SIMPLIFICATION OF NUMERICAL EXPRESSIONS

Simplification

Many times different operations like addition, subtraction, multiplication and division are involved simultaneously in the expression. The process of simplify these expressions is known as simplification. In order to simplify an arithmetic expression we must follow the rule of VBODMAS.

VBODMAS Rule

The operation have to be carried out in the order in which they appear in the word 'VBODMAS', where

V → Vinculum (a horizontal line drawn over a group of term or bar '⁻')
B → Bracket [], {},()
O → Of (×)
D → Division (÷)
M → Multiplication (×)
A → Addition (+)
S → Subtraction (−)

↗ 'Of ' means multiplication but is operated even before division.

↗ If there is no sign between a number and bracket, it indicates multiplication.
e.g. $5(4+2)=5\times6=30$

Example 1. Simplify $(27-25)(12+1)$.

   (1) 24   (2) 21
   (3) 23   (4) 26

Sol. (4) $(27-25)(12+1)=2\times13=26$

Example 2. Simplify $\dfrac{4}{9}\times\dfrac{18}{5}\div\dfrac{24}{5}$.

   (1) $\dfrac{1}{4}$ (2) $\dfrac{2}{3}$
   (3) $\dfrac{1}{3}$ (4) $\dfrac{7}{6}$

Sol. (3) $\dfrac{4}{9}\times\dfrac{18}{5}\times\dfrac{5}{24}=\dfrac{1}{3}$

Example 3. Simplify $\left[\dfrac{2}{5}+\dfrac{1}{7}\right]\div\left[\dfrac{1}{5}-\dfrac{1}{8}\right]-\dfrac{5}{21}$.

   (1) 8   (2) 7   (3) 9   (4) 10

Sol. (2) $\left[\dfrac{14+5}{35}\right]\div\left[\dfrac{8-5}{40}\right]-\dfrac{5}{21}=\dfrac{19}{35}\div\dfrac{3}{40}-\dfrac{5}{21}$

     $=\dfrac{19}{35}\times\dfrac{40}{3}-\dfrac{5}{21}=\dfrac{152}{21}-\dfrac{5}{21}=\dfrac{147}{21}=7$

Example 4. Simplify $\left(\dfrac{5+5\times5}{5\times5+5}\right)\times\left(\dfrac{\frac{1}{5}\div\frac{1}{5}\text{ of }\frac{1}{5}}{\frac{1}{5}\text{ of }\frac{1}{5}\div\frac{1}{5}}\right)$

   (1) 25   (2) 26   (3) 22   (4) 28

Sol. (1) $\left(\dfrac{5+25}{25+5}\right)\times\left(\dfrac{\frac{1}{5}\div\frac{1}{5}\times\frac{1}{5}}{\frac{1}{5}\times\frac{1}{5}\div\frac{1}{5}}\right)=\left(\dfrac{30}{30}\right)\times\left(\dfrac{\frac{1}{5}\div\frac{1}{25}}{\frac{1}{25}\div\frac{1}{5}}\right)$

     $=1\times\dfrac{\frac{1}{5}\times\frac{25}{1}}{\frac{1}{25}\times\frac{5}{1}}$

     $=\dfrac{\frac{5}{1}}{\frac{1}{5}}=5\times\dfrac{5}{1}=25$

Entrance Corner

1. Simplification of the following gives

$$15\frac{1}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div 1\frac{3}{4}\right)\right] \times 2$$ **[JNV 2019]**

   (1) $\frac{2}{9}$ (2) $\frac{7}{2}$ (3) $\frac{9}{2}$ (4) $\frac{11}{2}$

2. Simplify $\dfrac{\frac{7}{3} \times \frac{2}{3} \div \frac{3}{5}}{2 + 1\frac{2}{3}}$. **[JNV 2017]**

   (1) 99/70 (2) 70/99 (3) 33/30 (4) 70/27

3. What is the product of
   $9680 \times 10 \times 14 \times 0 \times 8$? **[JNV 2016]**
   (1) 561260 (2) 642976
   (3) 912040 (4) 0

