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MATHEMATICAL OPERATION

Under this type of problem, usually mathematical symbol are converted into another form by either interchanging the symbol or using different symbol in place of usual symbol and then calculate the equation according to the given condition.

EXAMPLE 1. If '+' stands for division, '×' stands for addition, '-' stands for multiplication, and '÷' stands for subtraction, then which of the following equation 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) $36 - 6 + 3 \times 5 \div 3 = 74$

Sol. (d) $36 \times 6 \div 3 + 5 - 3$
 $\Rightarrow 36 \times 2 + 5 - 3 = 74$

EXAMPLE 2. 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) $8 R 8 P 8 S 8 Q = 57$
 (d) $36 R 4 S 8 Q 7 P 4 = 10$

Sol. (c) $8 R 8 P 8 S 8 Q$
 $= 8 \times 8 + 8 \div 8 - 8$
 $= 8 \times 8 + \frac{8}{8} - 8$
 $= 64 + 1 - 8 = 57$

EXAMPLE 3. Select correct combination of mathematical sign to replace '*' sign to balance the equation.

- $9 * 4 * 22 * 14$
 (a) $\times = -$ (b) $\times - =$
 (c) $= - \times$ (d) $- \times =$

Sol. (b) $9 * 4 * 22 * 14$
 $9 \times 4 - 22 = 14$

EXAMPLE 4. $\square \rightarrow$ means is 'bigger than'

$\triangle \rightarrow$ means is 'smaller than'

$\bigcirc \rightarrow$ means is 'equal to'

$\times \rightarrow$ means 'plus'

$= \rightarrow$ means 'minus'

If a \square c and $b \times d \bigcirc$ c, then

- (a) $d \square a$ (b) $a \bigcirc d$
 (c) $b \square c$ (d) $d \triangle a$

Sol. (d) $a > c$ and $b + d = c$
 $\Rightarrow a > b + d$ and this is true only if, $d < a$
 $\Rightarrow d \triangle a$

EXAMPLE 5. Given interchange : sign '+' and '-' and numbers 5 and 8. Which of the following is correct?

- (a) $82 - 35 + 55 = 2$ (b) $82 - 35 + 55 = 102$
 (c) $85 - 38 + 85 = 132$ (d) $52 - 35 + 55 = 72$

Sol. (a) $52 + 38 - 88 = 2$



EXERCISE



- If '+' means '-', '-' means '×', '÷' means '+' and '×' means '÷', then $10 \times 5 \div 3 - 2 + 3 = ?$
 (a) 5 (b) 21 (c) $\frac{53}{3}$ (d) 18
- If '+' means '÷', '-' means '×', '÷' means '+' and '×' means '-', then $63 \times 24 + 8 \div 4 + 2 - 3 = ?$
 (a) 54 (b) 66 (c) 186 (d) 48
- Which one of the following is correct?
 $6 * 4 * 9 * 15$
 (a) $\times, =, -$ (b) $\times, -, =$ (c) $=, \times, -$ (d) $-, \times, =$
- If $> = \div$, $\vee = \times$, $< = +$, $\wedge = -$, $+ = <$, $\times = =$, $- = >$
 (a) $6 > 2 > 3 \wedge 8 \vee 4 + 13$ (b) $6 \wedge 2 < 3 > 8 < 4 - 13$
 (c) $6 \vee 2 < 3 \wedge 8 > 4 \times 13$ (d) $6 > 2 \vee 3 < 8 \wedge 4 + 13$
- Find out the correct answer for the unsolved equation on the basis of the given equations.
 If $6 * 5 = 91$, $8 * 7 = 169$, $10 * 7 = 211$, then $11 * 10 = ?$
 (a) 331 (b) 993 (c) 678 (d) 845
- If '-' stands for division, '+' for multiplication '÷' for subtraction and '×' for addition. Which one of the following equation is correct?
 (a) $6 \div 20 \times 12 + 7 - 1 = 70$ (b) $6 + 20 - 20 \div 7 \times 1 = 62$
 (c) $6 - 20 \div 12 \times 7 + 1 = 57$ (d) $6 + 20 - 20 \div 7 - 1 = 38$

