

# Simplification

BODMAS Rule

Grade 5

# Simplification

## Numerical Expression

↓  
made up of two or more numbers connected by  
one or more operators (+, -, ×, ÷, of or order)

- Ex: (i)  $7 + 2$  is a numerical expression.
- (ii)  $2 + 9 \times 3$  is a numerical expression.
- (iii)  $60 - 48 \div 6 \times 9 + 8$  is also a numerical expression.

Rule: **DMAS** → subtrd.  
↓      ↓      ↓  
Division      Multiplication      add

D M A S  
↑ ↑ ↑ ↑

Q. Simplify  $60 - 48 \div 6 \times 4 + 8$

Sol<sup>n</sup>: We have  $60 - \underbrace{48 \div 6}_{=8} \times 4 + 8$

If no operator is written before a number, then it is taken as + (positive)

Positive nos. = Numbers with + sign or no sign

Negative nos. = Numbers with - sign.

$$\begin{aligned} &= 60 - \overbrace{8 \times 4}^{=32} + 8 \\ &= \underline{60} - \underline{32} + \underline{8} \\ &= \underline{\underline{60 + 8 - 32}} \\ &= \underline{\underline{68 - 32}} \\ &= \underline{\underline{36}} \end{aligned}$$

[ ÷ simplified ]

[ × simplified ]

[ Rearrange all + numbers with + sign at one place and numbers with - sign at another place ]

Simplify  $39 - 16 + 18 \times 9 \div 3$

DMAS  
↑ ↑ ↑ ↑

$$\begin{aligned} 39 - 16 + 18 \times 9 \div 3 &= 39 - 16 + \underline{18 \times 3} \\ &= 39 - 16 + 54 \\ &= \underline{39 + 54} - 16 \\ &= 93 - 16 \\ &= \underline{\underline{77}} \end{aligned}$$

Simplify

$$\begin{aligned} 100 - 72 \div 8 + 4 \times 3 &= 100 - 9 + \underline{4 \times 3} \\ &= 100 - 9 + 12 \\ &= 100 + 12 - 9 \\ &= 112 - 9 \\ &= \underline{\underline{103}} \end{aligned}$$

103

H.W.

Simplify:

(i)  $100 - 56 \div 7 + 15 \times 2$

(ii)  $8 \times 6 + 24 \div 6 - 18$

(iii)  $198 - 42 \times 15 \div 5 + 6$

(iv)  $32 \div 8 + 4 \times 6 - 2$

(v)  $17 + 34 \div 17 \times 5 - 20$  ]





# Use of brackets

Brackets a.k.a. grouping symbols

⇒ Brackets are used to separate various parts of an expression

eg. ( ) , [ ] , { }

There are four types of brackets.

- (i) Bar or Vinculum  Bar
- (ii) Small brackets or Round bracket 
- (iii) Curly brackets or Braces 
- (iv) Square bracket or Big bracket 

Ex  $12 - [20 \div \{8 - 2(9 - 5 - 2)\}]$

## Order of solving/working with brackets

- (i) Bar
- (ii) Small brackets ( )
- (iii) Curly Brackets { }
- (iv) Square bracket [ ]

To simplify expressions containing brackets we use BODMAS Rule.

# BODMAS

Bracket

( Bar, Small, curly, Big)

of or Order

Division

Multiplication

Addition

Subtraction

Q. Simplify  $12 - [20 \div \{8 - 2(\frac{9-5-2}{2})\}]$

Sol:  $12 - [20 \div \{8 - 2(9-5-2)\}] = 12 - [20 \div \{8 - 2 \times 2\}]$   
 $= 12 - [20 \div \{8 - 4\}]$   
 $= 12 - [20 \div 4]$

Q. Simplify

$$\begin{aligned}20 - \{18 \div (7 - 2 + 1)\} &= 20 - \{18 \div (7 + 1 - 2)\} \\ &= 20 - \{18 \div (8 - 2)\} \\ &= 20 - \{18 \div 6\} \\ &= 20 - 3 \\ &= \underline{\underline{17}}\end{aligned}$$

$$\textcircled{ii} \quad 23 - [6 + \{8 - (9 - 6)\}]$$

$$= 23 - [6 + \{8 - 3\}]$$

$$= 23 - [6 + 5]$$

$$= 23 - 11$$

$$= \underline{\underline{12}}$$

H.W.

