

RD SHARMA

Solutions

Class 8 Maths

Chapter 6

Ex 6.2

Q.1: Add the following algebraic expressions:

(i) $3a^2b, -4a^2b, 9a^2b$

(ii) $\frac{2}{3}a, \frac{3}{5}a, -\frac{6}{5}a$

(iii) $4xy^2-7x^2y, 12x^2y-6xy^2, -3x^2y+5xy^2$

(iv) $\frac{3}{2}a-\frac{5}{4}b+\frac{2}{5}c, \frac{2}{3}a-\frac{7}{2}b+\frac{7}{2}c, \frac{5}{3}a+\frac{5}{2}b-\frac{5}{4}c$

(v) $\frac{11}{2}xy+\frac{12}{5}y+\frac{13}{7}x, -\frac{11}{2}y-\frac{12}{5}x-\frac{13}{7}xy$

(vi) $\frac{7}{2}x^3-\frac{1}{2}x^2+\frac{5}{3}, \frac{3}{2}x^3+\frac{7}{4}x^2-x+\frac{1}{3}, \frac{3}{2}x^2-\frac{5}{2}x-2$

Solution:

(i) To add the like terms, we proceed as follows:

$$\begin{aligned} & 3a^2b + (-4a^2b) + 9a^2b \\ &= 3a^2b - 4a^2b + 9a^2b \quad (\text{Distributive Law}) \\ &= 8a^2b \end{aligned}$$

(ii) To add like terms, we proceed as follows:

$$\begin{aligned} & \frac{2}{3}a + \frac{3}{5}a + (-\frac{6}{5}a) \\ &= \frac{2}{3}a + \frac{3}{5}a - \frac{6}{5}a \\ &= (\frac{2}{3} + \frac{3}{5} - \frac{6}{5})a \quad (\text{Distributive Law}) \\ &= \frac{1}{15}a \end{aligned}$$

(iii) To add, we proceed as follows:

$$\begin{aligned} & (4xy^2-7x^2y) + (12x^2y) + (-6xy^2) + (-3x^2y+5xy^2) \\ &= 4xy^2-7x^2y+12x^2y-6xy^2-3x^2y+5xy^2 \\ &= 4xy^2-6xy^2+5xy^2-7x^2y+12x^2y-3x^2y \quad (\text{Collecting like terms}) \\ &= 3xy^2+2x^2y \quad (\text{Combining like terms}) \end{aligned}$$

(iv) To add, we proceed as follows:

$$\begin{aligned} & (\frac{3}{2}a-\frac{5}{4}b+\frac{2}{5}c) + (\frac{2}{3}a-\frac{7}{2}b+\frac{7}{2}c) + (\frac{5}{3}a+\frac{5}{2}b-\frac{5}{4}c) \\ &= \frac{3}{2}a-\frac{5}{4}b+\frac{2}{5}c+\frac{2}{3}a-\frac{7}{2}b+\frac{7}{2}c+\frac{5}{3}a+\frac{5}{2}b-\frac{5}{4}c \\ &= \frac{3}{2}a+\frac{2}{3}a+\frac{5}{3}a-\frac{5}{4}b-\frac{7}{2}b+\frac{5}{2}b+\frac{2}{5}c+\frac{7}{2}c-\frac{5}{4}c \\ & \quad (\text{Collecting like terms}) \\ &= \frac{23}{6}a-\frac{9}{4}b+\frac{53}{20}c \quad (\text{Combining like terms}) \end{aligned}$$

(v) To add, we proceed as follows:

$$\begin{aligned} & (\frac{11}{2}xy+\frac{12}{5}y+\frac{13}{7}x) + (-\frac{11}{2}y-\frac{12}{5}x-\frac{13}{7}xy) \\ &= \frac{11}{2}xy+\frac{12}{5}y+\frac{13}{7}x-\frac{11}{2}y-\frac{12}{5}x-\frac{13}{7}xy \end{aligned}$$

$$= \frac{11}{2}xy - \frac{13}{7}xy + \frac{12}{5}y - \frac{11}{2}y + \frac{13}{7}x - \frac{12}{5}x \quad (\text{Collecting like terms})$$

$$= \frac{51}{14}xy - \frac{31}{10}y - \frac{19}{35}x \quad (\text{Combining like terms})$$