7. In an imaginary mathematical operation '+' means multiplication, '×' means subtraction, '÷' means addition and '-' means division. All other rules in mathematical operation are the same as in the existing system. Which one of the following gives the result of $175 - 25 \div 5 + 20 \times 3 + 10 = ?$
 (a) 160 (b) 2370 (c) 77 (d) 240
8. If L stands for +, M stands for -, N stands for ×, P stands for ÷, then $14 N 10 L 42 P 2 M 8 = ?$
 (a) 153 (b) 216 (c) 248 (d) 251
9. It being given that: > denotes +, < denotes -, + denotes ÷, - denotes =, = denotes 'less than' and × denotes 'greater than'. Find which of the following is a correct statement.
 (a) $3 + 2 > 4 = 9 + 3 < 2$ (b) $3 > 2 > 4 = 18 + 3 < 1$
 (c) $3 > 2 < 4 \times 8 + 4 < 2$ (d) $3 + 2 < 4 \times 9 + 3 < 3$
10. If '-' stand for addition, '+' stands for subtraction, '÷' stands for multiplication and '×' stands for division, then which one of the following equations is correct?
 (a) $25 \times 5 \div 20 - 27 + 7 = 120$
 (b) $25 + 5 \times 20 - 27 \div 7 = 128$
 (c) $25 + 5 - 20 + 27 \times 7 = 95$
 (d) $25 - 5 + 20 \times 27 \div 7 = 100$
11. 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?
 (a) $3 \times 4 > 2 - 9 + 3 < 3$ (b) $5 \times 3 < 7 \div 8 + 4 \times 1$
 (c) $5 > 2 + 2 = 10 < 4 \times 8$ (d) $3 \times 2 < 4 \div 16 > 2 + 4$

DIRECTIONS (Qs. 12 - 15): In an imaginary language, the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are substituted by a, b, c, d, e, f, g, h, i and j. And 10 is written as ba.

