Examples 0 in Arithmetic 1

Click this to start.

Examples 0

What’s this practice for?

It’s for your mental math, calculation by heart.

This practice helps improve your mental math.

Why mental math, though?

Your mental math will help you stay focused when you do math. The more mental math you do, the less you get distracted. More likely to stay focused if doing math mentally. Let’s now start doing practice for mental math.

0. How many 1s do we need to make 5?

Click the question to see the answer.

5 can be made of 5 of 1s, that is, five ones, so we can get this: $5 \times 1 = 5$.

1. How many 1s do we need to make 12?

12 can be made of 12 of 1s, that is, twelve ones, and we can get this:

12 x 1 = 12.

2. How many 1s do we need to make 45?

45 can be made of 45 of 1s, that is, forty five ones, so we can get this: 45 x 1 = 45.

3. How many 1s do we need to make 283?

283 can be made of 283 of 1s, and we can get this: 283 x 1 = 283.

4. How many 5s do we need to make 5?

5 can be made of 1 of 5s, that is, one five, so we can get this: 1 x 5 = 5.

5. How many 5s do we need to make 10?

10 can be made of 2 of 5s, that is, two fives, and we can get this: 2 x 5 = 10.

6. How many 5s do we need to make 0?

None.

0 has none of 5s, so we get 0 x 5 = 0.

Also, we can say that 0 can be made of none of 7s, so we can get this: 0 x 7 = 0.

7. How many 5s and 1s do we need to make 7?

7 can be made of 1 of 5s and 2 of 1s, that is, one five and two ones, so we can get this:

1 x 5 + 2 x 1 = 7.

8. How many 3s and 2s do we need to make 7?

7 can be made of 1 of 3s and 2 of 2s, that is, one three and two twos, so we can get this:

1 x 3 + 2 x 2 = 7.

9. How many 3s, 2s, and 1s do we need to make 7?

7 can be made of 1 of 3s, 1 of 2s, and 2 of 1s, that is, one three, one two, and two ones, so we can get this: 1 x 3 + 1 x 2 + 2 x 1 = 7.

And of course, 7 can be made other ways, too. Some examples are as follows.

We can put 7 the ways below, too.

7 = 1 x 3 + 2 x 2 + 0 x 1 = 3 + 4 + 0

7 = 0 x 3 + 3 x 2 + 1 x 1 = 0 + 6 + 1

7 = 0 x 3 + 2 x 2 + 3 x 1 = 0 + 4 + 3

7 = 0 x 3 + 1 x 2 + 5 x 1 = 0 + 2 + 5

There are many ways to make the same value or the same amount.

A number can indicate a value or an amount.

A. How many 10s do we need to make 80?

80 can be made of 8 of 10s, so we can get this: 8 x 10 = 80.

B. How many 10s do we need to make 100?

100 can be made of 10 of 10s, so we can get this: 10 x 10 = 100.

C. How many 10s do we need to make 190?

190 can be made of 19 of 10s, and we can get this: 19 x 10 = 190.

D. How many 10s do we need to make 350?

350 can be made of 35 of 10s, so we can get this: 35 x 10 = 350.

E. How many 10s do we need to make 990?

990 can be made of 99 of 10s, so we can get this: 99 x 10 = 990.

F. How many 10s do we need to make 1000?

1000 can be made of 100 of 10s, so we can get this: 100 x 10 = 1000.

G. How many 10s do we need to make 1040?

1040 can be made of 104 of 10s, and we can get this: 104 x 10 = 1040.

H. How many 10s do we need to make 1520?

1520 can be made of 152 of 10s, so we can get this: 152 x 10 = 1520.

I. How many 10s do we need to make 3500?

3500 can be made of 350 of 10s, and we can get this: 350 x 10 = 3500.

J. How many 10s do we need to make 6390?

6390 can be made of 639 of 10s, and we can get this: 639 x 10 = 6390.

K. How many 100s do we need to make 900?

900 can be made of 9 of 100s, so we can get this: 9 x 100 = 900.

L. How many 100s do we need to make 1000?

1000 can be made of 10 of 100s, and we can get this: 10 x 100 = 1000.

M. How many 100s do we need to make 9000?

9000 can made of 90 of 100s, so we can get this: 90 x 100 = 9000.

N. How many 100s do we need to make 3800?

3800 can be made of 38 of 100s, and we can get this: 38 x 100 = 3800.

O. So what pattern can you see in the sequence of all the answers to the questions above asking the numbers of 10s or 100s?

Note that the following explanation is not a rigorous proof in math. It is for general public and tries explaining a pattern so that it can help understand and see the pattern.

Every time we multiply an integer by 10, we put a zero at the end of the integer. So for instance, multiplying 35 by 10, we get 350, which is the product of 35 and 10, and if we multiply 2060 by 10, the product is 20600.

What happens then, to the integer when it gets multiplied by 10?

All the individual digits in the integer get shifted to one step higher in digit. So in the case of 35 by 10, 3 becomes 100’s digit, 5 becomes 10’s digit, and in the product, 1’s digit is 0.

