# HOW TO USE BIDMAS CORRECTLY

Mathematics is built on laws. No matter what your opinion on if the laws are stupid or not, you're going to have to do what they tell you if you want to pass your GCSE. There is one that you're going to use in almost every aspect of your maths exam though. The one that everyone always seems to forget even though it is one of the most important. BIDMAS.

BIDMAS. Or BODMAS. It all depends on what you're taught as to what acronym you're familiar with. It doesn't matter which you use, they're both just different ways of saying the same thing. In fact, if you were born in America it would be PEMDAS.

No matter what is called, it's a highly important aspect of maths. Something you need to know inside out. Let's go through what it means before we go anywhere else.

**B - Brackets**
**( )**
**I - Indices**
**$2^2$**
**D - Division**
**÷**
**M - Multiplication**
**X**
**A - Addition**
**+**
**S - Subtraction**
**-**

- The first tip is Don't Panic.
- Then take a deep breath.
- Relax and take the time to read these tips.

Each letter of the word BIDMAS stands for a different word, as documented above. The reason they spell out BIDMAS is because that is the order that you carry out each word, or operation if you want to be fancy. The actual term for this particular rule is the order of operations, because it is the order that we do the operations. Simple right? Here's what each operation means.

Brackets comes first. It means anything inside brackets is calculated first. So for example if I had the sum 3 + (2 + 2) The first thing you do is add 2 and 2 together, because it is inside the brackets.

Indices are next up. Indices are those little numbers you sometimes see above other numbers. You might know them as powers too. An example of indices would be 53. If you had 53 it means 5 to the

power of 3. Which means 5 X 5 X 5. This gives you 125. An example of using indices in relation to BIDMAS would be 3 + 53. In this case we do 53 first giving us 125. This changes the sum to 3 + 125, which obviously equals 128. It doesn't end there though, it's not just those little numbers above your big number that count as indices. Roots, like a square root also come under the umbrella of indices. So if you had √25 it means the square root of 25, which gives us 5.

Division is our next port of call. Division is when you divide two numbers. An example within the context of BIDMAS would be 15 + 2  2. Because you divide before you add, the first thing you would do would be 2  2, which gives us 1. So the final sum would be 15 + 1 which is 16.

Multiplication comes next. Multiplication is when you times two numbers together. In BIDMAS this would look like 7 + 5 X 2. Because multiplication comes before adding we do 5 X 2 first, giving us 10. The final sum would be 7 + 10 which is 17.



Oh. I was going to do addition and subtraction next, but it seems like I've missed something before I move on to them. Do you remember at the start when I said the Americans used PEMDAS? Their version of the order of operations is Parentheses (another way of saying brackets), Exponent (another way of saying indices), Multiplication, Division, Addition and Subtraction. Do you notice how the multiply and divide are reversed in the order to what we do? They do multiply first and we do divide first. So do we get different answers to your American cousins? No no, we don't.

You see multiplication and division don't actually come before each other. They are done at the same time. There is a reason for this. A pretty good one. You see multiplication and division are just like us and our American brethren. Slightly different, but essentially two sides of the same coin. The division is the inverse of multiplication. Multiplication is the inverse of division.

**12 X 12 = 144**

**144 ÷ 12 = 12**

See how when we go back and forth the number we start within the first sum is the same as what we end up with in the second sum? That is because multiplication and division are the inverses of each other and that's why we don't always calculate them in this order.

Time to get back to going through each letter.

Addition is next up. Addition comes after all of the previous steps we have done. So if we had (3 X 3) + 9 we would do what is in the brackets first, giving us 3 X 3 = 9. Our new sum would be 9 + 9, which gives us 18.

Subtraction is the final letter in our acronym. The final step of the order of operations. So if our sum was (4 X 2) – 5 then we would take care of the brackets first, giving us 4 X 2 = 8. Our new sum would be 8 – 5, which gives us 3.



==Another one of these? Great. Well, it needs to be said I suppose. Addition and Subtraction are related in the same way that multiplication and division are. Addition is the inverse of subtraction and vice versa. Take these sums for example.==

$$8 + 9 = 17$$

$$17 - 9 = 8$$

==Again notice how the first number in the first sum is the same as the last number in the second sum? Once again it's all because they are the inverse of each other. This explains why they are not always calculated in this order.==

While we must follow the rules of BIDMAS in all sums, we also have to remember that when we see division and multiplication together or addition and subtraction together we must still do our sum from left to right. So while the inverses hold equal weight to each other that doesn't mean we can just do them in any order. So remember. BIDMAS first, if we have any inverses then we do them from left to right, the same direction that we read in This is not only true for inverses, we also do it if we have any of the same operations. Like two divides for example…

All of that information is useful, there's no arguing with that, however without seeing it in practice, it doesn't really help us all that much does it? We need to see some questions to put our newly learned information into practice.

Okay then, let's do it. For our first example we'll start off nice and easy.

$$6 × 3 - 4 × 2$$

Let's look through at what we need to do then. As is always the case when we see a calculation, we

need to check through BIDMAS. Remember what they all stand for? Let's have a reminder just to be sure.

B - Brackets
( )
I - Indices
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Okay, we know what we're looking for now. Let's go for it.

**6 × 3 – 4 × 2**

Let's check through. Are there any brackets? None. Indices? None. Division? None. Multiplication? Now we're cooking, there is some multiplication in this. What are we going to do first though? 6 × 3 or 4 × 2? Well, if you remember from earlier we said that when we come across inverses or the same operations we calculate them from left to right.

