RD Sharma Solutions

Class 7

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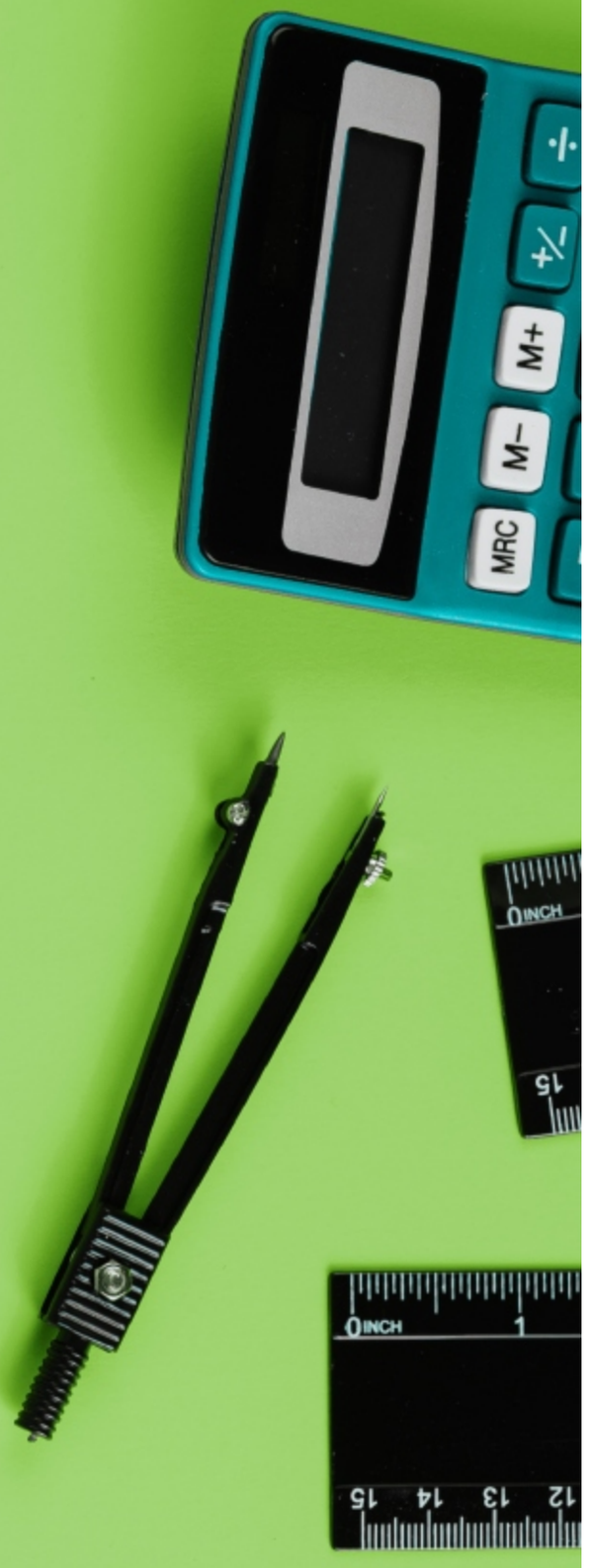

Exercise 7.2

(1) Add the following

(i) $3x$ and $7x$ (ii) $-5xy + 9xy$

Solution: (i) $3x$ and $7x$, here numerical coefficients of like terms are 3 and 7.

$$\because 3+7 = 10$$

$$\therefore 3x + 7x = 10x$$

(ii) $-5xy + 9xy$, here numerical coefficients of like terms are -5 and 9

$$\because -5+9 = 4$$

$$\therefore -5xy + 9xy = 4xy$$

Q.2 Simplify each of the following

(i) $7x^3y + 9yx^3$ (ii) $12a^2b + 3ba^2$

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

$$= 16x^3y$$

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

$$= 15a^2b$$

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Q.3 Add the following:

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

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

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

here numerical coefficients of given like terms are $7, -5, 9, -8$

$$\because \; 7+(-5)+9+(-8) = 16-13 = 3$$

Therefore, $7abc+(-5abc)+(9abc)+(-8abc) = 3abc$

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

here sum of numerical coefficients of given like terms

$$2+(-4)+6+(-5) = 8-9 = -1$$

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

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

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Collecting like terms.