(vi) To add, we proceed as follows:

$$\left(\frac{7}{2}x^3 - \frac{1}{2}x^2 + \frac{5}{3}\right) + \left(\frac{3}{2}x^3 + \frac{7}{4}x^2 - x + \frac{1}{3}\right) + \left(\frac{3}{2}x^2 - \frac{5}{2}x - 2\right)$$

$$= \frac{7}{2}x^3 - \frac{1}{2}x^2 + \frac{5}{3} + \frac{3}{2}x^3 + \frac{7}{4}x^2 - x + \frac{1}{3} + \frac{3}{2}x^2 - \frac{5}{2}x - 2$$

$$= \frac{7}{2}x^3 + \frac{3}{2}x^3 - \frac{1}{2}x^2 + \frac{7}{4}x^2 + \frac{3}{2}x^2 - x - \frac{5}{2}x + \frac{5}{3} + \frac{1}{3} - 2$$

(Collecting like terms)

$$= 5x^3 + \frac{11}{4}x^2 - \frac{7}{2}x \quad (\text{Combining like terms})$$

Q2) Subtract:

(i) **-5xy from 12xy**

(ii) **2a² from -7a²**

(iii) **2a - b from 3a - 5b**

(iv) **2x³ - 4x² + 3x + 5 from 4x³ + x² + x + 6**

(v) **$\frac{2}{3}y^3 - \frac{2}{7}y^2 - 5$ from $\frac{1}{3}y^3 + \frac{5}{7}y^2 + y - 2$**

(vi) **$\frac{3}{2}x - \frac{5}{4}y - \frac{7}{2}z$ from $\frac{2}{3}x + \frac{3}{2}y - \frac{4}{3}z$**

(vii) **$x^2y - \frac{4}{5}xy^2 + \frac{4}{3}xy$ from $\frac{2}{3}x^2y + \frac{3}{2}xy^2 - \frac{1}{3}xy$**

(viii) **$\frac{ab}{7} - \frac{35}{3}bc + \frac{6}{5}ac$ from $\frac{3}{5}bc - \frac{4}{5}ac$**

Solution:

(i) **12xy - (-5xy)**

$$= 12xy + 5xy = 17xy$$

(ii) **-7a² - (2a²)**

$$= -7a^2 - 2a^2 = -9a^2$$

(iii) **(3a - 5b) - (2a - b)**

$$= (3a - 5b) - 2a + b$$

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

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

(iv) **(4x³ + x² + x + 6) - (2x³ - 4x² + 3x + 5)**

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

$$= 4x^3 - 2x^3 + x^2 + 4x^2 + x - 3x + 6 - 5 \quad (\text{Collecting like terms})$$

$$= 2x^3 + 5x^2 - 2x + 1 \quad (\text{Combining like terms})$$

$$\begin{aligned}
\text{(v)} & \left(\frac{1}{3}y^3 + \frac{5}{7}y^2 + y - 2\right) - \left(\frac{2}{3}y^3 - \frac{2}{7}y^2 - 5\right) \\
&= \frac{1}{3}y^3 + \frac{5}{7}y^2 + y - 2 - \frac{2}{3}y^3 + \frac{2}{7}y^2 + 5 \\
&= \frac{1}{3}y^3 - \frac{2}{3}y^3 + \frac{5}{7}y^2 + \frac{2}{7}y^2 + y - 2 + 5 && \text{(Collecting like terms)} \\
&= -\frac{1}{3}y^3 + y^2 + y + 3 && \text{(Combining like terms)}
\end{aligned}$$

