

# Study Notes On Arithmetical Reasoning (Mathematical Operators)



**Arithmetic reasoning** involves the basic mathematical and **arithmetic** problems. So basically, Arithmetic reasoning primarily deals with converting the word problem and transforming it into equations to reach a solution. What is required of us is to have a look at the problem, check which concept of math is to be applied and then arrive at the answer, which is correct. Use our reasoning skills to analyse the information that can be useful and rule out the redundant data.

Arithmetic reasoning questions are asked from several areas such as: Ages, Profit & loss, Ratio & proportion, Time and work, Percentages, data based etc.

**NOTE:** Basic Arithmetic formulae are applied in this section to get the required answer.

### **Mathematical Operations:**

This section deals with questions on basic mathematical operations. Which includes — addition, subtraction, multiplication, and division. Also, statements such as 'less than' or 'greater than', 'equal to' or 'not equal to', etc. are represented by symbols. The questions involving these operations are set using artificial symbols. Hence, to get correct answer, one must substitute the right symbols and solve the question accordingly.

**NOTE:** While solving a mathematical expression, proceed according to the rule **BODMAS** — i.e., Brackets, Of, Division, Multiplication, Addition, Subtraction.

#### **TYPE 1: Problems based on substitution:**

**Question:** If 'A' stands for 'subtraction', 'B' stands for 'multiplication', 'C' stands for 'addition', and 'D' stands for 'division', then what is the value of the following expression? **27 A 8 B 5 C (11 C 3) B 5 C 36 D 6**

**Solution:** Given that: 'A' stands for 'subtraction', 'B' stands for 'multiplication', 'C' stands for 'addition', and 'D' stands for 'division'

So, **27 A 8 B 5 C (11 C 3) B 5 C 36 D 6**

$$= 27 - 8 \times 5 + (11 + 3) \times 5 + 36 \div 6$$

Now solve the expression

**27 - 8 × 5 + (11 + 3) × 5 + 36 ÷ 6** by using BODMAS rule.

$$27 - 8 \times 5 + (11 + 3) \times 5 + 36 \div 6$$

$$= 27 - 40 + 14 \times 5 + 6$$

$$= 27 - 40 + 70 + 6 = 33 + 30 = 63$$

**Question:** If '<' means 'minus', '>' means 'plus', '=' means 'multiplied by' and '\$' means 'divided by', then what would be the value of

$$63 > 21 \$ 3 = 7?$$

**Solution:**  $63 > 21 \$ 3 = 7$

After putting the signs

$$63 + 21 \div 3 \times 7$$

$$63 + 7 \times 7$$

$$63 + 49 = 112.$$

**TYPE 2: Problem based on interchange of signs and numbers:**

**Question:** Which two signs should be interchanged to make the given equation correct?  
 $225 + 5 \times 3 \div 5 - 7 = 133$

A. + and  $\div$

B. - and  $\times$

C. + and  $\times$

D. - and  $\div$

**Solution:** Given expression is  $-225 + 5 \times 3 \div 5 - 7 = 133$

After interchanging-

$$225 \div 5 \times 3 + 5 - 7 = 133$$

Apply BODMAS,

$$225 \div 5 \times 3 + 5 - 7 = 133$$

$$\text{Or, } 45 \times 3 - 2 = 133$$

$$\text{Or, } 135 - 2 = 133$$

$$\text{Or, } 133 = 133$$

As we got the correct answer, so no need to check more options. Hence, option (a) is the correct answer.

**Based on Equation balancing:**

**Question:** Select the correct combination of mathematical signs to sequentially replace the \* signs, to balance the following equation.

$$(14 * 9 * 6) * 15 * 8$$

A.  $\times, =, \div, -$

B.  $\times, -, \div, =$

C.  $-, \div, \times, =$

D.  $\div, -, =, \times$

**Solution:** On checking option (a)

$$(14 * 9 * 6) * 15 * 8$$

After putting signs

$$(14 \times 9 = 6) \div 15 - 8 \text{ (incorrect)}$$

**On checking option B**

$$(14 * 9 * 6) * 15 * 8$$

After putting signs

$$(14 \times 9 - 6) \div 15 = 8$$

$$(126 - 6) \div 15 = 8$$

$$120 \div 15 = 8$$

$$8 = 8$$

Signs in option (b) satisfied the above equation, So, no need to check other options. Hence, option (b) is the correct answer.

**Question:** The two given expressions on both the side of the '=' sign will have the same value if two numbers from either side or both sides are interchanged. Select the correct numbers to be interchanged from the given options.

$$3 + 5 \times 4 - 24 \div 3 = 7 \times 4 - 3 + 36 \div 6$$

- A. 5,7
- B. 4,7
- C. 6,3
- D. 24,36

**Solution: Check option (a)-**

Given expression is-

$$3 + 5 \times 4 - 24 \div 3 = 7 \times 4 - 3 + 36 \div 6$$

After interchanging-

$$3 + 7 \times 4 - 24 \div 3 = 5 \times 4 - 3 + 36 \div 6$$

Apply BODMAS,

$$3 + 28 - 8 = 20 - 3 + 6$$

$$\text{Or, } 3 + 28 - 8 = 20 - 3 + 6$$

$$\text{Or, } 3 + 20 = 23$$

$$\text{So, } 23 = 23$$

As we got the correct answer, so no need to check more options. Hence, option (a) is the correct answer.

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