4. The simplification of $641664 \div 16$ will be
   (1) 4104 (2) 40104 **[JNV 2015]**
   (3) 41404 (4) 41004

5. The simplification of
   $24 + [6 - \{5 - 2(4 - 3)\}]$ gives the result
   (1) 22 (2) 23 **[JNV 2015]**
   (3) 24 (4) 27

6. Karan obtains 10 more marks than Bhavana. Isha obtain 5 less marks than Bhavana. What is the marks of Karan if all three obtain total 140 marks? **[JNV 2013]**
   (1) 40 (2) 45 (3) 50 (4) 55

7. Solve $12 \times 10 \div \dfrac{120}{240} = ? \times 120$. **[JNV 2012]**
   (1) 12 (2) 10 (3) 2 (4) 240

8. Simplify $10\frac{2}{5} \times 8\frac{4}{5} \div 4\frac{2}{5}$. **[JNV 2011]**
   (1) $20\frac{4}{5}$ (2) $\frac{5}{104}$ (3) 64 (4) 21

9. $[\{(6 \div 2) \times 3\} \times 2]$ is equal to **[JNV 2011]**
   (1) 11 (2) 18 (3) 13 (4) 27

10. $1\frac{1}{24} - 1 + \frac{7}{36}$ is equal to **[JNV 2010]**
   (1) $\frac{17}{72}$ (2) $1\frac{17}{72}$
   (3) $\frac{7}{60}$ (4) $2\frac{7}{60}$

11. $20.08 + 20.008 + 20.0008 + 20$ is equal to **[JNV 2010]**
   (1) 80.0642 (2) 80.8000 (3) 81.0888 (4) 80.0888

12. Simplify $(0.50 + 0.15 \div 0.05) \times \frac{2}{7}$. **[JNV 2007]**
   (1) 1 (2) 0 (3) 3 (4) 5

13. What is the result of simplification of the expression $2.5 \div 0.5 \times 0.1 - 0.05$? **[JNV 2005]**
   (1) 0.45 (2) 49.95 (3) 0.25 (4) 100

14. The simplification of $1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$
   in decimal form gives **[JNV 2004, 1996]**
   (1) 1.0001 (2) 1.111 (3) 1.001 (4) 0.111

15. The simplification of
   $10 + 4 \div 2 - 3 \times 2 + 4 \div 2 \times 2 - 4$ gives
   [JNV 2004, 1995]
   (1) 0 (2) 1 (3) 6 (4) 8

16. The simplification of $6 \div 6 + 6 \times 6 - 6$ gives
   [JNV 2003]
   (1) 1 (2) 7 (3) 31 (4) 36

17. If $178 \times 34 = 6052$, what is $60.52 \div 17.8$?
   [JNV 2002, 1996]
   (1) 34 (2) 3.4 (3) 0.34 (4) 0.034

18. On simplifying $15 \times 4 - 10 \div 5$, we get
   [JNV 2002]
   (1) 10 (2) 30 (3) 58 (4) 120

19. The simplification of
   $98 - [65 + \{32 - (12 + 5)\}]$ gives the result
   (1) 8 (2) 18 **[JNV 2001]**
   (3) 178 (4) 212

20. The value of $50 \times 5 \times 0.05$ is **[JNV 2001]**
   (1) 1.25 (2) 12.50
   (3) 125 (4) 1250

21. Which of the following is equal to
   $\frac{3}{2} \div \frac{3}{2} \times 2 + \frac{3}{2}$? **[JNV 2000]**
   (1) 2 (2) 6 (3) $\frac{7}{2}$ (4) $\frac{2}{7}$

22. The value of $\{2(18 - 3)\} + 5(12 - 7)$ is
   [JNV 2000]
   (1) 5 (2) 25 (3) 30 (4) 55

23. Value of $2 - 3 + 4 + 3 - 3 - 2$ is equal to
   [JNV 1999]
   (1) 1 (2) 2 (3) 3 (4) 4

24. Value of $\frac{3}{4} + 1\frac{1}{4} - \frac{1}{4}$ is equal to **[JNV 1999]**
   (1) $\frac{3}{10}$ (2) $\frac{3}{5}$ (3) $1\frac{1}{3}$ (4) $1\frac{3}{4}$

