

RD SHARMA

Solutions

Class 7 Maths

Chapter 7

Ex 7.4

Simplify each of the following algebraic expressions by removing grouping symbols.

Q1) $2x + (5x - 3y)$

Solution:

We have

$$2x + (5x - 3y)$$

Since the '+' sign precedes the parentheses, we have to retain the sign of each term in the parentheses when we remove them.

$$= 2x + 5x - 3y$$

$$= 7x - 3y$$

Q2) $3x - (y - 2x)$

Solution:

We have

$$3x - (y - 2x)$$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them. Therefore, we have

$$3x - y + 2x$$

$$= 5x - y$$

Q3) $5a - (3b - 2a + 4c)$

Solution:

We have

$$5a - (3b - 2a + 4c)$$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them.

$$= 5a - 3b + 2a - 4c$$

$$= 7a - 3b - 4c$$

Q4) $-2(x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$

Solution:

We have

$$-2(x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them. Therefore, we have

$$= -2x^2 + 2y^2 - 2xy - 3x^2 - 3y^2 + 3xy$$

$$= -2x^2 - 3x^2 + 2y^2 - 3y^2 - 2xy + 3xy$$

$$= -5x^2 - y^2 + xy$$

Q5) $3x + 2y - \{x - (2y - 3)\}$

Solution:

We have

$$3x + 2y - \{x - (2y - 3)\}$$

First, we have to remove the small brackets (or parentheses): (). Then, we have to remove the curly brackets (or braces): { }.

Therefore,

$$= 3x + 2y - \{x - 2y + 3\}$$

$$= 3x + 2y - x + 2y - 3$$

$$= 2x + 4y - 3$$

$$Q6) 5a - \{3a - (2 - a) + 4\}$$

Solution:

We have

$$5a - \{3a - (2 - a) + 4\}$$

First, we have to remove the small brackets (or parentheses): (). Then, we have to remove the curly brackets (or braces): { }.

Therefore,

$$= 5a - \{3a - 2 + a + 4\}$$

$$= 5a - 3a + 2 - a - 4$$

$$= 5a - 4a - 2$$

$$= a - 2$$

$$Q7) a - [b - \{a - (b - 1) + 3a\}]$$

Solution:

First we have to remove the parentheses, or small brackets, (), then the curly brackets, { }, and then the square brackets [].

Therefore, we have

$$a - [b - \{a - (b - 1) + 3a\}]$$

$$= a - [b - \{a - b + 1 + 3a\}]$$

$$= a - [b - \{4a - b + 1\}]$$

$$= a - [b - 4a + b - 1]$$

$$= a - [2b - 4a - 1]$$

$$= a - 2b + 4a + 1$$

$$= 5a - 2b + 1$$

$$Q8) a - [2b - \{3a - (2b - 3c)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$a - [2b - \{3a - (2b - 3c)\}]$$

$$= a - [2b - \{3a - 2b + 3c\}]$$

$$= a - [2b - 3a + 2b - 3c]$$

$$= a - [4b - 3a - 3c]$$

$$= a - 4b + 3a + 3c$$

$$= 4a - 4b + 3c$$

$$Q9) -x + [5y - \{2x - (3y - 5x)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets { }, and then the square brackets, [].

Therefore, we have

$$-x + [5y - \{2x - (3y - 5x)\}]$$

$$= -x + [5y - \{2x - 3y + 5x\}]$$

$$= -x + [5y - \{7x - 3y\}]$$

$$= -x + [5y - 7x + 3y]$$

$$= -x + [8y - 7x]$$

$$= -x + 8y - 7x$$

$$= -8x + 8y$$

$$Q10) 2a - [4b - \{4a - 3(2a - b)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$2a - [4b - \{4a - 3(2a - b)\}]$$

$$= 2a - [4b - \{4a - 6a + 3b\}]$$

$$= 2a - [4b - \{-2a + 3b\}]$$

$$= 2a - [4b + 2a - 3b]$$

$$= 2a - [b + 2a]$$

$$= 2a - b - 2a$$

$$= -b$$

$$Q11) -a - [a + \{a + b - 2a - (a - 2b)\} - b]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$-a - [a + \{a + b - 2a - (a - 2b)\} - b]$$

