Mathematics Rules

Order of Operations: **BIRDMAS**

1. **B**rackets
2. **I**ndex *(Power of, exponential)*
3. **R**oots *(square root, etc)*
4. **D**ivision
5. **M**ultiplication
6. **A**ddition
7. **S**ubtraction

**Example**

|  |  |
| --- | --- |
| 7 + (6 × 52 + 3) ?? |  |
| 7 + (6 × 25 + 3) | Start inside Brackets, and then use "Orders" First |
| 7 + (150 + 3) | Then Multiply |
| 7 + (153) | Then Add |
| 7 + 153 | Brackets completed, last operation is add |
| **160** |  |

**Rules for Adding/Subtracting**

Signs **SAME**

- Add numbers
- Keep sign

Signs **DIFFER**

- Subtract smaller from bigger
**-** Use sign of bigger

**Rules for Multiplying/Dividing**

Signs **SAME**

- Multiply/Divide
- Use **+**

Signs **DIFFER**

- Multiply/Divide
- Use **-**

**Exercises**

1 What is the value of 3 + 6 ÷ 3 × 2 ?

A7 B6 C4 D 1.5

2 What is the value of 20 - (3 × 2³ - 5)?

A-191 B1 C11 D131

3 What is the value of 5 × 3 - 12 ÷ 4 + 8

A3 B4 C14 D20

4 What is the value of 5 × 4 - 2 × 3 + 16 ÷ 4

A10 B11½ C18 D34

5 What is the value of (3 + 2)2 - 5 × 3 + 23 ?

A2 B6 C18 D38

**Factors**

Factors of 18 are 1 x 18

2 x 9

3 x 6

**Factorising**

Take out a number/letter/both which is common to both parts of the expression

$6x^{2}-3x=3x(2x-1)$

In a Quadratic Expression as shown you will begin with ( … )( … )

$$3x^{2}+10x-8=(3x-2)(x+4)$$

$$x^{2}-y^{2}=(x-y)(x+y)$$

$$25y^{2}-1=(5y)^{2}-(1)^{2}=(5y-1)(5y+1)$$

$$x^{3}-y^{3}=(x-y)(x^{2}+xy+y^{2})$$

$$64y^{3}-8=(4y)^{3}-(2)^{3}=(4y-2)(16y^{2}+8y+4)$$

$$x^{3}+y^{3}=(x+y)(x^{2}-xy+y^{2})$$

$$1+125x^{3}=(1)^{3}+(5x)^{3}=(1+5x)(1-5x+25x^{2})$$