

11. Mathematical Operations

This section deals with questions on simple mathematical operations. Here, the four fundamental operations – addition, subtraction, multiplication and division and also statements such as 'less than', 'greater than', 'equal to', 'not equal to', etc. are represented by symbols, different from the usual ones. The questions involving these operations are set using artificial symbols. The candidate has to substitute the real signs and solve the questions accordingly, to get the answer.

In this type, you are provided with substitutes for various mathematical symbols or numerals, followed by a question involving calculation of an expression or choosing the correct/incorrect equation. The candidate is required to put in the real signs or numerals in the given equation and then solve the questions as required.

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

Solved examples

Ex.1 If '+' means 'minus', 'x' means 'divided by', '÷' means 'Plus' and '-' means 'multiplied by', then which of the following will be the value of the expression $252 \times 9 - 5 + 32 \div 92$?

- (1) 95 (2) 168 (3) 192 (4) 200

Sol. Putting the proper signs in the given expression, we get :

$$252 \div 9 \times 5 - 32 + 92 = 28 \times 5 - 32 + 92 = 140 - 32 + 92 = 232 - 32 = 200.$$

Hence, the answer is (4).

Ex.2 If L stands for +, M stands for -, N stands for x, P stands for ÷, then $14 N 10 L 42 P 2 M 8 = ?$

- (1) 153 (2) 216 (3) 248 (4) 251

Sol. Putting the proper signs in the given expression, we get :

$$14 \times 10 + 42 \div 2 - 8 = 14 \times 10 + 21 - 8 = 140 + 21 - 8 = 161 - 8 = 153.$$

Hence, the answer is (1).

Ex.3 If $20 - 10$ means 200, $8 \div 4$ means 12, 6×2 means 4, then $100 - 10 \times 1000 \div 1000 + 100 \times 10 = ?$

- (1) 0 (2) 20 (3) 1090 (4) 1900

Sol. Given that : $20 - 10 = 200$. But, actually $20 \times 10 = 200$. So, - means x

Given that : $8 \div 4 = 12$. But, actually $8 + 4 = 12$. So, ÷ means +.

Given that : $6 \times 2 = 4$. But, actually $6 - 2 = 4$. So, x means -.

Thus, in the given mathematical language, - means x, ÷ means + and x means -. So, + means ÷. Putting the correct signs, we have :

$$\text{Given expression} = 100 \times 10 - 1000 + 1000 \div 100 - 10 = 1000 - 1000 + 10 - 10 = 0.$$

Hence, the answer is (1).

Ex.4 It being given that : > denotes +, < denotes -, + denotes ÷, - denotes =, = denotes 'less than' and x denotes 'greater than', find which of the following is a correct statement.

- (1) $3 + 2 > 4 = 9 + 3 < 2$ (2) $3 > 2 > 4 = 18 + 3 < 1$
(3) $3 > 2 < 4 \times 8 + 4 < 2$ (4) $3 + 2 < 4 \times 9 + 3 < 3$

Sol. Using proper notations, we have :

(1) Given statement is $3 \div 2 + 4 < 9 \div 3 - 2$ or $\frac{11}{2} < 1$, which is not true.

(2) Given statement is $3 + 2 + 4 < 18 \div 3 - 1$ or $9 < 5$, which is not true.

(3) Given statement is $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true.

(4) Given statement is $3 \div 2 - 4 > 9 \div 3 - 3$ or $-\frac{5}{2} > 0$, which is not true.

Hence, the answer is (3).

Ex. 5 If the given interchanges namely : signs + and \div and numbers 2 and 4 are made in signs and numbers, which one of the following four equations would be correct?

- (1) $2 + 4 \div 3 = 3$ (2) $4 + 2 \div 6 = 1.5$ (3) $4 \div 2 + 3 = 4$ (4) $2 + 4 \div 6 = 8$

Sol. Interchanging (+ and \div) and (2 and 4), we get :

(1) $4 \div 2 + 3 = 3$ or $5 = 3$, which is false.

(2) $2 \div 4 + 6 = 1.5$ or $6.5 = 1.5$, which is false.

(3) $2 + 4 \div 3 = 4$ or $\frac{10}{3} = 4$, which is false.

(4) $4 \div 2 + 6 = 8$ or $8 = 8$, which is true.

Hence, the answer is (4).

Ex. 6 Which one of the four interchanges in signs and numbers would make the given equation correct?

$$3 + 5 - 2 = 4$$

- (1) + and -, 2 and 3 (2) + and -, 2 and 5 (3) + and -, 3 and 5 (4) None of these

Sol. By making the interchanges given in (1), we get the equation as $2 - 5 + 3 = 4$ or $0 = 4$, which is false.

By making the interchanges given in (2), we get the equation as $3 - 2 + 5 = 4$ or $6 = 4$, which is false.

By making the interchanges given in (3), we get the equation as $5 - 3 + 2 = 4$ or $4 = 4$, which is true.

Hence, the answer is (3).

EXERCISE

Directions : (Q.1 to Q. 3) : Answer the questions on the basis of the information given below. If '\$' represents '+', '*' represents '-', '#' represents '×', '@' represents '/' then answer the following questions bases on the above given representation.