25. Value of $12 \times 8 - 4 \div 4$ is equal to **[JNV 1999]**
   (1) 12 (2) 23 (3) 84 (4) 95

26. $60 \times 7 + 3 \times 60$ is equal to　　**[JNV 1998]**

(1) 130　　(2) 600　　(3) 25380　　(4) 3600

27. Value of $2(12 - 3) + 4(10 - 7)$ is　　**[JNV 1998]**

(1) 18　　(2) 30　　(3) 54　　(4) 66

Answers

1. (3)	**2.** (2)	**3.** (4)	**4.** (2)	**5.** (4)	**6.** (4)	**7.** (3)	**8.** (1)	**9.** (2)	**10.** (1)
11. (4)	**12.** (1)	**13.** (1)	**14.** (2)	**15.** (3)	**16.** (3)	**17.** (2)	**18.** (3)	**19** (2)	**20.** (2)
21. (3)	**22.** (4)	**23.** (1)	**24.** (4)	**25.** (4)	**26.** (2)	**27.** (2)			

Hints and Solutions

1. Given expression, $15\frac{1}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div 1\frac{3}{4}\right)\right] \times 2$

By applying VBODMAS,

$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div \frac{7}{4}\right)\right] \times 2$

$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \frac{7 \times 4}{7}\right] \times 2 = \frac{31}{2} - \left[\frac{3}{2} + 4\right] \times 2$

$= \frac{31}{2} - \left[\frac{11}{2}\right] \times 2 = \frac{31}{2} - 11 = \frac{31 - 22}{2} = \frac{9}{2}$

2. $\dfrac{\frac{7}{3} \times \frac{2}{3} \div \frac{3}{5}}{2 + 1\frac{2}{3}} = \dfrac{\frac{7}{3} \times \frac{2}{3} \times \frac{5}{3}}{2 + \frac{5}{3}} = \dfrac{\frac{70}{27}}{\frac{11}{3}} = \frac{70 \times 3}{27 \times 11} = \frac{70}{99}$

3. We know that if we multiply by zero in any number, resultant will be zero.

$\therefore 9680 \times 10 \times 14 \times 0 \times 8 = 0$

4. $\therefore$ Required value $= 641664 \div 16 = 40104$

5. $24 + [6 - \{5 - 2(4 - 3)\}] = 24 + [6 - \{5 - 2 \times 1\}]$

$= 24 + [6 - 3] = 24 + 3 = 27$

6. Suppose Bhavana's marks $= x$

$\therefore$ Isha's marks $= x - 5$

and Karan's marks $= x + 10$

Then, $x + x - 5 + x + 10 = 140$

$\Rightarrow \qquad\qquad 3x + 5 = 140$

$\Rightarrow \qquad\qquad 3x = 135$

$\Rightarrow \qquad\qquad x = 45$

Hence, Karan's marks $= 45 + 10 = 55$

7. $? \times 120 = 12 \times 10 \div \frac{120}{240}$

$\Rightarrow \qquad ? \times 120 = 120 \div \frac{1}{2}$

$\Rightarrow \qquad ? \times 120 = 120 \times 2$

$\therefore \qquad\qquad ? = \frac{120 \times 2}{120} = 2$

8. $10\frac{2}{5} \times 8\frac{4}{5} \div 4\frac{2}{5} = \frac{52}{5} \times \frac{44}{5} \div \frac{22}{5}$

$= \frac{52}{5} \times \frac{44}{5} \times \frac{5}{22} = \frac{52}{5} \times 2 = \frac{104}{5} = 20\frac{4}{5}$

9. $[\{(6 \div 2) \times 3\} \times 2] = [\{3 \times 3\} \times 2] = [9 \times 2] = 18$

