

RD SHARMA

Solutions

Class 7 Maths

Chapter 7

Ex 7.2

Q1) Add the following:

(i) $3x$ and $7x$

(ii) $-5xy$ and $9xy$

Solution:

We have

(i) $3x + 7x = (3 + 7)x = 10x$

(ii) $-5xy + 9xy = (-5 + 9)xy = 4xy$

Q2) Simplify each of the following:

(i) $7x^3y + 9yx^3$

(ii) $12a^2b + 3ba^2$

Solution:

Simplifying the given expressions, we have

(i) $7x^3y + 9yx^3 = (7 + 9)x^3y = 16x^3y$

(ii) $12a^2b + 3ba^2 = (12 + 3)a^2b = 15a^2b$

Q3) Add the following:

(i) $7abc, -5abc, 9abc, -8abc$

(ii) $2x^2y, -4x^2y, 6x^2y, -5x^2y$

Solution:

Adding the given terms, we have

(i) $7abc + (-5abc) + (9abc) + (-8abc)$

$= 7abc - 5abc + 9abc - 8abc$

$= (7 - 5 + 9 - 8)abc$

$= (16 - 13)abc$

$= 3abc$

(ii) $2x^2y + (-4x^2y) + (6x^2y) + (-5x^2y)$

$= 2x^2y - 4x^2y + 6x^2y - 5x^2y$

$= (2 - 4 + 6 - 5)x^2y$

$= (8 - 9)x^2y$

$= -x^2y$

Q4) Add the following expressions:

(i) $x^3 - 2x^2y + 3xy^2 - y^3, 2x^3 - 5xy^2 + 3x^2y - 4y^3$

(ii) $a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4, -2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4$

Solution:

Adding the given expressions, we have

(i) $x^3 - 2x^2y + 3xy^2 - y^3 + 2x^3 - 5xy^2 + 3x^2y - 4y^3$

Collecting positive and negative like terms together, we get

$x^3 + 2x^3 - 2x^2y + 3x^2y + 3xy^2 - 5xy^2 - y^3 - 4y^3$

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

(ii) $(a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4) + (-2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4)$

$a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4 - 2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4$

Collecting positive and negative like terms together, we get

$$a^4 - 2a^4 - 2a^3b + 7a^3b + 3ab^3 - 5ab^3 + 4a^2b^2 - 6a^2b^2 + 3b^4 + b^4$$

$$= -a^4 + 5a^3b - 2ab^3 - 2a^2b^2 + 4b^4$$

Q5) Add the following expressions:

(i) $8a - 6ab + 5b$, $-6a - ab - 8b$ and $-4a + 2ab + 3b$

(ii) $5x^3 + 7 + 6x - 5x^2$, $2x^2 - 8 - 9x$, $4x - 2x^2 + 3x^3$, $3x^3 - 9x - x^2$ and $x - x^2 - x^3 - 4$

Solution:

(i) Required expression = $(8a - 6ab + 5b) + (-6a - ab - 8b) + (-4a + 2ab + 3b)$

Collecting positive and negative like terms together, we get

$$8a - 6a - 4a - 6ab - ab + 2ab + 5b - 8b + 3b$$

$$= 8a - 10a - 7ab + 2ab + 8b - 8b$$

$$= -2a - 5ab$$

(ii) Required expression =

$$(5x^3 + 7 + 6x - 5x^2) + (2x^2 - 8 - 9x) + (4x - 2x^2 + 3x^3) + (3x^3 - 9x - x^2)$$

$$+ (x - x^2 - x^3 - 4)$$

Collecting positive and negative like terms together, we get

$$5x^3 + 3x^3 + 3x^3 - x^3 - 5x^2 + 2x^2 - 2x^2 - x^2 - x^2 + 6x - 9x + 4x - 9x + x + 7 - 8$$

$$= 10x^3 - 7x^2 - 7x - 5$$

Q6) Add the following:

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

$$5x + 7y - 8z$$

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

(ii) $4ab - 5bc + 7ca$

$$-3ab + 2bc - 3ca$$

$$5ab - 3bc + 4ca$$

Solution:

