birth (2211-2=2209)
- Subtract the day of your birth (2209-29=2180)
- Divide by 10 (2180/10=218)
- Add 11 (218+11=229)
- Divide by 100 (229/100 = 2.29)

This will work every time! Try it!

Of course, a real math trick will impress friends by giving you a real aura of genius! To do this, don't let your friend do the last three steps - do them yourself in your head. Dividing by 10 or 100 or adding 11 should be easy enough for a kid your age to accomplish in your head, right? Or if you're not so sure, practice a bit with the adult who gave you this.

So now, the instructions become :

- Enter the number 7
- Multiply by the month of your birth (Eg, if your birthday was 29 February, you'd multiply by 2)
- Subtract 1
- Multiply by 13
- Add the day of your birth (eg, if your birthday was 29 February, you'd multiply by 29)
- Add 3
- Multiply by 11
- Subtract the month of your birth (eg 2)
- Subtract the day of your birth (eg 29)
- Tell me the result
- (after mentally dividing by 10, adding 11, and dividing by 100) Your birthday is February 29!

If you are in Europe or Australia, you probably want February 29 to look like 29.02, not 2.29. In that case, wherever you see month, write day, and vice-versa. For example :

- Enter the number 7 (7)
- Multiply by the day of your birth (7x29=203)
- Subtract 1 (203-1=202)
- Multiply by 13 (202x13=2626)
- Add the month of your birth (2626+2=2628)
- Add 3 (2628+3=2631)
- Multiply by 11 (2631x11=28941)
- Subtract the day of your birth (28941-29=28912)
- Subtract the month of your birth (28912-2=28910)
- Tell me the result

Then, mentally, do these steps

- Divide by 10 (28910/10=2891)
- Add 11 (2891+11=2902)
- Divide by 100 (2902/100 = 29.02)

The result is clear. This trick is sure to make you seem like a real math genius to your friends! They'll bug you again and again to find out just how this math trick works. *Don't tell them!*