10. $1\frac{1}{24} - 1 + \frac{7}{36} = \frac{25}{24} - 1 + \frac{7}{36}$

$= \frac{1}{24} + \frac{7}{36} = \frac{3 + 14}{72} = \frac{17}{72}$

11. $20.08 + 20.008 + 20.0008 + 20 = 80.0888$

12. $(0.50 + 0.15 \div 0.05) \times \frac{2}{7}$

$= \left(0.50 + 0.15 \times \frac{1}{0.05}\right) \times \frac{2}{7}$

$= (0.50 + 3) \times \frac{2}{7} = 3.5 \times \frac{2}{7} = \frac{7}{7} = 1$

13. Expression $= 2.5 \div 0.5 \times 0.1 - 0.05$

$= \frac{2.5}{0.5} \times 0.1 - 0.05$

$= 5 \times 0.1 - 0.05 = 0.5 - 0.05 = 0.45$

14. $1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$

$= 1 + 0.1 + 0.01 + 0.001 = 1.111$

15. $10 + 4 \div 2 - 3 \times 2 + 4 \div 2 \times 2 - 4$

$= 10 + 2 - 3 \times 2 + 2 \times 2 - 4$

$= 10 + 2 - 6 + 4 - 4$

$= 10 + 2 + 4 - 6 - 4 = 16 - 10 = 6$

16. $6 \div 6 + 6 \times 6 - 6 = 1 + 6 \times 6 - 6$

$= 1 + 36 - 6 = 37 - 6 = 31$

17. $\because 178 \times 34 = 6052$

$\Rightarrow \qquad 34 = \frac{6052}{178} \Rightarrow \frac{34}{10} = \frac{6052}{178 \times 10}$

$\therefore \qquad 60.52 \div 17.8 = 3.4$

18. $15 \times 4 - 10 \div 5 = 15 \times 4 - 2 = 60 - 2 = 58$

19. $98 - [65 + \{32 - (12 + 5)\}]$

$= 98 - [65 + \{32 - 17\}] = 98 - [65 + 15]$

$= 98 - 80 = 18$

20. $50 \times 5 \times 0.05 = 250 \times \dfrac{5}{100}$

$= \dfrac{25}{2}$ or $12\dfrac{1}{2}$ or 12.50

21. $\dfrac{3}{2} \div \dfrac{3}{2} \times 2 + \dfrac{3}{2} = \dfrac{3}{2} \times \dfrac{2}{3} \times 2 + \dfrac{3}{2} = 2 + \dfrac{3}{2} = \dfrac{7}{2}$

22. $\{2(18 - 3)\} + 5(12 - 7) = \{2 \times 15\} + 5 \times 5$

$= 30 + 25 = 55$

23. $2 - 3 + 4 + 3 - 3 - 2$

$= 2 + 4 + 3 - 3 - 3 - 2 = 9 - 8 = 1$

24. $\dfrac{3}{4} + 1\dfrac{1}{4} - \dfrac{1}{4} = \dfrac{3}{4} + \dfrac{5}{4} - \dfrac{1}{4}$