(i) Required expression = $(x - 3y - 2z) + (5x + 7y - 8z) + (3x - 2y + 5z)$

Collecting positive and negative like terms together, we get

$$x + 5x + 3x - 3y + 7y - 2y - 2z - 8z + 5z$$

$$= 9x - 5y + 7y - 10z + 5z$$

$$= 9x + 2y - 5z$$

(ii) Required expression = $(4ab - 5bc + 7ca) + (-3ab + 2bc - 3ca) + (5ab - 3bc + 4ca)$

Collecting positive and negative like terms together, we get

$$4ab - 3ab + 5ab - 5bc + 2bc - 3bc + 7ca - 3ca + 4ca$$

$$= 9ab - 3ab - 8bc + 2bc + 11ca - 3ca$$

$$= 6ab - 6bc + 8ca$$

Q7) Add $2x^2 - 3x + 1$ to the sum of $3x^2 - 2x$ and $3x + 7$.

Solution:

Sum of $3x^2 - 2x$ and $3x + 7$

$$= (3x^2 - 2x) + (3x + 7)$$

$$= 3x^2 - 2x + 3x + 7$$

$$= (3x^2 + x + 7)$$

$$\begin{aligned}
\text{Now, required expression} &= 2x^2 - 3x + 1 + (3x^2 + x + 7) \\
&= 2x^2 + 3x^2 - 3x + x + 1 + 7 \\
&= 5x^2 - 2x + 8
\end{aligned}$$

Q8) Add $x^2 + 2xy + y^2$ to the sum of $x^2 - 3y^2$ and $2x^2 - y^2 + 9$.

Solution:

$$\begin{aligned}
&\text{Sum of } x^2 - 3y^2 \text{ and } 2x^2 - y^2 + 9 \\
&= (x^2 - 3y^2) + (2x^2 - y^2 + 9) \\
&= x^2 + 2x^2 - 3y^2 - y^2 + 9 \\
&= 3x^2 - 4y^2 + 9
\end{aligned}$$

$$\begin{aligned}
\text{Now, required expression} &= (x^2 + 2xy + y^2) + 3x^2 - 4y^2 + 9 \\
&= x^2 + 3x^2 + 2xy + y^2 - 4y^2 + 9 \\
&= 4x^2 + 2xy - 3y^2 + 9
\end{aligned}$$

Q9) Add $a^3 + b^3 - 3$ to the sum of $2a^3 - 3b^3 - 3ab + 7$ and $-a^3 + b^3 + 3ab - 9$.

Solution:

$$\begin{aligned}
&\text{First, we need to find the sum of } 2a^3 - 3b^3 - 3ab + 7 \text{ and } -a^3 + b^3 + 3ab - 9 \\
&= (2a^3 - 3b^3 - 3ab + 7) + (-a^3 + b^3 + 3ab - 9)
\end{aligned}$$

Collecting positive and negative like terms together, we get

$$\begin{aligned}
&= 2a^3 - a^3 - 3b^3 + b^3 - 3ab + 3ab + 7 - 9 \\
&= a^3 - 2b^3 - 2
\end{aligned}$$

$$\begin{aligned}
\text{Now, the required expression} &= (a^3 + b^3 - 3) + (a^3 - 2b^3 - 2) \\
&= a^3 + a^3 + b^3 - 2b^3 - 3 - 2 \\
&= 2a^3 - b^3 - 5
\end{aligned}$$

Q10) Subtract:

(i) $7a^2b$ from $3a^2b$

(ii) $4xy$ from $-3xy$

Solution:

$$\begin{aligned}
\text{(i) Required expression} &= 3a^2b - 7a^2b \\
&= (3 - 7)a^2b \\
&= -4a^2b
\end{aligned}$$

$$\begin{aligned}
\text{(ii) Required expression} &= -3xy - 4xy \\
&= -7xy
\end{aligned}$$

Q11) Subtract:

(i) $-4x$ from $3y$

(ii) $-2x$ from $-5y$

Solution:

(i) Required expression = $(3y) - (-4x)$

$$= 3y + 4x$$

(ii) Required expression = $(-5y) - (-2x)$

$$= -5y + 2x$$

Q12) Subtract:

(i) $6x^3 - 7x^2 + 5x - 3$ from $4 - 5x + 6x^2 - 8x^3$

(ii) $-x^2 - 3z$ from $5x^2 - y + z + 7$

(iii) $x^3 + 2x^2y + 6xy^2 - y^3$ from $y^3 - 3xy^2 - 4x^2y$

Solution:

