MULTIPLYING BY COLUMN

FACT 1: This is another way of multiplying by using the Distributive Property

Multiply 23 x 2 using columns from left to right.

The mental steps are:

(a) For 1's: 2 times 3 equal 6 ones.

(b) For 10's: 2 times 2 equal 4 tens.

(c) The product is 46.

23 x 2	=	(20 + 3) x 2
	=	(20 x 2) + (3 x 2)
	=	40 + 6
	=	46

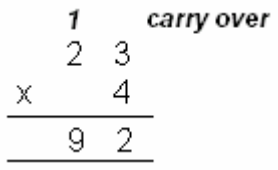
FACT 2: When the product in a column is more than ten then carry the "tens" over to the column on the left.

Multiply 23 by 4

(a) For 1's: 4 times 3 equals 12; put down 2 ones; carry over 1 ten;

(b) For 10's: 4 times 2 equal 8, plus 1 carried over, equals 9; put down 9 tens.

(c) The product is 92.



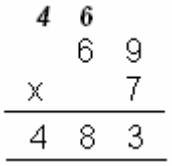
Multiply 69 by 7

(a) For 1's: 7 times 9 equal 63; put down 3; carry over 6 tens;

(b) For 10's: 7 times 6 equal 42, plus 6 carried over, equal 48 tens; put down 8; carry over 4 hundreds;

(c) For 100's: No digit in hundred's column; carried is 4 hundreds; put down 4.

(d) The product is 483.



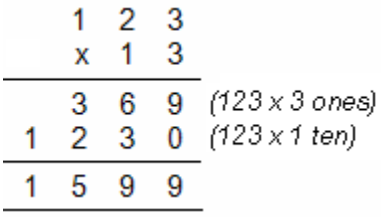
FACT 3: To multiply by double-digit numbers, obtain partial products for TENS and ONES. The product is the sum of the partial products.

Multiply 123 by 13

(a) First multiply 123 by 3 ones, and write the partial product 369.

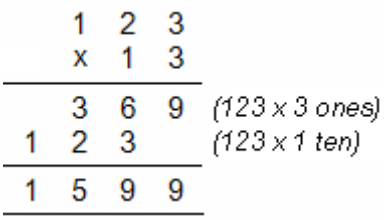
(b) Next multiply 123 by 1 ten, and write the partial product 1230.

(c) Add the two partial products together to get the final product 1599.



It is customary to omit the final zero of the second line. We write the partial product from right to left, starting from the same column as the digit in the second factor (multiplier). See below.

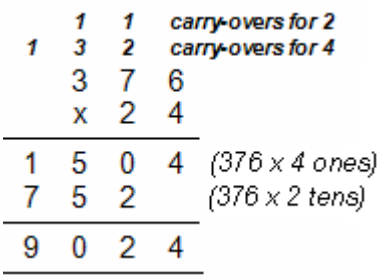
(a) Multiply 123 by 3 ones. The digit '9' of the partial product 369 starts from the column of 3 (in 13).
(b) Multiply 123 by 1 ten. The digit '3' of the partial product 123 starts from the column of 1 (in 13).



Multiply 376 by 24

Note that there may be two sets of carry-overs, one for each digit of the second factor (24), as shown here.

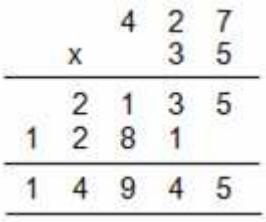
Do this multiplication on paper and then check out the product **9,024** on a calculator.



Multiply 427 by 35.

In most cases carry-overs can be kept in mind when multiplying, and need not be written.

Do this multiplication on paper and then check out the product **14,945** on a calculator.



1. Multiply the following numbers by columns. Verify your answers on a calculator.

(a) 17 x 2 = _____ (h) 54 x 5 = _____ (o) 46 x 4 = _____
(b) 12 x 3 = _____ (i) 62 x 9 = _____ (p) 45 x 9 = _____
(c) 12 x 7 = _____ (j) 23 x 3 = _____ (q) 53 x 2 = _____
(d) 13 x 4 = _____ (k) 75 x 6 = _____ (r) 88 x 5 = _____
(e) 29 x 5 = _____ (l) 35 x 2 = _____ (s) 70 x 6 = _____
(f) 23 x 9 = _____ (m) 33 x 8 = _____ (t) 87 x 6 = _____
(g) 53 x 7 = _____ (n) 32 x 5 = _____ (u) 93 x 3 = _____

2. Multiply the following by columns. Verify your answers on a calculator.

(a) 317 x 22 = _____ (h) 354 x 45 = _____ (o) 546 x 24 = _____
(b) 142 x 13 = _____ (i) 562 x 29 = _____ (p) 745 x 49 = _____
(c) 222 x 32 = _____ (j) 423 x 37 = _____ (q) 953 x 62 = _____
(d) 235 x 24 = _____ (k) 175 x 63 = _____ (r) 188 x 85 = _____
(e) 293 x 53 = _____ (l) 835 x 24 = _____ (s) 370 x 60 = _____
(f) 323 x 64 = _____ (m) 933 x 86 = _____ (t) 687 x 56 = _____
(g) 537 x 75 = _____ (n) 732 x 55 = _____ (u) 893 x 73 = _____

End of Lesson