$= \dfrac{3 + 5 - 1}{4} = \dfrac{7}{4} = 1\dfrac{3}{4}$

25. $12 \times 8 - 4 \div 4 = 12 \times 8 - 1 = 96 - 1 = 95$

26. $60 \times 7 + 3 \times 60 = 420 + 180 = 600$

27. $2(12 - 3) + 4(10 - 7) = 2 \times 9 + 4 \times 3$

$= 18 + 12 = 30$

Practice Exercise

1. $16 \div 4$ of $2 - 2[2 - \{2 - 2(2 - 2 - 2)\}]$ is equal to

(1) 5　　　　(2) -2　　　(3) 6　　　　(4) 8

2. $55 \div 5.5 \div 0.5$ is equal to

(1) 20　　　(2) 10　　　(3) 8.5　　　(4) 10.5

3. Simplify $8059 - 7263 = ? \times 40$.

(1) 19.9　　　　　　(2) 18.7
(3) 15.9　　　　　　(4) 17.7

4. Simplify $5437 - 3153 + 2284 = ? \times 50$.

(1) 96.66　　　　　(2) 91.36
(3) 96.13　　　　　(4) 93.16

5. Simplify $3 \div \left[(8 - 5) \div \left\{(4 - 2) \div \left(2 + \dfrac{8}{13}\right)\right\}\right]$.

(1) $\dfrac{13}{17}$　　　　　　(2) $\dfrac{17}{13}$

(3) $\dfrac{68}{13}$　　　　　　(4) $\dfrac{13}{68}$

6. Shown here are expressions given to Sangita, Anandi, Abha and Tulsi with their answers.

Sangita　　$4 \times 1 + 8 \div 2 = 8$
Anandi　　$6 + 4 \div 2 - 1 = 4$
Abha　　　$9 + 3 \times 2 - 4 \div 2 = 10$
Tulsi　　　$27 \div 3 - 2 \times 3 = 21$

Who has got the correct answer?

(1) Abha　　　　　　(2) Tulsi
(3) Sangita　　　　　(4) Anandi

7. If　　$A = \dfrac{3}{4} \div \dfrac{5}{6}$, $B = 3 \div [(4 \div 5) \div 6]$,

$C = [3 \div (4 \div 5)] \div 6$ and
$D = 3 \div 4 (5 \div 6)$, then

(1) A and D are equal　　(2) A and C are equal
(3) A and B are equal　　(4) All are equal

8. The value of the expression

$6 - \left[\dfrac{5}{6} + \left(3\dfrac{7}{8} - 2\dfrac{1}{3} + 1\dfrac{7}{9}\right)\right]$ is

(1) $\dfrac{135}{72}$　　(2) $1\dfrac{61}{72}$　　(3) 1　　　(4) 0

9. The value of $\left[\left(\dfrac{5}{6} \times 1\dfrac{6}{13}\right) \div \left(2\dfrac{5}{7} \div 3\dfrac{1}{4}\right)\right]$ is

(1) 24/35　　(2) 1　　　(3) 35/24　　(4) 91/76

10. Simplify $1 \div \left[\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{6} \div \left(\dfrac{3}{4} - \dfrac{1}{3}\right)\right]$.

(1) 30/37　　(2) 37/30　　(3) 1　　　(4) 7/37

11. The value of the expression $2 + 2 \div 2 + 2 \times 2 + 2 - 2$ is

(1) 7　　　(2) 14　　　(3) 21　　　(4) 28

12. Simplify $7 \div 7 + 9 \times 7 - 45$.

(1) 20　　　(2) 21　　　(3) 22　　　(4) 19

13. Simplify $21 \times 7 + 25 \div 5 - 24 \times \dfrac{1}{8}$.

(1) 150　　(2) 147　　(3) 148　　(4) 149

14. The value of expression $\dfrac{7}{36} \div \dfrac{5}{12} \times \dfrac{25}{14}$ is

(1) 7/5　　(2) 6/5　　(3) 5/6　　(4) 7/6

15. Simplify $162 \div 18 + 9 \times 6$.

(1) 64　　　(2) 21　　　(3) 42　　　(4) 63

16. The value of $4\dfrac{1}{6} \div 2\dfrac{1}{8}$ of $\dfrac{1}{6} - 4\dfrac{1}{6}$ of $\dfrac{2}{17}$ is

(1) $11\dfrac{14}{51}$　　(2) 0　　　(3) 1　　　(4) 51/14

17. The value of expression

$60 + [7 \div \{6 \div (1 \div \overline{5 - 3})\}]$ of $\dfrac{12}{7}$ is

(1) 12   (2) 60   (3) 62   (4) 61

18. Simplify

$$\left[\frac{2}{5} - \left(2\frac{2}{5} - 2\right) \text{ of } \left\{1\frac{1}{5} - \frac{2}{5} \div \left(1\frac{1}{3} - \frac{5}{6}\right)\right\}\right].$$