$$\textcircled{1} \quad 40 - [12 + \{6 - (12 \div 3)\}]$$

$$\Rightarrow 40 - [12 + \{6 - 4\}]$$

$$\Rightarrow 40 - [12 + 2]$$

$$\Rightarrow 40 - 14$$

$$\Rightarrow \underline{\underline{26}}$$

$$\boxed{4 - 10 = -6}$$

Simplify:  $[105 \div \{23 + 2(9 - 5 - 2)\}]$

$$= [105 \div \{23 + 2(9 - 3)\}]$$

$$= [105 \div \{23 + 2(6)\}]$$

$$= [105 \div \{23 + 12\}]$$

$$= [105 \div 35]$$

$$= 3$$



$$\boxed{2(3)} = 2 \times 3 = 6$$

Fill in the blanks:

$$(a) \quad 5 - 6 + 3 = \boxed{2}$$

$$(b) \quad 6 + 6 - \underline{6 \div 6} \times 6 = \boxed{6}$$

$$(c) \quad 3 \times 8 \div 4 = \boxed{6}$$

$$(d) \quad 5 \times 50 + 57 - 57 \div 57 = \boxed{306}$$

$$(e) \quad 21 \div 7 + 16 - 5 \times 3 = \boxed{4}$$

$$5 - 6 + 3$$

$$\Rightarrow \underline{5 + 3} - 6$$

$$6 + 6 - \underline{1} \times 6$$

$$\underline{6 + 6} - 6$$

Q. Fill in the blanks using =, > or <.

(a)  $\frac{8 \times 9 \div 9}{8} = \frac{(8 \times 9) \div 9}{8}$

(b)  $\frac{15 \times 2 + 120 \div 20 - 8}{28} < \frac{15 \times 2 + 120 \div (20 - 8)}{40}$

(c)  $\frac{26 - 3 \times 8 \div 4}{20} = \frac{26 - (3 \times 8) \div 4}{20}$

$26 - 3 \times 2$

BODMAS

$12$   
 $\frac{15 \times 2 + 6 - 8}{30 + 6 - 8}$   
 $36 - 8$   
 $28$

$20 \overline{)120}$

$15 \times 2 + 120 \div 12$   
 $15 \times 2 + 10$   
 $30 + 10 = 40$

$(12 \div 2)$

$\frac{12}{2} = 6$

$20 \times 6 = 120$

$12 \div 2 = 6$

$120 \div 20 = 6$

$1200 \div 200 = 6$

$12000 \div 2000 = 6$

Simplify :

$$[ \{ (30 - \underline{9-6}) \div 3 \} \times 6 + 6 ]$$

$$\boxed{60} \checkmark$$

$$( \underline{27 \div 3} ) \times 6 + 6$$

$$\underline{9 \times 6 + 6}$$
$$54$$

H.W.

Simplify:

{

(i)

$$\begin{array}{r} 298 \\ 152 \\ \hline \end{array} \quad \begin{array}{l} 289 + \frac{153}{9} \div 17 - \frac{8 \times 19}{+36152} \end{array} = \begin{array}{r} \cancel{162} \\ 149 \end{array}$$

(ii)

$$80 + [20 \times \{ \underset{\#18}{20} - \underbrace{(10 \div 5)}_2 \}] = \boxed{348}$$

(iii)

$$\underbrace{10 \times 10}_{20} + [ \underbrace{400}_{5} \div \{ \underbrace{100}_{20} - ( \underbrace{50}_{20} - \underbrace{3 \times 10}_{30} ) \} ] = \underline{\underline{25}}$$

25 ✓

$$\begin{array}{r} 19 \\ \times 8 \\ \hline 152 \end{array}$$

$$[\{64 - (12 + 13)\} \div 13] + 15$$

$$= 18 \checkmark$$

$$\Rightarrow [\{64 - 25\} \div 13] + 15$$

$$\Rightarrow [39 \div 13] + 15$$

$$3 + 15$$

$$\Rightarrow 18$$

BODMAS

( ) | Order

12 of  $\frac{3}{4}$

$\frac{3}{4}$  of 12

End of the chapter