35 x 10 = 350

And the same is true of 10 by 35, too, so the product of 10 and 35 equals the product of 35 and 10. It’s because multiplication commutes, which means, order doesn’t matter in multiplications, so we have this:

10 x 35 = 35 x 10 = 350

In the case of 2060 by 10, 2 becomes 10000’s digit, 6 becomes 100’s digit, and in the product, 10’s and 1’s digits are 0s.

2060 x 10 = 10 x 2060 = 20600

What then about the product of an integer and 100?

Mentioned earlier that every time we multiply an integer by 10, we put a zero at the end of the integer.

So every time an integer gets multiplied by 10, all the individual digits in the integer get shifted to one step higher in digit.

Now, multiplying 1 by 10, we get 10.
And multiplying 10 by 10, we get 100.

So multiplying 1 by 10 and then, multiplying the product by 10 again, what do we get?
We get 100.

Next, multiplying 3 by 10, we get 30.

And multiplying 30 by 10, we get 300.

So multiplying 3 by 10 and then, multiplying the product by 10 again, what do we get?

Multiplying 3 by 10, we get 30, and
multiplying 30 by 10, we get 300.

So multiplying a number by 100, how many
times do we multiply the number by 10?

Twice.

So multiplying a number by 100, we multiply the number by 10 twice.

Thus, for instance, taking the product of 24 and 100, we put two zeros at the end of 24. Thus, we get 2400.

24 x 100 = 100 x 24 = 2400

And taking the product of 3070 and 100, we put two zeros at the end of 3070. So we get 307000.

3070 x 100 = 100 x 3070 = 307000

What then about the product of an integer and 1000?

Again, every time we multiply an integer by 10, we put a zero at the end of the integer. So every time an integer gets multiplied by 10, all the individual digits in the integer get shifted to one step higher in digit.

Now, multiplying 1 by 10, we get 10.

And multiplying 10 by 10, we get 100.

Again, multiplying 100 by 10, we get 1000.

So multiplying 1 by 10 three times, what do we get?

We get 1000.

Next, multiplying 9 by 10, we get 90.

And multiplying 90 by 10, we get 900.

That is, multiplying 9 by 10 twice, we get 900.

So multiplying 9 by 10 three times, what do we get?

We get 9000.

So multiplying a number by 1000, how many times do we multiply the number by 10?

Three times. So multiplying a number by 1000, we multiply the number by 10 three times.

Thus, for instance, taking the product of 98 and 1000, we put three zeros at the end of 98. So we get 98000.

98 x 1000 = 1000 x 98 = 98000

And taking the product of 8090 and 1000, we put three zeros at the end of 8090. So we get 8090000.

8090 x 1000 = 1000 x 8090 = 8090000

What then about the product of an integer and 10000?

All the individual digits in the integer get shifted to four steps higher in digit.
So we multiply an integer by 10000, we put four zeros at the end of the integer.

And for instance, taking the product of 73 and 10000, we put four zeros at the end of 73.
So we get 730000.

What if we multiply 12 by 300?

We know this: 300 = 3 x 100.

So taking the product of 12 and 300, we can take the product of 12 and (3 x 100).

That is, we can do this: 12 x (3 x 100).

And we can put it this way, too:

12 x 3 x 100

So we have this: 12 x 300 = 12 x 3 x 100.

And multiplication associates.

So taking the product of 12 and 300, we can take the product of 12 and 3 first, and then, multiply that product by 100.

It’s because multiplication associates, as well as commutes, so we can have this:

12 x 3 x 100 = 12 x (3 x 100) = (12 x 3) x 100 = 100 x (12 x 3)

So the final product can be the product of 100 and the product of 12 and 3.

Thus, taking the product of 12 and 3, and putting two zeros at the end of the product, we get the product of 12 and 300, which is 3600.

Taking the product of 12 and 3, we get 36.

What if we multiply 3 by 12000?

We know this: 12000 = 12 x 1000.

And multiplication associates.

So taking the product of 3 and 12000, we can take the product of 3 and 12 first, and then, multiply that product by 1000.

It’s because multiplication associates and commutes, so we can have this:

3 x 12 x 1000 = 3 x (12 x 1000)

= (3 x 12) x 1000 = 1000 x (3 x 12)

So the final product can be the product of 1000 and the product of 3 and 12.

Thus, taking the product of 3 and 12, and putting three zeros at the end of the product, we get the product of 3 and 12000, which is 36000.

What then about division?

So what changes are made to an integer if we divide the integer by 10, 100, or 1000?

A division is the opposite of a multiplication.
So we can expect the opposite of the case
where we multiply a number by 10.

Thus, we can notice that every time we divide a number by 10, all the individual digits in that number get shifted to one-step lower in digit, or we can say that the decimal point moves to the left by 1 place.

So for instance, if we divide a number by 1000, all the individual digits in that number get shifted to three-step lower in digit, or we can say that the decimal point moves to the left by 3 places. So we get this:

$15092 \div 1000 = 15.092.$

And by the same token, we get these:

$15092 \div 100 = 150.92$,

and $15092 \div 10 = 1509.2$.