(1) 25/6   (2) 6/25   (3) 4/25   (4) 25/4

19. Simplify $5\frac{1}{3} - \left[4\frac{1}{3} - \left(2\frac{1}{3} - \frac{1}{3}\right)\right]$.

(1) 3   (2) 2   (3) 1   (4) 0

Answers

1. (2)	**2.** (1)	**3.** (1)	**4.** (2)	**5.** (1)	**6.** (3)	**7.** (1)	**8.** (2)	**9.** (3)	**10.** (1)
11. (1)	**12.** (4)	**13.** (4)	**14.** (3)	**15.** (4)	**16.** (1)	**17.** (4)	**18.** (2)	**19.** (1)	

Hints and Solutions

1. $[16 \div 4 \text{ of } 2 - 2[2 - \{2 - 2(2 - 2 - 2)\}]]$

$= 16 \div (4 \times 2) - 2[2 - \{2 - 2(-2)\}]$

$= 16 \div 8 - 2[2 - \{2 + 4\}]$

$= 2 - 2[2 - \{6\}] = 2 - 2[2 - 4] = 2 - 2[-2]$

$= 2 - 4 = -2$

2. $? = 55 \div 5.5 \div 0.5 \Rightarrow ? = \dfrac{55}{5.5 \times 0.5} = 20$

3. $? \times 40 = 8059 - 7263$

$\Rightarrow \quad ? = \dfrac{796}{40} = 19.9$

4. $? \times 50 = 5437 - 3153 + 2284$

$\therefore \quad ? = \dfrac{4568}{50} = 91.36$

5. $3 \div \left[(8 - 5) \div \left\{(4 - 2) \div \left(2 + \dfrac{8}{13}\right)\right\}\right]$

$= 3 \div \left[3 \div \left\{2 \div \left(\dfrac{34}{13}\right)\right\}\right]$

$= 3 \div \left\{3 \div \left(2 \times \dfrac{13}{34}\right)\right\} = 3 \div \left[3 \div \dfrac{13}{17}\right] = 3 \div \left[3 \times \dfrac{17}{13}\right]$

$= 3 \div \dfrac{51}{13} = 3 \times \dfrac{13}{51} = \dfrac{13}{17}$

6. Sangita $4 \times 1 + 8 \div 2 = 4 + 4 = 8$

Anandi $6 + 4 \div 2 - 1 = 6 + 2 - 1$

$\qquad\qquad = 8 - 1 = 7 \neq 4$

Abha $9 + 3 \times 2 - 4 \div 2 = 9 + 6 - 2$

$\qquad\qquad = 14 - 2 = 12 \neq 10$

Tulsi $27 \div 3 - 2 \times 3 = 9 - 6 = 3 \neq 21$

Hence, answer of Sangita is correct.

7. $A = \dfrac{3}{4} \div \dfrac{5}{6} = \dfrac{3}{4} \times \dfrac{6}{5} = \dfrac{9}{10}$

$B = 3 \div [(4 \div 5) \div 6]$

$= 3 \div \left[\dfrac{4}{5} \div 6\right] = 3 \div \left[\dfrac{4}{30}\right] = 3 \times \dfrac{30}{4} = \dfrac{45}{2}$

$C = [3 \div (4 \div 5)] \div 6]$

$= \left[3 \div \dfrac{4}{5}\right] \div 6 = \left(3 \times \dfrac{5}{4}\right) \div 6$

$= \dfrac{15}{4} \div 6 = \dfrac{15}{24} = \dfrac{5}{8}$

$D = 3 \div 4(5 \div 6)$

$= 3 \div 4 \times \dfrac{5}{6} = 3 \div \dfrac{20}{6} = 3 \times \dfrac{6}{20} = \dfrac{18}{20} = \dfrac{9}{10}$

Hence, A and D are equal.