$$\begin{aligned}
\text{(vi)} & \left(\frac{2}{3}x + \frac{3}{2}y - \frac{4}{3}z\right) - \left(\frac{3}{2}x - \frac{5}{4}y - \frac{7}{2}z\right) \\
&= \frac{2}{3}x + \frac{3}{2}y - \frac{4}{3}z - \frac{3}{2}x + \frac{5}{4}y + \frac{7}{2}z \\
&= \frac{2}{3}x - \frac{3}{2}x + \frac{3}{2}y + \frac{5}{4}y - \frac{4}{3}z + \frac{7}{2}z && \text{(Collecting like terms)} \\
&= -\frac{5}{6}x + \frac{11}{4}y + \frac{13}{6}z && \text{(Combining like terms)}
\end{aligned}$$

$$\begin{aligned}
\text{(vii)} & \left(\frac{2}{3}x^2y + \frac{3}{2}xy^2 - \frac{1}{3}xy\right) - \left(x^2y - \frac{4}{5}xy^2 + \frac{4}{3}xy\right) \\
&= \frac{2}{3}x^2y + \frac{3}{2}xy^2 - \frac{1}{3}xy - x^2y + \frac{4}{5}xy^2 - \frac{4}{3}xy \\
&= \frac{2}{3}x^2y - x^2y + \frac{3}{2}xy^2 + \frac{4}{5}xy^2 - \frac{1}{3}xy - \frac{4}{3}xy && \text{(Collecting like terms)} \\
&= -\frac{1}{3}x^2y + \frac{23}{10}xy^2 - \frac{5}{3}xy && \text{(Combining like terms)}
\end{aligned}$$

$$\begin{aligned}
\text{(viii)} & \left(\frac{3}{5}bc - \frac{4}{5}ac\right) - \left(\frac{ab}{7} - \frac{35}{3}bc + \frac{6}{5}ac\right) \\
&= \frac{3}{5}bc - \frac{4}{5}ac - \frac{ab}{7} + \frac{35}{3}bc - \frac{6}{5}ac \\
&= \frac{3}{5}bc + \frac{35}{3}bc - \frac{4}{5}ac - \frac{6}{5}ac - \frac{ab}{7} && \text{(Collecting like terms)} \\
&= \frac{184}{15}bc - 2ac - \frac{ab}{7} && \text{(Combining like terms)}
\end{aligned}$$

Q3) Take away:

$$\text{(i)} \quad \frac{6}{5}x^2 - \frac{4}{5}x^3 + \frac{5}{6} + \frac{3}{2}x \text{ from } \frac{x^3}{3} - \frac{5}{2}x^2 + \frac{3}{5}x + \frac{1}{4}$$

$$\text{(ii)} \quad \frac{7}{4}x^3 + \frac{3}{5}x^2 + \frac{1}{2}x + \frac{9}{2} \text{ from } \frac{7}{2} - \frac{x}{3} - \frac{x^2}{5}$$

$$\text{(iii)} \quad \frac{y^3}{3} + \frac{7}{3}y^2 + \frac{1}{2}y + \frac{1}{2} \text{ from } \frac{1}{3} - \frac{5}{3}y^2$$

$$\text{(iv)} \quad \frac{2}{3}ac - \frac{5}{7}ab + \frac{2}{3}bc \text{ from } \frac{3}{2}ab - \frac{7}{4}ac - \frac{5}{6}bc$$

Solution:

(i) The difference is given by:

$$\begin{aligned}
& \left(\frac{x^3}{3} - \frac{5}{2}x^2 + \frac{3}{5}x + \frac{1}{4}\right) - \left(\frac{6}{5}x^2 - \frac{4}{5}x^3 + \frac{5}{6} + \frac{3}{2}x\right) \\
&= \frac{x^3}{3} - \frac{5}{2}x^2 + \frac{3}{5}x + \frac{1}{4} - \frac{6}{5}x^2 + \frac{4}{5}x^3 - \frac{5}{6} - \frac{3}{2}x \\
&= \frac{x^3}{3} + \frac{4}{5}x^3 - \frac{5}{2}x^2 - \frac{6}{5}x^2 + \frac{3}{5}x - \frac{3}{2}x + \frac{1}{4} - \frac{5}{6} && \text{(Collecting like terms)} \\
&= \left(\frac{5+12}{15}\right)x^3 + \left(\frac{-25-12}{10}\right)x^2 + \left(\frac{6-15}{10}\right)x + \left(\frac{6-20}{24}\right) \\
&= \frac{17}{15}x^3 - \frac{37}{10}x^2 - \frac{9}{10}x - \frac{7}{12} && \text{(Combining like terms)}
\end{aligned}$$

