

# Symbolic Operations

This is probably one of the easiest and the most scoring areas in the Logical reasoning section of any aptitude-based test. Normally, questions from symbols and operations are asked in sets of 3 - 5 questions. So, you can fetch easy marks in a short span of time. Lately, this topic is gaining importance as a large number of questions in Logical Reasoning section are being asked from it.

Basic Concepts in Symboperation:

For better understanding of this topic, some basic concepts have been explained below:

- If  $A = 50$  and  $B = 60$ , then, is  $A > B$ ? - of course not.
- If  $A = (50, 60)$  and  $B = (40, 50)$ , then, is  $A \geq B$ ? - This is true, since,  $A$  is equal to  $B$  when both are 50, else  $A$  will always be greater than  $B$ .
- If  $A = 30$  and  $B = 80$ , then, is  $A < B$ ? - Of course yes.
- If  $A = (50, 60)$  and  $B = (40, 50)$ , then, is  $A \leq B$ ? - This is false, as  $A$  is equal to  $B$  when both are 50, but  $A > B$  for all other values. Hence, it should be represented as  $A \geq B$  instead of  $A \leq B$ .
- If  $A = B$  and  $A > C$ , then, is  $B > C$ ? - Of course yes.

Solved Examples on Symboperation:

**DIRECTIONS:** The symbols %, ?, \$, #, and ! are used with the following meaning:

$A \% B = A$  is greater than  $B$ .  $A ? B = A$  is either greater than or equal to  $B$ .  $A \$ B = A$  is smaller than  $B$ .  $A \# B = A$  is either smaller than or equal to  $B$ .  $A ! B = A$  is equal to  $B$ .

Now, for each of the questions mark your answer options as follows:

- If only conclusion I is true
- If only conclusion II is true
- If both conclusion I and II are true
- If either conclusion I or II is true
- If neither conclusion I nor II is true

**Example 1: Statements:**  $S \% T$ ,  $U \$ S$ ,  $T \$ S$ ,  $S ? M$ ,  $Q ? R$ .

**Conclusions:**

I.  $T \% U$

II.  $M \# T$

**Solution:** Firstly, the statements and conclusions should be converted into the normal symbols for better understanding.

**Statements:**  $S > T$ ,  $U < S$ ,  $T < S$ ,  $S \geq M$ ,  $Q \geq R$ .

**Conclusions:**

I.  $T > U$

II.  $M \leq T$

**Conclusion 1:** Since,  $S > T$  and  $U < S$ . So,  $U < S > T$  and, thus,  $U$  can be  $< T$  or  $= T$  or  $> T$ . Hence, nothing can be said definitely.

**Conclusion 2:** Since,  $T < S$  and  $S \geq M$ . So,  $T < S \geq M$ . Here again, nothing can be concluded about the relation of  $M$  and  $T$ .

Hence, the **answer is option (e)**.

**Example 2: Statements:**  $T \leq Q$ ,  $S \geq M$ ,  $Q \geq R$ ,  $U \leq S$ ,  $S \leq T$

**Conclusions:**

I.  $Q \geq S$

II.  $U \leq T$

**Solution:** Firstly, the statements and conclusions should be converted into the normal symbols for better understanding of the same.

**Statements:**  $T < Q$ ,  $S \geq M$ ,  $Q \geq R$ ,  $U < S$ ,  $S < T$ .

**Conclusions:**

I.  $Q > S$

II.  $U < T$

**Conclusion 1:** Since,  $T < Q$  and  $S < T$ . So,  $S < T < Q$ . Thus,  $Q > S$  can be concluded.

**Conclusion 2:** Since  $U < S$  and  $S < T$ . So,  $U < S < T$ . Thus, conclusion 2 i.e.  $U < T$  is definitely true.

Hence, the **answer is option (c)**.

# Symbolic Operations Question and Answer:

**Example.1.** If + stands for 'division', × stands for 'addition', – stands for 'multiplication' and ÷ stands for subtraction, then which of the following equations is correct?

(a)  $36 \times 6 + 7 \div 2 - 6 = 20$

(b)  $36 + 6 - 3 \times 5 \div 3 = 24.$

(c)  $36 \div 6 + 3 \times 5 - 3 = 45.$

(d)  $36 - 6 + 3 \times 5 \div 3 = 74.$

**Ans. d**

**Solution**

$$36 - 6 + 3 \times 5 \div 3$$

$$\rightarrow 36 \times 6 \div 3 + 5 - 3.$$

$$\rightarrow 36 \times 2 + 5 - 3 = 74.$$

$$\rightarrow 72 + 5 - 3 = 74.$$

## Symbolic Operation

In these types of questions, a mathematical equation is given with symbolic notification. Candidates are required to replace these symbols according to the given instruction, so that equations may have the perfect mean.