8. $6 - \left[\dfrac{5}{6} + \left\{\dfrac{31}{8} - \dfrac{7}{3} + \dfrac{16}{9}\right\}\right]$

$= 6 - \left[\dfrac{5}{6} + \left(\dfrac{279 - 168 + 128}{72}\right)\right]$

$= 6 - \left[\dfrac{5}{6} + \dfrac{239}{72}\right] = 6 - \left[\dfrac{60 + 239}{72}\right]$

$= 6 - \left[\dfrac{299}{72}\right] = \dfrac{432 - 299}{72} = \dfrac{133}{72} = 1\dfrac{61}{72}$

9. $\left(\dfrac{5}{6} \times \dfrac{19}{13}\right) \div \left(\dfrac{19}{7} \div \dfrac{13}{4}\right) = \left(\dfrac{95}{78}\right) \div \left(\dfrac{19}{7} \times \dfrac{4}{13}\right)$

$= \left(\dfrac{95}{78}\right) \div \left(\dfrac{76}{91}\right)$

$= \dfrac{95}{78} \times \dfrac{91}{76} = \dfrac{35}{24}$

10. $1 \div \left[\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{6} \div \left(\dfrac{9 - 4}{12}\right)\right]$

$= 1 \div \left[\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{6} \div \dfrac{5}{12}\right]$

$= 1 \div \left[\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{6} \times \dfrac{12}{5}\right]$

$= 1 \div \left[\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{2}{5}\right]$

$= 1 \div \left[\dfrac{15 + 10 + 12}{30}\right]$

$$= 1 \div \frac{37}{30} = 1 \times \frac{30}{37} = \frac{30}{37}$$

11. $2 + 2 \div 2 + 2 \times 2 + 2 - 2$

$$= 2 + 2 \times \frac{1}{2} + 4 + 2 - 2$$

$$= 2 + 1 + 4 + 2 - 2 = 9 - 2 = 7$$

12. $7 \div 7 + 9 \times 7 - 45 = 7 \times \frac{1}{7} + 63 - 45$

$$= 1 + 63 - 45 = 64 - 45 = 19$$

13. $21 \times 7 + 25 \div 5 - 24 \times \frac{1}{8}$

$$= 147 + 25 \times \frac{1}{5} - 3$$

$$= 147 + 5 - 3 = 149$$

14. $\frac{7}{36} \div \frac{5}{12} \times \frac{25}{14} = \frac{7}{36} \times \frac{12}{5} \times \frac{25}{14} = \frac{5}{6}$

15. $162 \div 18 + 9 \times 6 = 162 \times \frac{1}{18} + 54$

$$= 9 + 54 = 63$$

16. $4\frac{1}{6} \div 2\frac{1}{8} \text{ of } \frac{1}{6} - 4\frac{1}{6} \text{ of } \frac{2}{17}$

$$= \frac{25}{6} \div \frac{17}{8} \times \frac{1}{6} - \frac{25}{6} \times \frac{2}{17}$$

$$= \frac{25}{6} \div \frac{17}{48} - \frac{25}{51} = \frac{25}{6} \times \frac{48}{17} - \frac{25}{51}$$

$$= \frac{200}{17} - \frac{25}{51} = \frac{600 - 25}{51}$$

$$= \frac{575}{51} = 11\frac{14}{51}$$

17. $60 + [7 \div \{6 \div (1 \div \overline{5 - 3})\}] \text{ of } \frac{12}{7}$

$$= 60 + \left[7 \div \left(6 \div \frac{1}{2}\right)\right] \text{ of } \frac{12}{7}$$

$$= 60 + [7 \div \{6 \times 2\}] \text{ of } \frac{12}{7}$$

$$= 60 + [7 \div 12] \text{ of } \frac{12}{7}$$

$$= 60 + \frac{7}{12} \text{ of } \frac{12}{7}$$

$$= 60 + \frac{7}{12} \times \frac{12}{7} = 60 + 1 = 61$$

18. $\left[\frac{2}{5} - \left(2\frac{2}{5} - 2\right) \text{ of } \left\{1\frac{1}{5} - \frac{2}{5} \div \left(1\frac{1}{3} - \frac{5}{6}\right)\right\}\right]$

$$= \left[\frac{2}{5} - \left(\frac{12}{5} - 2\right) \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \div \left(\frac{4}{3} - \frac{5}{6}\right)\right\}\right]$$

$$= \left[\frac{2}{5} - \left(\frac{12 - 10}{5}\right) \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \div \left(\frac{8 - 5}{6}\right)\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \times \frac{6}{3}\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \left\{\frac{6}{5} - \frac{4}{5}\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \frac{2}{5}\right] = \left[\frac{2}{5} - \frac{4}{25}\right] = \frac{10 - 4}{25} = \frac{6}{25}$$