(ii) The difference is given by:

$$\begin{aligned} & \left(\frac{7}{2} - \frac{x}{3} - \frac{x^2}{5}\right) - \left(\frac{7}{4}x^3 + \frac{3}{5}x^2 + \frac{x}{2} + \frac{9}{2}\right) \\ &= \frac{7}{2} - \frac{x}{3} - \frac{x^2}{5} - \frac{7}{4}x^3 - \frac{3}{5}x^2 - \frac{x}{2} - \frac{9}{2} \\ &= \frac{7}{2} - \frac{9}{2} - \frac{x}{3} - \frac{x}{2} - \frac{x^2}{5} - \frac{3x^2}{5} - \frac{7x^3}{4} \quad \text{(Collecting like terms)} \\ &= \left(\frac{7-9}{2}\right) + \left(\frac{-2-3}{6}\right)x + \left(\frac{-1-3}{5}\right)x^2 - \frac{7x^3}{4} \\ &= -1 - \frac{5x}{6} - \frac{4x^2}{5} - \frac{7x^3}{4} \quad \text{(Combining like terms)} \end{aligned}$$

(iii) The difference is given by:

$$\begin{aligned} & \left(\frac{1}{3} - \frac{5}{3}y^2\right) - \left(\frac{y^3}{3} + \frac{7}{3}y^2 + \frac{1}{2}y + \frac{1}{2}\right) \\ &= \frac{1}{3} - \frac{5}{3}y^2 - \frac{y^3}{3} - \frac{7}{3}y^2 - \frac{1}{2}y - \frac{1}{2} \\ &= \frac{1}{3} - \frac{1}{2} - \frac{y}{2} - \frac{5}{3}y^2 - \frac{7}{3}y^2 - \frac{y^3}{3} \quad \text{(Collecting like terms)} \\ &= \left(\frac{2-3}{6}\right) - \frac{y}{2} + \left(\frac{-5-7}{3}\right)y^2 - \frac{7}{3}y^2 - \frac{y^3}{3} \\ &= -\frac{1}{6} - \frac{y}{2} - 4y^2 - \frac{y^3}{3} \quad \text{(Combining like terms)} \end{aligned}$$

(iv) The difference is given by:

$$\begin{aligned} & \left(\frac{3}{2}ab - \frac{7}{4}ac - \frac{5}{6}bc\right) - \left(\frac{2}{3}ac - \frac{5}{7}ab + \frac{2}{3}bc\right) \\ &= \frac{3}{2}ab - \frac{7}{4}ac - \frac{5}{6}bc - \frac{2}{3}ac + \frac{5}{7}ab - \frac{2}{3}bc \\ &= \frac{3}{2}ab + \frac{5}{7}ab - \frac{7}{4}ac - \frac{2}{3}ac - \frac{5}{6}bc - \frac{2}{3}bc \quad \text{(Collecting like terms)} \\ &= \left(\frac{21+10}{14}\right)ab + \left(\frac{-21-8}{12}\right)ac + \left(\frac{-5-4}{6}\right)bc \\ &= \frac{31}{14}ab - \frac{29}{12}ac - \frac{3}{2}bc \quad \text{(Combining like terms)} \end{aligned}$$

Q4: Subtract $3x - 4y - 7z$ from the sum of $x - 3y + 2z$ and $-4x + 9y - 11z$

Solution:

First add the expressions $x - 3y + 2z$ and $-4x + 9y - 11z$ we get:

$$\begin{aligned} & (x - 3y + 2z) + (-4x + 9y - 11z) \\ &= x - 3y + 2z - 4x + 9y - 11z \\ &= x - 4x - 3y + 9y + 2z - 11z \quad \text{(Collecting like terms)} \\ &= -3x + 6y - 9z \quad \text{(Combining like terms)} \end{aligned}$$