(i) Required expression = $(4 - 5x + 6x^2 - 8x^3) - (6x^3 - 7x^2 + 5x - 3)$

$$= 4 - 5x + 6x^2 - 8x^3 - 6x^3 + 7x^2 - 5x + 3$$

$$= -8x^3 - 6x^3 + 7x^2 + 6x^2 - 5x - 5x + 3 + 4$$

$$= -14x^3 + 13x^2 - 10x + 7$$

(ii) Required expression = $(5x^2 - y + z + 7) - (-x^2 - 3z)$

$$= 5x^2 - y + z + 7 + x^2 + 3z$$

$$= 5x^2 + x^2 - y + z + 3z + 7$$

$$= 6x^2 - y + 4z + 7$$

(iii) Required expression = $(y^3 - 3xy^2 - 4x^2y) - (x^3 + 2x^2y + 6xy^2 - y^3)$

$$= y^3 - 3xy^2 - 4x^2y - x^3 - 2x^2y - 6xy^2 + y^3$$

$$= y^3 + y^3 - 3xy^2 - 6xy^2 - 4x^2y - 2x^2y - x^3$$

$$= 2y^3 - 9xy^2 - 6x^2y - x^3$$

Q13) From

(i) $p^3 - 4 + 3p^2$, take away $5p^2 - 3p^3 + p - 6$

(ii) $7 + x - x^2$, take away $9 + x + 3x^2 + 7x^3$

(iii) $1 - 5y^2$, take away $y^3 + 7y^2 + y + 1$

(iv) $x^3 - 5x^2 + 3x + 1$, take away $6x^2 - 4x^3 + 5 + 3x$

Solution:

(i) Required expression = $(p^3 - 4 + 3p^2) - (5p^2 - 3p^3 + p - 6)$

$$= p^3 - 4 + 3p^2 - 5p^2 + 3p^3 - p + 6$$

$$= p^3 + 3p^3 + 3p^2 - 5p^2 - p - 4 + 6$$

$$= 4p^3 - 2p^2 - p + 2$$

(ii) Required expression = $(7 + x - x^2) - (9 + x + 3x^2 + 7x^3)$

$$= 7 + x - x^2 - 9 - x - 3x^2 - 7x^3$$

$$= -7x^3 - x^2 - 3x^2 + 7 - 9$$

$$= -7x^3 - 4x^2 - 2$$

$$\begin{aligned}
\text{(iii) Required expression} &= (1 - 5y^2) - (y^3 + 7y^2 + y + 1) \\
&= 1 - 5y^2 - y^3 - 7y^2 - y - 1 \\
&= -y^3 - 5y^2 - 7y^2 - y \\
&= -y^3 - 12y^2 - y
\end{aligned}$$

$$\begin{aligned}
\text{(iv) Required expression} &= (x^3 - 5x^2 + 3x + 1) - (6x^2 - 4x^3 + 5 + 3x) \\
&= x^3 - 5x^2 + 3x + 1 - 6x^2 + 4x^3 - 5 - 3x \\
&= x^3 + 4x^3 - 5x^2 - 6x^2 + 1 - 5 \\
&= 5x^3 - 11x^2 - 4
\end{aligned}$$

Q14) From the sum of $3x^2 - 5x + 2$ and $-5x^2 - 8x + 9$ subtract $4x^2 - 7x + 9$.

Solution:

$$\begin{aligned}
\text{Required expression} &= [(3x^2 - 5x + 2) + (-5x^2 - 8x + 9)] - (4x^2 - 7x + 9) \\
&= [3x^2 - 5x + 2 - 5x^2 - 8x + 9] - (4x^2 - 7x + 9) \\
&= [3x^2 - 5x^2 - 5x - 8x + 2 + 9] - (4x^2 - 7x + 9) \\
&= [-2x^2 - 13x + 11] - (4x^2 - 7x + 9) \\
&= -2x^2 - 13x + 11 - 4x^2 + 7x - 9 \\
&= -2x^2 - 4x^2 - 13x + 7x + 11 - 9 \\
&= -6x^2 - 6x + 2
\end{aligned}$$

Q15) Subtract the sum of $13x - 4y + 7z$ and $-6z + 6x + 3y$ from the sum of $6x - 4y - 4z$ and $2x + 4y - 7$.