19. $5\frac{1}{3} - \left[4\frac{1}{3} - \left(2\frac{1}{3} - \frac{1}{3}\right)\right]$

$$= \frac{16}{3} - \left[\frac{13}{3} - \left(\frac{7}{3} - \frac{1}{3}\right)\right]$$

$$= \frac{16}{3} - \left(\frac{13}{3} - \frac{6}{3}\right)$$

$$= \frac{16}{3} - \frac{7}{3} = \frac{9}{3} = 3$$

Self Practice

1. Simplify $5.75 \times 8.08 + 5.75 \times 4.13 - 9.18 \times 5.75$.
   (1) 17.4225   (2) 18.4225   (3) 1   (4) 16.4

2. Simplify $\left(\dfrac{7}{9}\right)^2 \div \left(\dfrac{7}{9}\right) \times \left(\dfrac{7}{9}\right)$.
   (1) 0   (2) 2   (3) 3   (4) 1

3. Simplify $\dfrac{1}{1 \times 2} + \dfrac{1}{2 \times 4} + \dfrac{1}{2 \times 4 \times 6}$.
   (1) 0.645   (2) 0.640   (3) 0.646   (4) 0.647

4. Simplify $7 + 5 - \left(3 \div 2 \times \dfrac{1}{4}\right)$ of $\dfrac{2}{7} + \dfrac{7}{2} \times \dfrac{1}{16}$.
   (1) 2713   (2) 224/2713   (3) 2713/224   (4) 224

5. Simplify $5\dfrac{2}{3} + 16\dfrac{1}{5} - 12\dfrac{1}{3}$.
   (1) $\dfrac{9}{15}$ (2) $9\dfrac{8}{15}$ (3) $\dfrac{15}{8}$ (4) $\dfrac{17}{15}$

6. The value of expression $8\dfrac{1}{2} - \left[3\dfrac{1}{5} \div 4\dfrac{1}{2} \text{ of } 5\dfrac{1}{3} + \left\{11 - \left(3 - 1\dfrac{1}{4} - \dfrac{5}{8}\right)\right\}\right]$ is
   (1) $-\dfrac{31}{120}$ (2) $-\dfrac{120}{31}$ (3) $\dfrac{120}{31}$ (4) $\dfrac{31}{120}$

7. Simplify $165 \div 15 + 5 \times 10$.
   (1) 51   (2) 71   (3) 61   (4) 52

8. Simplify $4\dfrac{1}{2}$ of $\left(1\dfrac{1}{3} + \dfrac{1}{3} - 1\right) + (25 \div 5 - 2 \times 1) \div (0.03 \times 0.06 \div 0.03)$.
   (1) 53   (2) 54   (3) 1   (4) 0

9. Simplify $3034 - (1002 - 20.04)$.
   (1) 3034   (2) 2052.04   (3) 2032   (4) 2052

10. Simplify $\dfrac{20.16 \div 14}{14.4 \div 2}$.
   (1) 0.2   (2) 0.1   (3) 2   (4) 0.002

11. Mohan spends 2/5 of his money on clothes and 3/4 of the remainder for milk and food. He is now left with ₹ 450 only. How much money he had in the beginning?
   (1) ₹ 2000   (2) ₹ 300   (3) ₹ 4000   (4) ₹ 3000

12. If $a = 3$, $b = 4$, $c = 5$. Then, value of $\dfrac{1}{a} + \dfrac{2}{b} - \dfrac{3}{c}$ is
   (1) 30/7   (2) 7/30   (3) 28   (4) 30

Answers

1. (1)	**2.** (4)	**3.** (3)	**4.** (3)	**5.** (2)	**6.** (1)	**7.** (3)	**8.** (1)	**9.** (2)	**10.** (1)
11. (4)	**12.** (2)								