Now, Subtracting the expression $3x - 4y - 7z$ from the above sum, we get:

$$\begin{aligned} & (-3x + 6y - 9z) - (3x - 4y - 7z) \\ &= -3x + 6y - 9z - 3x + 4y + 7z \\ &= -3x - 3x + 6y + 4y - 9z + 7z \quad \text{(Collecting like terms)} \\ &= -6x + 10y - 2z \quad \text{(Combining like terms)} \end{aligned}$$

Thus, the answer is $-6x + 10y - 2z$.

Q5) Subtract the sum of $3l - 4m - 7n^2$ and $2l + 3m - 4n^2$ from the sum of $9l + 2m - 3n^2$ and $-3l + m + 4n^2$.

Solution:

We have to subtract the sum of $(3l - 4m - 7n^2)$ and $(2l + 3m - 4n^2)$ from the sum of $(9l + 2m - 3n^2)$ and $(-3l + m + 4n^2)$

$$\{(9l + 2m - 3n^2) + (-3l + m + 4n^2)\} - \{(3l - 4m - 7n^2) + (2l + 3m - 4n^2)\}$$

$$\begin{aligned}
&= (9l - 3l + 2m + m - 3n^2 + 4n^2) - (3l + 2l - 4m + 3m - 7n^2 - 4n^2) \\
&= (6l + 3m + n^2) - (5l - m - 11n^2) \quad \text{(Combining like terms inside the parenthesis)} \\
&= 6l + 3m + n^2 - 5l + m + 11n^2 \\
&= 6l - 5l + 3m + m + n^2 + 11n^2 \quad \text{(Collecting like terms)} \\
&= l + 4m + 12n^2 \quad \text{(Combining like terms)}
\end{aligned}$$

Thus, the required solution is $l + 4m + 12n^2$.

Q6) Subtract the sum $2x - x^2 + 5$ and $-4x - 3 + 7x^2$ from 5.

Solution:

We have to subtract the sum of $(2x - x^2 + 5)$ and $(-4x - 3 + 7x^2)$ from 5.

$$\begin{aligned}
&5 - \{(2x - x^2 + 5) + (-4x - 3 + 7x^2)\} \\
&= 5 - (2x - 4x - x^2 + 7x^2 + 5 - 3) \\
&= 5 - 2x + 4x + x^2 - 7x^2 - 5 + 3 \\
&= 5 - 5 + 3 - 2x + 4x + x^2 - 7x^2 \quad \text{(Collecting like terms)} \\
&= 3 + 2x - 6x^2 \quad \text{(Combining like terms)}
\end{aligned}$$

Thus, the answer is $3 + 2x - 6x^2$.

Q7) Simplify each of the following:

$$\begin{aligned}
\text{(i)} & x^2 - 3x + 5 - \frac{1}{2}(3x^2 - 5x + 7) \\
\text{(ii)} & [5 - 3x + 2y - (2x - y)] - (3x - 7y + 9) \\
\text{(iii)} & \frac{11}{2}x^2y - \frac{9}{4}xy^2 + \frac{1}{4}xy - \frac{1}{14}y^2x + \frac{1}{15}yx^2 + \frac{1}{2}xy \\
\text{(iv)} & (\frac{1}{3}y^2 - \frac{4}{7}y + 11) - (\frac{1}{7}y - 3 + 2y^2) - (\frac{2}{7}y - \frac{2}{3}y^2 + 2) \\
\text{(v)} & -\frac{1}{2}a^2b^2c + \frac{1}{3}ab^2c - \frac{1}{4}abc^2 - \frac{1}{5}cb^2a^2 + \frac{1}{6}cb^2a - \frac{1}{7}c^2ab + \frac{1}{8}ca^2b.
\end{aligned}$$