Solution:

$$\begin{aligned}
&\text{Sum of } (13x - 4y + 7z) \text{ and } (-6z + 6x + 3y) \\
&= (13x - 4y + 7z) + (-6z + 6x + 3y) \\
&= (13x - 4y + 7z - 6z + 6x + 3y) \\
&= (13x + 6x - 4y + 3y + 7z - 6z) \\
&= (19x - y + z)
\end{aligned}$$

$$\begin{aligned}
&\text{Sum of } (6x - 4y - 4z) \text{ and } (2x + 4y - 7) \\
&= (6x - 4y - 4z) + (2x + 4y - 7) \\
&= (6x - 4y - 4z + 2x + 4y - 7) \\
&= (6x + 2x - 4z - 7) \\
&= (8x - 4z - 7)
\end{aligned}$$

$$\begin{aligned}
\text{Now, required expression} &= (8x - 4z - 7) - (19x - y + z) \\
&= 8x - 4z - 7 - 19x + y - z \\
&= 8x - 19x + y - 4z - z - 7 \\
&= -11x + y - 5z - 7
\end{aligned}$$

Q16) From the sum of $x^2 + 3y^2 - 6xy$, $2x^2 - y^2 + 8xy$, $y^2 + 8$ and $x^2 - 3xy$ subtract $-3x^2 + 4y^2 - xy + x - y + 3$.

Solution:

$$\begin{aligned}
& \text{Sum of } (x^2 + 3y^2 - 6xy), (2x^2 - y^2 + 8xy), (y^2 + 8) \text{ and } (x^2 - 3xy) \\
&= (x^2 + 3y^2 - 6xy) + (2x^2 - y^2 + 8xy) + (y^2 + 8) + (x^2 - 3xy) \\
&= (x^2 + 3y^2 - 6xy + 2x^2 - y^2 + 8xy + y^2 + 8 + x^2 - 3xy) \\
&= (x^2 + 2x^2 + x^2 + 3y^2 - y^2 + y^2 - 6xy + 8xy - 3xy + 8) \\
&= (4x^2 + 3y^2 - xy + 8)
\end{aligned}$$

$$\begin{aligned}
& \text{Now, required expression} = (4x^2 + 3y^2 - xy + 8) - (-3x^2 + 4y^2 - xy + x - y + 3) \\
&= 4x^2 + 3y^2 - xy + 8 + 3x^2 - 4y^2 + xy - x + y - 3 \\
&= 4x^2 + 3x^2 + 3y^2 - 4y^2 - xy + xy - x + y - 3 + 8 \\
&= 7x^2 - y^2 - x + y + 5
\end{aligned}$$

Q17) What should be added to $xy - 3yz + 4zx$ to get $4xy - 3zx + 4yz + 7$?

Solution:

The required expression can be got by subtracting $xy - 3yz + 4zx$ from $4xy - 3zx + 4yz + 7$.

$$\begin{aligned}
& \text{Therefore, required expression} = (4xy - 3zx + 4yz + 7) - (xy - 3yz + 4zx) \\
&= 4xy - 3zx + 4yz + 7 - xy + 3yz - 4zx \\
&= 4xy - xy - 3zx - 4zx + 4yz + 3yz + 7 \\
&= 3xy - 7zx + 7yz + 7
\end{aligned}$$

Q18) What should be subtracted from $x^2 - xy + y^2 - x + y + 3$ to obtain $-x^2 + 3y^2 - 4xy + 1$?

Solution:

Let 'M' be the required expression. Then, we have

$$x^2 - xy + y^2 - x + y + 3 - M = -x^2 + 3y^2 - 4xy + 1$$

Therefore,

$$\begin{aligned}
M &= (x^2 - xy + y^2 - x + y + 3) - (-x^2 + 3y^2 - 4xy + 1) \\
&= x^2 - xy + y^2 - x + y + 3 + x^2 - 3y^2 + 4xy - 1
\end{aligned}$$

Collecting positive and negative like terms together, we get

$$\begin{aligned}
& x^2 + x^2 - xy + 4xy + y^2 - 3y^2 - x + y + 3 - 1 \\
&= 2x^2 + 3xy - 2y^2 - x + y + 2
\end{aligned}$$

Q19) How much is $x - 2y + 3z$ greater than $3x + 5y - 7$?