So first up we have 6 × 3, which gives us 18. That's the left-hand part of the sum done, now for the right-hand part. 4 × 2, which gives us 8. That changes our final sum to 18 – 8, which we know = 10. So 10 is our final answer.

We need to make sure we see our working step by step to really get it into our heads though. Let's go through again what we did.

6 X 3 – 4 X 2

First
18 – 4 X 2

Second
18 – 8 = 10

Easy as pie right? Well let's not get ahead of ourselves just yet, that was just a simple one to start with. Things can and do get much harder when it comes to what you will see on your GCSE paper. Let's have a look at something a little more difficult this time.

**9 + 2 X ( 6 – 3)**

Right this time we're really going to have to think about it. Remember what we have to do first, BIDMAS. Okay, are there any brackets? Well as it happens yes there is this time. So our first step is to

solve what is inside the brackets. Fortunately, it's a nice and easy sum. 6 – 3. That gives us 3. Let's see what we have now we've done that.

**9 + 2 × 3**

We have the 3 in blue this time. That is what used to be ( 6 – 3 ). So what are we going to do next? Well, we have already done brackets. Indices come next. None of those so we move on. Division? None of that either. Multiplication? We have that. 2 X 3 comes next for us. What does 2 X 3 give us? That's right 6. Let's have a look at what our new sum is.

**9 + 6**

The blue shows what we did last time. It is what used to be 2 × 3. Our final step is a nice simple one. 9 + 6 which gives us 15. So our final answer is 15. Let's go through each of those steps again.

9 + 2 X ( 6 – 3)

First step
9 + 2 X 3

Second step
9 + 6 = 15

That one was a little trickier, wasn't it? We had to think a little bit more and check our steps. Let's really step things up a notch though.

$$\left(2^{2}+6\right)^{2} \times 4-8$$

Sorry, I did say we were going to step things up a notch though. Right, let's hit this one hard. What do we need to do first? We need to check through BIDMAS to see what our first step is. So, do we have any brackets? Why yes we do. Right at the very start of this one we have brackets. These are our brackets (22 + 6), the important thing to remember when it comes to solving what is inside brackets is that we need to follow the order of operations again. So we look at our brackets and we apply BIDMAS to them again. 22 + 6 is what we have, so are there any brackets here? Nope, not a thing. What about indices? There we go right at the start of 22 , which gives us 4. So 4 + 6 is what we have inside our brackets, which gives us 10.

$$10^{2} \times 4-8$$

That's our first step completed. We've done the B in BIDMAS, what's next? Indices. Do we have any? We do, we have 102, that gives us 100. So our calculation now looks like this.

100 × 4 – 8

We've done the brackets and indices. Our next step is to look at the division. Do we have any division? No, we don't. What's next? Multiplication. Do we have any? Yes, we do. 100 X 4. That gives us 400. So our final stage of calculation looks like this.

$$400 - 8$$

Our final step is an easy enough one. A simple subtraction sum. 400 – 8 gives us 392. So our final answer for this one is 392. It was pretty difficult this time and we certainly had to be careful with our use of BIDMAS. Let's check through it more time, step by step.

\(
left(2^{2}+6right)^{2} times 4-8
\)

First step
\(
10^{2} times 4-8
\)

Second step
100 x 4 – 8
Third step
400 – 8 = 392

We've gone from not really knowing what to do with BIDMAS to moving forward at an alarmingly fast rate and completing quite a complex sum. Be honest with yourself, could you have done that sum at the start? There's one more step we need to take to really get to where we need to be though. You see the rules of BIDMAS don't just apply to sums with numbers. They apply to sums with a letter in too. You see, BIDMAS isn't just a rule when it comes to numbers, it applies to everything. Even algebra. Which is what we're going to cover now.

Algebra is what most people enjoy the least about maths. When you take it down to just using the rules that you already know though, it's not that hard. Let's have a look at some algebra just to really keep the rules for the order of operations, you know, BIDMAS, in our heads.

\(
x^{2}+3(2 y+4)
\)

Now there isn't actually any calculations for us to do when it comes to this one. All we need to do is simplify the expression. Don't worry, I know those sound like complicated words, but they're not honest. Just remember our BIDMAS. What does the B mean? Brackets. So are there any brackets in this expression? Why yes there are. (2y + 4) We're not solving anything here though, we're just simplifying. Can we simplify this bracket? Not right now we can't.

*What about indices? Well, we have those too. $X^2$ well we can't simplify that either. It's as simple as it gets. What comes next? Division? Well, we have none of that here. Multiplication? Well, we do have that. It's hidden quite well though. There's no sign there. However, when you put a number in front of brackets, it means that we multiply everything inside the brackets.*

3(2y + 4) is our multiplication in this particular expression. Which when we work it all out gives us 6y + 12. So now our expression looks like.

\(

$$x^{2}+6 \ y+12$$
\)

From here our expression is as simple as it gets. There is nothing else we can do to it. All simplified because we used our BIDMAS. You will see much harder algebra problems than this on your GCSE exam, but they are for another time.

So next time you see an expression or a calculation don't panic if it's a complicated one. All you have to do is ensure you follow the order of operations and you will be fine. Check each step as you work through. Brackets. Indices. Division. Multiplication. Addition. Subtraction.

As long as you follow each step you won't have any issues. The maths paper isn't trying to trick you, as long as you stick to what we have done, then no matter how hard the calculation looks, you can do it.