12. $(cd + ef) \times bc$ is equal to
 (a) 684 (b) 816 (c) 916 (d) 1564
13. $dc \times f - (bf - d) \times d$ is equal to
 (a) abb (b) abe (c) bce (d) bcf
14. $baf + fg - (ca \times h/be)$ is equal to
 (a) 141 (b) 145 (c) 151 (d) 161
15. $baf \div bf \times d$ is equal to
 (a) df (b) cb (c) be (d) d
16. In the following question, some relationship have been expressed through symbols which are
 × = greater than θ = not less than
 ÷ = less than β = not greater than
 + = equal to φ = not equal to,
 then $A \theta B \times C$ implies
 (a) $B \theta C$ (b) $A \div C$ (c) $A \phi C$ (d) $B \beta C$
17. If the given interchanges namely : signs + and ÷ and numbers 2 and 4 are made in signs and numbers, which one of the following four equations would be correct ?
 (a) $2 + 4 \div 3 = 3$ (b) $4 + 2 \div 6 = 1.5$
 (c) $4 \div 2 + 3 = 4$ (d) $2 + 4 \div 6 = 8.$
18. If L denotes ×, M denotes ÷, P denotes + and Q denotes -, then $8 P 36 M 6 Q 6 M 2 L 3 = ?$
 (a) $\frac{13}{6}$ (b) $-\frac{1}{6}$ (c) $14\frac{1}{2}$ (d) 5
19. If × stands for 'addition', < for 'subtraction', + stands for 'division', > for 'multiplication', =, stands for 'equal to', ÷ for 'greater than' and = stands for 'less than', state which of the following is true ?
 (a) $3 \times 2 < 4 \div 16 > 2 + 4$ (b) $5 > 2 + 2 = 10 < 4 \times 2$
 (c) $3 \times 4 > 2 - 9 + 3 < 3$ (d) $5 \times 3 < 7 \div 8 + 4 \times 1$
20. If '20 - 10' means 200, '8 ÷ 4' means 12, '6 × 2' means 4 and '12 + 3' means 4, then
 $100 - 10 \times 1000 \div 1000 + 100 \times 10 = ?$
 (a) 1090 (b) 0 (c) 1900 (d) 20
21. If '+' means '×'; '-' means '÷'; '×' means '-' and '÷' means '+' then $9 + 8 \div 8 - 4 \times 9 = ?$
 (a) 26 (b) 17 (c) 65 (d) 11
22. If '÷' means '+'; '-' means '×'; '+' means '÷' and '×' means '-' then $20 \div 12 \times 4 + 8 - 6 = ?$
 (a) $8\frac{2}{3}$ (b) 29 (c) 32 (d) 26
23. If → stands for 'addition' ← stands for 'subtraction' ↑ stands for 'division'; ↓ stands for 'multiplication' ↗ stands for 'equal to' then which of the following alternatives is correct?
 (a) $7 \leftarrow 43 \uparrow 6 \downarrow 1 \nearrow 4$
 (b) $3 \downarrow 6 \uparrow 2 \rightarrow 3 \leftarrow 6 \nearrow 5$
 (c) $5 \rightarrow 7 \leftarrow 3 \uparrow 2 \nearrow 5$
 (d) $2 \downarrow 5 \leftarrow 6 \rightarrow 2 \nearrow 6$
24. If '×' Stands for 'addition' '<' for subtraction '+' for division' > for multiplication' '-' for equal to' '+' for 'greater than' and '=' for 'less than' state which of the following is true. ?
 (a) $3 \times 4 > 2 - 9 + 3 < 3$ (b) $5 \times 3 < 7 \div 8 + 4 \times 1$
 (c) $5 > 2 + 2 = 10 < 4 \times 8$ (d) $3 \times 2 < 4 \div 16 > 2 + 4$
25. If ÷ means + - means ÷ × means - and + means × then
 $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 + 1} = ?$
 (a) 0 (b) 8 (c) 12 (d) 16
26. If × means +, - means ×, ÷ means + and + means - then $(3 - 15 \div 19) \times 8 + 6 = ?$
 (a) -1 (b) 2 (c) 4 (d) 8
27. If + means ÷, - means ×, × means +, ÷ means -, then $90 + 18 - 6 \times 30 \div 4 = ?$
 (a) 64 (b) 65 (c) 56 (d) 48
28. Given below are numbers in the first line and symbols in the second line. Numbers and symbols are code for each other. Choose the correct code for given symbols.
 1 2 3 4 5 6 7 8 9
 + - × ÷ ≠ ↑ → □ β
 Which number can be decoded from the following :
 $\neq \square \uparrow \times \rightarrow$
 (a) 5 8 6 3 7 (b) 5 6 8 7 3
 (c) 5 7 8 6 3 (d) 5 8 3 6 7
29. If '-' stands for '+', '+' stands for '×', '×' stands for '-' then which one of the following is not correct ?
 (a) $22 + 7 - 3 \times 9 = 148$ (b) $33 \times 5 - 10 + 20 = 228$
 (c) $7 + 28 - 3 \times 52 = 127$ (d) $44 - 9 + 6 \times 11 = 87$
30. Some equations are solved on the basis of a certain system. Find the correct answer for the unsolved equation on that basis.
 $5 * 6 = 35, 8 * 44 = 28, 6 * 8 = ?$
 (a) 46 (b) 34 (c) 23 (d) 38
31. Select the correct combination of mathematical signs to replace * signs and to balance the following equation.
 $12 * 3 * 4 = 6 * 8 * 8$

- (a) +, ×, -, × (b) ×, +, -, ×
 (c) ×, +, ×, - (d) ×, -, ×, +
32. Which of the following interchange of signs would the equation correct?
 $6 \times 4 + 2 = 16$
 (a) + and ×, 2 & 4 (b) + and ×, 4 & 6
 (c) + and ×, 2 & 6 (d) + and ×, 3 & 4
33. Select the correct combination of mathematical sings to

replace the * sings and to balance the following equation :

$$(45 * 3 * 6) * 6 * 15$$

- (a) + × ÷ = (b) + ÷ × =
 (c) + × - = (d) ÷ × ÷ =
34. Select the correct combination of mathematical sings to replace * sings and to balance the following equation :
 $8 * 5 * 10 * 2 * 25$
 (a) + × ÷ = (b) + ÷ - =
 (c) × + = × (d) × - = ×