Solution:

$$\text{Required expression} = (x - 2y + 3z) - (3x + 5y - 7)$$

$$= x - 2y + 3z - 3x - 5y + 7$$

Collecting positive and negative like terms together, we get

$$\begin{aligned}
& x - 3x - 2y + 5y + 3z + 7 \\
&= -2x - 7y + 3z + 7
\end{aligned}$$

Q20) How much is $x^2 - 2xy + 3y^2$ less than $2x^2 - 3y^2 + xy$?

Solution:

$$\text{Required expression} = (2x^2 - 3y^2 + xy) - (x^2 - 2xy + 3y^2)$$

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

Collecting positive and negative like terms together, we get

$$2x^2 - x^2 - 3y^2 - 3y^2 + xy + 2xy \quad x^2 - 6y^2 + 3xy$$

Q21) How much does $a^2 - 3ab + 2b^2$ exceed $2a^2 - 7ab + 9b^2$?

Solution:

$$\text{Required expression} = (a^2 - 3ab + 2b^2) - (2a^2 - 7ab + 9b^2)$$

$$= a^2 - 3ab + 2b^2 - 2a^2 + 7ab - 9b^2$$

Collecting positive and negative like terms together, we get

$$= a^2 - 2a^2 - 3ab + 7ab + 2b^2 - 9b^2$$

$$= -a^2 + 4ab - 7b^2$$

Q22) What must be added to $12x^3 - 4x^2 + 3x - 7$ to make the sum $x^3 + 2x^2 - 3x + 2$?

Solution:

Let 'M' be the required expression. Thus, we have

$$12x^3 - 4x^2 + 3x - 7 + M = x^3 + 2x^2 - 3x + 2$$

Therefore,

$$M = (x^3 + 2x^2 - 3x + 2) - (12x^3 - 4x^2 + 3x - 7)$$

$$M = x^3 + 2x^2 - 3x + 2 - 12x^3 + 4x^2 - 3x + 7$$

Collecting positive and negative like terms together, we get

$$x^3 - 12x^3 + 2x^2 + 4x^2 - 3x - 3x + 7 + 2 \quad x^3 - 12x^3 + 2x^2 + 4x^2 - 3x - 3x + 7 + 2 \\ = -11x^3 + 6x^2 - 6x + 9$$

Q23) If $P = 7x^2 + 5xy - 9y^2$, $Q = 4y^2 - 3x^2 - 6xy$ and $R = -4x^2 + xy + 5y^2$, show that $P + Q + R = 0$.

Solution:

We have

$$P + Q + R = (7x^2 + 5xy - 9y^2) + (4y^2 - 3x^2 - 6xy) + (-4x^2 + xy + 5y^2)$$

$$= 7x^2 + 5xy - 9y^2 + 4y^2 - 3x^2 - 6xy - 4x^2 + xy + 5y^2$$

Collecting positive and negative like terms together, we get

$$7x^2 - 3x^2 - 4x^2 + 5xy - 6xy + xy - 9y^2 + 4y^2 + 5y^2$$

$$= 7x^2 - 7x^2 + 6xy - 6xy - 9y^2 + 9y^2$$

$$= 0$$

Q24) If $P = a^2 - b^2 + 2ab$, $Q = a^2 + 4b^2 - 6ab$, $R = b^2 + b$, $S = a^2 - 4ab$ and $T = -2a^2 + b^2 - ab + a$. Find $P + Q + R + S - T$.

Solution:

We have

$$P + Q + R + S - T = [(a^2 - b^2 + 2ab) + (a^2 + 4b^2 - 6ab) + (b^2 + b) + (a^2 - 4ab)] - (-2a^2 + b^2 - ab + a)$$

$$= [a^2 - b^2 + 2ab + a^2 + 4b^2 - 6ab + b^2 + b + a^2 - 4ab] - (-2a^2 + b^2 - ab + a)$$

$$= [3a^2 + 4b^2 - 8ab + b] - (-2a^2 + b^2 - ab + a)$$

$$= 3a^2 + 4b^2 - 8ab + b + 2a^2 - b^2 + ab - a$$

Collecting positive and negative like terms together, we get

$$3a^2 + 2a^2 + 4b^2 - b^2 - 8ab + ab - a + b$$

$$= 5a^2 + 3b^2 - 7ab - a + b$$