**Example. If P denotes '+', Q denotes '-', R denotes '×' and S denotes '÷', then which of the following statement is correct ?**

(a)  $16 R 12 P 49 S 7 Q 9 = 200$

(b)  $32 S 8 R 9 = 160 Q 12 R 12$

(c)  $8 R 8 P 8 S 8 Q 8 = 57$

(d)  $36 R 4 S 8 Q 7 P 4 = 10$

**Ans. c**

**Solution**

$$= 8 \times 8 + 8 \div 8 - 8$$

$$= 8 \times 8 + (8/8) - 8$$

$$= 64 + 1 - 8 = 57.$$

1. If '+' stands for 'multiplication', '<' stands for 'division', '÷' stands for 'subtraction', '-' stand for 'addition' and '×' stands for 'greater than'. Identify which expression is correct?

(A)  $20 - 40 + 4 + 8 < 2 \times 26$

(B)  $20 \times 8 + 15 < 5 \div 9 - 8$

(C)  $20 < 2 + 10 \div 4 - 6 \times 100$

(D)  $20 < 5 + 25 \div 10 - 2 \times 96$

**Answer**

Ans . C

Solution

$$20 < 2 + 10 \div 4 - 6 \times 100$$

$$= 20 \div 2 \times 10 - 4 + 6 > 100$$

$$= 10 \times 10 - 4 + 6 > 100$$

$$= 106 - 4 > 100$$

$$= 102 > 100.$$

2. If '+' means '÷', '-' means '×', '×' means '+', '÷' means '-', given the value of  $45 + 9 - 3 \times 15 \div 2$ .

(A) 40

(B) 36

(C) 56

(D) 28

**Answer**

Ans . D

**Solution**

$$45 + 9 - 3 \times 15 \div 2.$$

**Conversion according to question.**

$$\rightarrow 45 \div 9 \times 3 + 15 - 2.$$

$$= 5 \times 3 + 15 - 2.$$

$$= 15 + 15 - 2 = 28.$$



3. If '-' stands for '÷', '+' stands for '×', '÷' stand for '-' and '×' stands for '+', which one of the following question is correct?

(A)  $30 - 6 + 5 \times 4 \div 2 = 27$ .

(B)  $30 + 6 - 5 \div 4 \times 2 = 30$ .

(C)  $30 \times 6 \div 5 - 4 + 2 = 32$ .

(D)  $30 \div 6 \times 5 + 4 - 2 = 40$ .

**Answer**

Ans . A

**Solution**

After interchanging the signs,

$$30 \div 6 \times 5 + 4 - 2 = 27$$

$$\rightarrow 5 \times 5 + 4 - 2 = 27.$$

$$\rightarrow 29 - 2 = 27.$$

$$\rightarrow 27 = 27.$$

2. Symbolic Operation

4. If 'R' stands for '-', 'A' stands for '+', 'B' stands for '÷' and 'C' stands for '×', then what is the value of the given equation ?(BODMAS rule will not be applicable).

$$25 A 37 C 2 B 4 R 1 = ?$$

(A) 32

(B) 35

(C) 30

(D) 27

**Answer**

Ans . C

**Solution**

Given equation =  $25 A 37 C 2 B 4 R 1$

According to the question, after putting signs

$$= 25 + 37 \times 2 \div 4 - 1$$

$$= 62 \times 2 \div 4 - 1$$

$$= 124 \div 4 - 1$$

$$= 31 - 1 = 30.$$

**Directions (1-5). Study the nature of signs carefully and determine the value of given equations.**

**1. If '+' means 'divided by', '-' means 'added to', '×' means 'subtracted from' and '÷' means 'multiplied by', then what is the value of  $15 \div 12 - 36 + 3$  ?**

(A) 180

(B) 195

(C) 192

(D) 200

**Answer**

Ans . C

**2. If '+' stands for '×', '-' for '÷', '×' for '-' and '÷' for '+', find the value of  $12 + 90 - 5 \times 9 \div 3$ .**

(A) 210

(B) 216

(C) 215

(D) 120

**Answer**

Ans . C

**Direction:** In the following question, the equations have become wrong because of the wrong order of signs. Choose the correct order of signs from the four options given below, so as to make the equations right.

**3.  $17 - 3 \times 6 = 45$ .**

(A)  $\times, =, -$

(B)  $\times, -, =$

(C)  $-, \times, =$

(D)  $=, -, \times$

**Answer**

Ans . B

**4.  $40 - 45 \times 5 = 1$**

(A)  $-, \times, =$

(B)  $=, \times, -$

(C)  $\times, =, -$

(D)  $=, -, \times$

**Answer**

Ans . D

**5.  $10 \div 2 = 6 - 14$**

(A) =, ×, −

(B) −, ×, =

(C) =, −, ×

(D) ×, −, =

**Answer**

Ans . D

**6.  $34 \times 2 \div 10 = 7$**

(A) +, ÷, =

(B) ÷, =, +

(C) +, =, ÷

(D) =, +, ÷

**Answer**

Ans . B

**7.  $8 - 2 = 10 \div 6$**

(A) =, -,  $\div$

(B)  $\div$ , =, -

(C)  $\div$ , -, =

(D) -,  $\div$ , =

**Answer**

Ans . B

Direction: In each of the following questions, the given equation becomes correct due to the interchange of two signs. One of the four options under it specifies the interchange of signs in the equation which when made will make the equation correct. Find the correct option.

