

Multiplication

568
423



Multiplication

Carry: 2

$$\begin{array}{r} 568 \\ 423 \\ \hline 4 \end{array}$$

Operation

1. multiply two digits, save the carry

Multiplication

Carry: 2

$$\begin{array}{r} 568 \\ 423 \\ \hline 04 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit
5. shift a number 1 digit to the left

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \\ \hline 12864 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit
5. shift a number 1 digit to the left
6. add two numbers

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \\ \hline 12864 \\ 2272 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit
5. shift a number 1 digit to the left
6. add two numbers

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \\ \hline 12864 \\ 2272 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit
5. shift a number k digits to the left
6. add two numbers

Multiplication

Carry:

$$\begin{array}{r} 568 \\ 423 \\ \hline 1504 \\ 1136 \\ \hline 12864 \\ 2272 \\ \hline 240064 \end{array}$$

Operation

1. multiply two digits, save the carry
2. multiply two digits, add the carry, save the carry
3. multiply two digits, place result
4. multiply a number by a digit
5. shift a number k digits to the left
6. add two numbers

Multiplication

What functions do we need:

1. `addNum(n1, n2)` – two integers as input, output is the sum
2. `shifLeft(n, k)` – an integer n and a shift number k , output is n multiplied by 10 raised to power k
3. `multiplyLine(n, d)` – an integer n and a digit d as input, output is n times d .

Multiplication

```
function number = multiplyNum(n1, n2);
    number = [];
    k=0;           % line multiply shifts k position
    for i=length(n2):-1:1
        number = addNum(number, shiftLeft(multiplyLine(n1,n2(i)),k));
        k = k+1;
    end
end
```