$$= -a - [a + \{a + b - 2a - a + 2b\} - b]$$

$$= -a - [a + \{-2a + 3b\} - b]$$

$$= -a - [a - 2a + 3b - b]$$

$$= -a - [-a + 2b]$$

$$= -a + a - 2b$$

$$= -2b$$

$$Q12) 2x - 3y - [3x - 2y - \{x - z - (x - 2y)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$2x - 3y - [3x - 2y - \{x - z - (x - 2y)\}]$$

$$= 2x - 3y - [3x - 2y - \{x - z - x + 2y\}]$$

$$= 2x - 3y - [3x - 2y - \{-z + 2y\}]$$

$$= 2x - 3y - [3x - 2y + z - 2y]$$

$$= 2x - 3y - [3x - 4y + z]$$

$$= 2x - 3y - 3x + 4y - z$$

$$= -x + y - z$$

$$Q13) 5 + [x - \{2y - (6x + y - 4) + 2x\} - \{x - (y - 2)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$5 + [x - \{2y - (6x + y - 4) + 2x\} - \{x - (y - 2)\}]$$

$$\begin{aligned}
&= 5 + [x - \{2y - 6x - y + 4 + 2x\} - \{x - y + 2\}] \\
&= 5 + [x - \{y - 4x + 4\} - \{x - y + 2\}] \\
&= 5 + [x - y + 4x - 4 - x + y - 2] \\
&= 5 + [4x - 6] \\
&= 5 + 4x - 6 \\
&= 4x - 1
\end{aligned}$$

$$Q14) x^2 - [3x + [2x - (x^2 - 1)] + 2]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$\begin{aligned}
&x^2 - [3x + [2x - (x^2 - 1)] + 2] \\
&= x^2 - [3x + [2x - x^2 + 1] + 2] \\
&= x^2 - [3x + 2x - x^2 + 1 + 2] \\
&= x^2 - [5x - x^2 + 3] \\
&= x^2 - 5x + x^2 - 3 \\
&= 2x^2 - 5x - 3
\end{aligned}$$

$$Q15) 20 - [5xy + 3\{x^2 - (xy - y) - (x - y)\}]$$

Solution:

$$\begin{aligned}
&20 - [5xy + 3\{x^2 - (xy - y) - (x - y)\}] \\
&= 20 - [5xy + 3\{x^2 - xy + y - x + y\}] \\
&= 20 - [5xy + 3\{x^2 - xy + 2y - x\}] \\
&= 20 - [5xy + 3x^2 - 3xy + 6y - 3x] \\
&= 20 - [2xy + 3x^2 + 6y - 3x] \\
&= 20 - 2xy - 3x^2 - 6y + 3x \\
&= -3x^2 - 2xy - 6y + 3x + 20
\end{aligned}$$

$$Q16) 85 - [12x - 7(8x - 3) - 2\{10x - 5(2 - 4x)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$\begin{aligned}
&85 - [12x - 7(8x - 3) - 2\{10x - 5(2 - 4x)\}] \\
&= 85 - [12x - 56x + 21 - 2\{10x - 10 + 20x\}] \\
&= 85 - [12x - 56x + 21 - 2\{30x - 10\}] \\
&= 85 - [12x - 56x + 21 - 60x + 20] \\
&= 85 - [12x - 116x + 41] \\
&= 85 - [-104x + 41] \\
&= 85 + 104x - 41 \\
&= 44 + 104x
\end{aligned}$$

$$Q17) \ xy[yz - zx - \{yx - (3y - xz) - (xy - zy)\}]$$

Solution:

First we have to remove the small brackets, or parentheses, (), then the curly brackets, { }, and then the square brackets, [].

Therefore, we have

$$xy - [yz - zx - \{yx - (3y - xz) - (xy - zy)\}]$$

$$= xy - [yz - zx - \{yx - 3y + xz - xy + zy\}]$$

$$= xy - [yz - zx - \{-3y + xz + zy\}]$$

$$= xy - [yz - zx + 3y - xz - zy]$$

$$= xy - [-zx + 3y - xz]$$

$$= xy - [-2zx + 3y]$$

$$= xy + 2xz - 3y$$