ANSWER KEY

1	(a)	6	(a)	11	(c)	16	(a)	21	(c)	26	(b)	31	(c)
2	(b)	7	(c)	12	(b)	17	(d)	22	(b)	27	(c)	32	(b)
3	(b)	8	(a)	13	(c)	18	(d)	23	(d)	28	(a)	33	(d)
4	(c)	9	(c)	14	(c)	19	(b)	24	(c)	29	(c)	34	(c)
5	(a)	10	(a)	15	(b)	20	(b)	25	(a)	30	(a)		

HINTS & SOLUTIONS

1. (a)

+ ⇒ -	- ⇒ ×
÷ ⇒ +	× ⇒ ÷

 $10 \times 5 \div 3 - 2 + 3 = ?$
 or, $? = 10 \div 5 + 3 \times 2 - 3$
 or, $? = 2 + 6 - 3 = 5$
2. (b)

+ ⇒ ÷	- ⇒ ×
÷ ⇒ +	× ⇒ -

 $63 \times 24 + 8 \div 4 + 2 - 3 = ?$
 or, $? = 63 - 24 \div 8 + 4 \div 2 \times 3$
 or, $? = 63 - 3 + 2 \times 3$
 or, $? = 66$
3. (b) $6 \times 4 - 9 = 15$
4. (c)

> ⇒ ÷	√ ⇒ ×	< ⇒ +	- ⇒ >
∧ ⇒ -	+ ⇒ <	× ⇒ <	

 $6 \times 2 + 3 - 8 \div 4 = 13$
 $6 \times 2 + 3 - 2 = 13$
 $12 + 3 - 2 = 13$
 $15 - 2 = 13$
5. (a) $6 \times 5 = 30, 30 \times 3 + 1 = 91, 8 \times 7 = 56, 56 \times 3 + 1 = 169, 10 \times 7 = 70, 70 \times 3 + 1 = 211$
 Similarly $11 \times 10 = 110, 110 \times 3 + 1 = 331$
6. (a)

- ⇒ ÷, + ⇒ ×
÷ ⇒ -, × ⇒ +

 Option (a) : $6 \div 20 \times 12 + 7 - 1 = 70$
 L.H.S. = $6 - 20 + 12 \times 7 \div 1$
 $= 6 - 20 + 84$
 $= 90 - 20 = 70$ R. H.S.
7. (c)

+ ⇒ ×, × ⇒ -
÷ ⇒ +, - ⇒ ÷

 Given expression → $175 - 25 \div 5 + 20 \times 3 + 10$
 After conversion ⇒ $175 \div 25 + 5 \times 20 - 3 \times 10$
 $= 7 + 100 - 30$
 $= 77$
8. (a) Using the proper signs, we get
 Given expression = $14 \times 10 + 42 \div 2 - 8$
 $= 140 + 21 - 8$
 $= 153$
9. (c) Using proper notations, we have:
 (a) Given statement is $3 \div 2 + 4 < 9 \div 3 - 2$ or $\frac{11}{2} < 1$ not true
 (b) $3 + 2 + 4 < 18 \div 3 - 1$ or $9 < 5$, which is not true.
 (c) $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true
 (d) $3 \div 2 - 4 > 9 \div 3 - 3$ or $-\frac{5}{2} > 0$, which is not true.
10. (a) Solve by options, we can check all the options one by one.
 $25 \div 5 \times 20 + 27 - 7 \Rightarrow 5 \times 20 + 27 - 7 \Rightarrow 100 + 27 - 7$
 $120 = 120$
11. (c) Using the proper notations in (c), we get the statement as:-
 $5 \times 2 \div 2 < 10 - 4 + 8$
 or, $5 \times 1 < 18 - 4$
 or $5 < 12 \rightarrow$ which is true.
12. (b) Using the correct symbols, we have
 Given expression = $(23 + 45) \times 12 = 68 \times 12 = 816$.
13. (c) Given expression = $32 \times 5 - (15 - 3) \times 3$
 $= 160 - 12 \times 3$
 $= 160 - 36 = 124 = bce$

14. (c) Given expression = $105 + 56 - (20 \times 7/14)$
 $= 105 + 56 - 10$
 $= 151$

15. (b) Given expression = $105 \div 15 \times 3$
 $= 7 \times 3 = 21 = cb$

16. (a) $A \theta B \times C$
 $A \theta B; B \times C$
 $\therefore A \geq B; B > C$

Hence, option (a) implies the given equation.