**8.  $5 + 6 \div 3 - 12 \times 2 = 17$ .**

(A)  $\div$  and  $\times$

(B) + and  $\times$

(C) + and  $\div$

(D) + and -

**Answer**

Ans . A

**9.  $2 \times 3 + 6 - 12 \div 4 = 17.$**

(A)  $\times$  and  $+$

(B)  $\div$  and  $-$

(C)  $+$  and  $\div$

(D)  $-$  and  $\div$

**Answer**

Ans . A

**10.  $16 - 8 \div 4 + 5 \times 2 = 8$**

(A)  $\div$  and  $\times$

(B)  $-$  and  $\div$

(C)  $\div$  and  $\times$

(D)  $-$  and  $\times$

**Answer**

Ans . B

**11.  $9 + 5 \div 4 \times 3 - 6 = 12$**

(A) + and  $\times$

(B)  $\div$  and  $\times$

(C)  $\div$  and  $-$

(D) + and  $-$

**Answer**

Ans . C

**12.  $12 \div 2 - 6 \times 3 + 8 = 16.$**

(A)  $\div$  and +

(B)  $-$  and +

(C)  $\times$  and +

(D)  $\div$  and  $\times$

**Answer**

Ans . B

**Study the nature of symbols carefully and determine the value of given equation.**



13. If P denotes  $\div$ ; Q denotes  $\times$ , R denotes  $+$  and S denotes  $-$ , then what is the value of  $18 Q 12 P 4 R 5 S 6$  ?

(A) 53

(B) 59

(C) 63

(D) 65

**Answer**

Ans . A

14. If L stands for  $+$ , M stands for  $-$ , N stands for  $\times$ , P stands for  $\div$ , then  $14 N 10 L 42 P 2 M 8 = ?$

(A) 153

(B) 216

(C) 248

(D) 251

**Answer**

Ans . A

**15. If P means 'division; T means 'addition; M means 'subtraction' and D means 'multiplication', then what will be the value of the expression 12 M 12 D 28 P 7 T 15?**

(A) – 30

(B) – 15

(C) 15

(D) – 21

**Answer**

Ans . D

**16. If Q means 'add' to; J means 'Multiply by', T means 'subtract from' and K means 'divide by' then 30 K 2 Q 3 J 6 T 5 = ?**

(A) 18

(B) 28

(C) 31

(D) 103

**Answer**

Ans . B

17. If P denotes 'multiplied' by', T denotes 'subtracted' from', M denotes 'add to' and B denotes 'divided by', then  $28 \text{ B } 7 \text{ P } 8 \text{ T } 6 \text{ M } 4 = ?$

(A)  $-3/2$

(B) 30

(C) 32

(D) 34

**Answer**

Ans . B

Q.18. If  $\square = 12$ ,  $\triangle = 15$ ,  $\square = 6$ ,  $\square = 4$ , and  $\bigcirc = 8$ , then

$$\triangle + \bigcirc - \square = ?$$

(A)  $\triangle$

(B)  $\square$

(C)  $\square$

(D)  $\bigcirc$

**Answer**

Ans . C

Q.19. If  $\text{Hexagon} = 6$ ,  $\text{Triangle} = 3$ ,  $\text{House} = 5$ ,  $\text{Diamond} = 4$ ,  $\text{Square} = 8$  and  $\text{Circle} = 10$ , then  $(\text{Square} \times \text{Triangle}) \div \text{Diamond} = ?$

(A)  $\text{Hexagon}$

(B)  $\text{Diamond}$

(C)  $\text{Triangle}$

(D)  $\text{Square}$

**Answer**

Ans . A

Q.20. If  $\text{Square} = 12$ ,  $\text{Triangle} = 15$ ,  $\text{Circle} = 6$ ,  $\text{Parallelogram} = 4$  and  $\text{Circle} = 3$ , then  $\text{Square} \div \text{Parallelogram} = ?$

(A)  $\text{Circle}$

(B)  $\text{Square}$

(C)  $\text{Parallelogram}$

(D)  $\text{Triangle}$

**Answer**

Ans . A

## References Links

<https://www.hitbullseye.com/Reasoning/Symbols-Operations.php>

<https://www.examsbook.com/mathematical-operations-reasoning-questions-with-examples/1>