1. What is the value of $4 \# 3 \$ 10 @ 5 \$ 8 \# 2 * 18$?
 (1) 10 (2) 12 (3) 6.8 (4) 11.2
2. Which of the following has the value equivalent of $5 \$ 6 \# 2 \$ 8 @ 4$?
 (1) $4 \# 7 * 12 \$ 2 \# 1$ (2) $8 \# 2 * 3 \$ 6 @ 3$ (3) $8 @ 2 - 3 \$ 6 \# 3$ (4) $4 \$ 7 * 12 \$ 2 \# 1$
3. Which of the given values is greater than $7 \$ 3 * 2 \$ 12 @ 4$?
 (1) $4 \# 3 \$ 6 @ 3 * 4$ (2) $5 \# 2 * 8 @ 4 \$ 3 \# 3 * 7$
 (3) $6 \# 3 * 18 @ 2 \$ 1 \# 2$ (4) $9 @ 3 \$ 6 \# 2 * 2 \# 1$
4. Correct the following equation by interchanging two signs :
 $16 - 21 \div 7 \times 6 + 3 = 31$
 (1) - and + (2) + and × (3) ÷ and + (4) ÷ and ×

Directions (Q.5 & Q.6): In each of the following questions, which one of the four interchanges in signs and numbers would make the given equation correct?

5. $6 \times 4 + 2 = 16$
 (1) + and ×, 2 and 4 (2) + and ×, 2 and 6 (3) + and ×, 4 and 6 (4) None of these
6. $4 \times 6 - 2 = 14$
 (1) × to ÷, 2 and 4 (2) - to ×, 2 and 6 (3) - to +, 2 and 6 (4) × to +, 4 and 6
7. It is given that : > denotes +, < denotes -, + denotes ÷, - denotes =, = denotes 'less than' and × denotes 'greater than', find which of the following is a correct statement.
 (1) $3 + 2 < 4 = 9 + 3 < 1$ (2) $3 > 2 > 4 = 18 + 3 < 2$
 (3) $3 > 2 < 4 \times 8 + 4 < 2$ (4) $3 + 2 < 4 \times 9 + 3 < 3$
8. If '×' stands for 'addition', '<' for 'subtraction', '+' for 'division', '>' for 'multiplication', '=' for 'equal to', '÷' for 'greater than' and '-' for 'less than', then state which of the following is true?
 (1) $3 \times 4 > 2 - 9 + 3 < 3$ (2) $5 \times 3 < 7 \div 8 + 4 \times 1$
 (3) $5 > 2 + 2 = 10 < 4 \times 8$ (4) $3 \times 2 < 4 \div 16 > 2 + 4$
9. If '+' stands for 'division', '÷' stands for 'multiplication', '×' stands for 'subtraction' and '-' stands for 'addition', which one of the following is correct?
 (1) $18 \div 6 \times 7 + 5 - 2 = 22$ (2) $18 \times 6 + 7 \div 5 - 2 = 16$
 (3) $18 \div 6 - 7 + 5 \times 2 = 20$ (4) $18 + 6 \div 7 \times 5 - 2 = 18$

Directions : (Q.10 to Q. 14) : In the following question, different letters stand for various symbols as indicated below:

R : Addition	S : Subtraction	T : Multiplication	U : Division
V : Equal to	W : Greater than	X : Less than	

Out of the four alternatives given in these questions, only one is correct according to the above letter symbols. Identify the correct one.

10. (1) $16 T 2 R 4 U 6 X 8$ (2) $16 R 2 S 4 V 6 R 8$ (3) $16 T 2 U 4 V 6 R 8$ (4) $16 U 2 R 4 S 6 W 8$

11. (1) 20 U 4 R 4 X 2 T 3 (2) 20 S 4 U 4 V 2 T 3 (3) 20 T 4 U 4 U 2 X 3 (4) 20 R 4 U 4 S 2 W 3
12. (1) 15 U 5 R 3 V 2 T 3 (2) 15 U 5 W 3 R 2 T 3 (3) 15 S 5 T 3 W 2 R 3 (4) 15 R 5 U 3 V 2 R 3
13. (1) 24 U 3 R 2 S 2 W 8 (2) 24 S 3 X 2 T 2 U 8 (3) 24 R 3 S 2 X 2 T 8 (4) 24 U 3 T 2 V 2 T 8
14. (1) 30 R 6 U 2 W 4 T 3 (2) 30 S 6 S 2 X 4 T 3 (3) 30 S 6 U 2 U 4 V 3 (4) 30 U 6 R 2 W 4 T 3
15. If 'P' means '+'; 'R' means 'x'; 'S' means '-'; 'T' means '÷' then what is the value of 5 R 9 P 7 S 9 T 3 P 6 = ?
- (1) 54 (2) 128 (3) 59 (4) 55
16. If ÷ means +, - means ÷, x means - and + means x, then ?

$$\frac{(32 \times 8) - 8 \times 2}{4 + 188 + 91} = \frac{(32 - 8) \div 8 - 2}{4 \times 188 \div 91} = \frac{24 \div 8 - 2}{4 \times 188 \div 91} = \frac{3 - 2}{4 \times 188 \div 91} = 1$$

□

- (1) 0 (2) 1 (3) 12 (4) None of these
17. If L denoted ÷, M denotes x, P denotes + and Q denotes -, then which of following statements is true ?
- (1) 32 P 8 L 16 Q 4 = 3/2 (2) 6 M 18 Q 26 L 13 P 7 = 173/13
- (3) 11 M 34 L 17 Q 8 L 3 = 38/3 (4) 9 P 9 L 9 Q 9 M 9 = - 71
18. If + means ÷, ÷ means -, - means x, x means +, then 12 + 6 ÷ 3 - 2 x 8 = ?
- (1) -2 (2) 2 (3) 4 (4) 8
19. If + means -, - means x, x means + and ÷ means ÷ then 15 - 3 + 10 x 5 ÷ 5 = ?
- (1) 5 (2) 22 (3) 48 (4) 52
20. If x means ÷, ÷ means x, + means - and - means +, then (3 - 15 ÷ 19) x 8 + 6 = ?
- (1) -1 (2) 2 (3) 4 (4) 8

EXERCISE

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	4	2	3	3	3	3	4	2	4	1	4	1	4	2	4	3	3	2