17. (d) 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.

18. (d) Using the correct symbols, we have:
 Given expression = $8 + 36 \div 6 - 6 \div 2 \times 3$
 $= 8 + 6 - 3 \times 3 = 5$

19. (b) Using the proper notations in (2), we get the statement as $5 \times 2 \div 2 < 10 - 4 + 2$ or $5 < 8$, which is true.

20. (b) Since, $20 \times 10 = 200$, therefore, $-$ means \times
 $8 + 4 = 12$, therefore, \div means $+$.
 $6 - 2 = 4$, therefore, \times means $-$.
 and $12 \div 3 = 4$, therefore, $+$ means \div .

Now, given expression
 $= 100 \times 10 - 1000 + 1000 \div 100 - 10$
 $= 1000 - 1000 + 10 - 10 = 0$

21. (c) $9 \times 8 + 8 \div 4 - 9 = 65$

22. (b) $20 + 12 - 4 \div 8 \times 6 = 29$

23. (d) Using the proper notations in (4) we get the statement as $2 \times 5 - 6 + 2 = 6$ or $10 - 6 + 2 = 6$ or $6 = 6$, which is true.

24. (c) Using the proper notations in (3), we get the statement as $5 \times 2 \div 2 < 10 - 4 + 8$ or $5 \times 1 < 18 - 4$ or $5 < 14$, which is true.

25. (a) Using the correct symbols, we have
 Given expression
 $= \frac{(36 - 4) \div 8 - 4}{4 \times 8 - 2 \times 16 + 1} = \frac{32 \div 8 - 4}{32 - 32 + 1} = \frac{4 - 4}{0 + 1} = 0.$

26. (b) Using the correct symbols, we have
 Given expression = $(3 \times 15 + 19) \div 8 - 6$
 $= 64 \div 8 - 6 = 8 - 6 = 2.$

27. (c) $90 \div 18 \times 6 + 30 - 4 = 56$

28. (a) $\# \square \uparrow \times \rightarrow$
 $\uparrow \uparrow \uparrow \uparrow \uparrow$
 Decoded as $\rightarrow 5 \ 8 \ 6 \ 3 \ 7$

29. (c) By options -
 (a) $22 \times 7 + 3 - 9 = 148$
 $154 + 3 - 9$

(b) $33 - 5 + 10 \times 20 = 228$
 $33 - 5 + 200$
 $200 + 33 - 5$
 $233 - 5 = 228$ (correct)

(c) $7 \times 28 + 3 - 52 = 127$
 $196 + 3 - 52$
 $199 - 52 = 147$ (incorrect)
 (d) $44 + 9 \times 6 - 11 = 87$
 $44 + 54 - 11$
 $98 - 11 = 87$ (correct)

30. (a) $5 * 6/2 = 3 \ 5$
 $8 * 4/2 = 2 \ 8$
 $6 * 8/2 = 4 \ 6$

31. (c) By options,
 (a) $12 + 3 \times 4 = 6 - 8 \times 8$
 $12 + 12 = 6 - 64$
 $24 = 58$ (incorrect)
 $\therefore 58 > 24$

(b) $12 \times 3 + 4 = 6 - 8 \times 8$
 $36 + 4 = 6 - 64$
 $40 = 58$ (incorrect)
 $\therefore 58 > 48$

(c) $12 \times 3 + 4 = 6 \times 8 - 8$
 $36 + 4 = 48 - 8$
 $40 = 40$ (correct)

(d) $12 \times 3 - 4 = 6 \times 8 + 8$
 $36 - 4 = 48 + 8$
 $32 = 56$ (incorrect)
 $\therefore 56 > 32$

32. (b) $4 + 6 \times 2 = 16$

33. (d) $(45 \div 3 \times 6) \div 6 = 15$

34. (c) $8 \times 5 + 10 = 2 \times 25$
 $50 = 50$