Solution:

$$\begin{aligned}
\text{(i)} & x^2 - 3x + 5 - \frac{1}{2}(3x^2 - 5x + 7) \\
&= x^2 - 3x + 5 - \frac{3x^2}{2} + \frac{5x}{2} - \frac{7}{2} \\
&= x^2 - \frac{3x^2}{2} - 3x + \frac{5x}{2} + 5 - \frac{7}{2} \quad \text{(Collecting like terms)} \\
&= (\frac{1-3}{2})x^2 + (\frac{-3+5}{2})x + (\frac{10-7}{2}) \\
&= \frac{-x^2}{2} - \frac{x}{2} + \frac{3}{2}
\end{aligned}$$

Thus, the answer is $\frac{-x^2}{2} - \frac{x}{2} + \frac{3}{2}$.

$$\begin{aligned}
\text{(ii)} & [5 - 3x + 2y - (2x - y)] - (3x - 7y + 9) \\
&= [5 - 3x + 2y - 2x + y] - (3x - 7y + 9) \\
&= [5 - 5x + 3y] - (3x - 7y + 9) \\
&= 5 - 5x + 3y - 3x + 7y - 9 \\
&= 5 - 9 - 5x - 3x + 3y + 7y = -4 - 8x + 10y
\end{aligned}$$

$$\begin{aligned}
\text{(iii)} & \frac{11}{2}x^2y - \frac{9}{4}xy^2 + \frac{1}{4}xy - \frac{1}{14}y^2x + \frac{1}{15}yx^2 + \frac{1}{2}xy \\
&= \frac{11}{2}x^2y + \frac{1}{15}yx^2 - \frac{9}{4}xy^2 - \frac{1}{14}y^2x + \frac{1}{4}xy + \frac{1}{2}xy \quad \text{(Collecting like terms)} \\
&= (\frac{165+2}{30})x^2y + (\frac{-63-2}{28})xy^2 + (\frac{1+2}{4})xy
\end{aligned}$$

$$= \frac{167}{30}x^2y - \frac{65}{28}xy^2 + \frac{3}{4}xy \quad (\text{Combining like terms})$$

$$(iv) \left(\frac{1}{3}y^2 - \frac{4}{7}y + 11\right) - \left(\frac{1}{7}y - 3 + 2y^2\right) - \left(\frac{2}{7}y - \frac{2}{3}y^2 + 2\right)$$

$$= \frac{1}{3}y^2 - \frac{4}{7}y + 11 - \frac{1}{7}y + 3 - 2y^2 - \frac{2}{7}y + \frac{2}{3}y^2 - 2$$

$$= \frac{1}{3}y^2 + \frac{2}{3}y^2 - 2y^2 - \frac{4}{7}y - \frac{1}{7}y - \frac{2}{7}y + 11 + 3 - 2 \quad (\text{Collecting like terms})$$

$$= \left(\frac{1-6+2}{3}\right)y^2 + \left(\frac{-4-1-2}{7}\right)y + 12$$

$$= -y^2 - 7y + 12 \quad (\text{Combining like terms})$$

$$(v) -\frac{1}{2}a^2b^2c + \frac{1}{3}ab^2c - \frac{1}{4}abc^2 - \frac{1}{5}cb^2a^2 + \frac{1}{6}cb^2a - \frac{1}{7}c^2ab + \frac{1}{8}ca^2b$$

$$= -\frac{1}{2}a^2b^2c - \frac{1}{5}cb^2a^2 + \frac{1}{3}ab^2c + \frac{1}{6}cb^2a - \frac{1}{4}abc^2 - \frac{1}{7}c^2ab + \frac{1}{8}ca^2b \quad (\text{Collecting like terms})$$

$$= \left(\frac{-5-2}{10}\right)a^2b^2c + \left(\frac{2+1}{6}\right)ab^2c + \left(\frac{-7-4}{28}\right)c^2ab + \frac{1}{8}ca^2b$$

$$= -\frac{7}{10}a^2b^2c + \frac{1}{2}ab^2c - \frac{11}{28}abc^2 + \frac{1}{8}a^2bc \quad (\text{Combining like terms})$$