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

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

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

Collecting like terms

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

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

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

Collecting like terms, we get

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

$$= -2a+(-5ab)+(0) = -2a-5ab$$

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

By collecting like terms, we get

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

$= 10x^3+(-7x^2)+(-7x)+(-5)$

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

Q6 Add the following expressions:

(i)
$$\begin{array}{r} x-3y-2z \\ 5x+7y-8z \\ 3x-2y+5z \end{array}$$

(ii)
$$\begin{array}{r} 4ab-5bc+7ca \\ -3ab+2bc-3ca \\ 5ab-3bc+4ca \end{array}$$

Solution: (i)
$$\begin{array}{r} x-3y-2z \\ +\ 5x+7y-8z \\ +\ 3x-2y+5z \\ \hline 9x+2y-5z \\ \hline \end{array}$$

(ii)
$$\begin{array}{r} 4ab-5bc+7ca \\ -3ab+2bc-3ca \\ 5ab-3bc+4ca \\ \hline 6ab-6bc+8ca \\ \hline \end{array}$$

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

Solution: Sum of $3x^2-2x$ and $3x+7$ is given by

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

Now, $(3x^2+x+7)+(2x^2-3x+1)$

$$= (3x^2+2x^2)+(x-3x)+(7+1)$$
$$= 5x^2-2x+8$$

Q.8 Add $x^2+2xy+y^2$ to the sum of x^2-3y^2 and $2x^2-y^2+9$

Solution: The sum of x^2-3y^2 and $2x^2-y^2+9$ is given by $(x^2-3y^2)+(2x^2-y^2+9)$

$$= (x^2+2x^2)+(-3y^2-y^2)+9$$
$$= 3x^2-4y^2+9$$

Now, sum of $x^2+2xy+y^2$ and $3x^2-4y^2+9$

$$= (x^2+2xy+y^2)+(3x^2-4y^2+9)$$
$$= (x^2+3x^2)+(2xy)+(y^2-4y^2)+9$$
$$= 4x^2+2xy-3y^2+9$$

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

Solution Sum of $2a^3-3b^3-3ab+7$ and $-a^3+b^3+3ab-9$

is given by

$$(2a^3-3b^3-3ab+7)+(-a^3+b^3+3ab-9)$$

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

$$= a^3-2b^3+0-2$$

$$= a^3-2b^3-2$$

Now sum of $(a^3+b^3-3)+(a^3-2b^3-2)$

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

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

Q.10 Subtract: (i) $7a^2b$ from $3a^2b$ (ii) $4xy$ from $-3xy$

Solution (i) $3a^2b-7a^2b$

$$= -4a^2b$$

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

$$= -7xy$$

Q.11 Subtract (i) $-4x$ from $3y$ (ii) $-2x$ from $-5y$

Solution: (i) $3y-(-4x) = 3y+4x$

(ii) $-5y-(-2x) = -5y+2x$

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Q.13 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) $(p^3 - 4 + 3p^2) - (5p^2 - 3p^3 + p - 6)$

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

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

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

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

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

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

$= -7x^3 + (-4x^2) + (0) + (-2)$

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

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

$= (1 - 5y^2 - y^3 - 7y^2 - y - 1)$

$= (1 - 1) + (-5y^2 - 7y^2) + (-y^3) + (-y)$

$= 0 - 12y^2 - y^3 - y$

$= -y^3 - 12y^2 - y$

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

$= x^3-5x^2+3x+1-6x^2+4x^3-5-3x$

$= (x^3+4x^3)+(-5x^2-6x^2)+(3x-3x)+(1-5)$

$= 5x^3+(-11x^2)+0+(-4)$

$= 5x^3-11x^2-4$

Q.14 From the sum of $3x^2-5x+2$ and $-5x^2-8x+9$ subtract $4x^2-7x+9$

Solution: Sum of $(3x^2-5x+2)+(-5x^2-8x+9)$

$= (3x^2-5x^2)+(-5x-8x)+(2+9)$

$= -2x^2-13x+11$

Now, we subtract $4x^2-7x+9$ from $-2x^2-13x+11$

required expression

$= (-2x^2-13x+11)-(4x^2-7x+9)$

$= -2x^2-13x+11-4x^2+7x-9$

$= (-2x^2-4x^2)+(-13x+7x)+(11-9)$

$= -6x^2-6x+2$

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Q.15 Subtract the sum of $13x-4y+7z$ and $-6z+6x+3y$ from the sum of $6x-4y-4z$ and $2x+4y-7$.

Solution: Sum of $13x-4y+7z$ and $-6z+6x+3y$ is given by

$$(13x-4y+7z)+(-6z+6x+3y)$$
$$=(13x+6x)+(-4y+3y)+(7z-6z)$$
$$=19x-y+z$$

Now sum of $6x-4y-4z$ and $2x+4y-7$ is given by

$$=(6x-4y-4z)+(2x+4y-7)$$
$$=(6x+2x)+(-4y+4y)+(-4z-7)$$
$$=8x+0-4z-7 \quad =8x-4z-7$$

Now required expression

$$=(8x-4z-7)-(19x-y+z)$$
$$=8x-4z-7-19x+y-z$$
$$=(8x-19x)+y+(-4z-z)-7$$
$$=-11x+y-5z-7$$

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Q.16 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:

$$\text{Sum} = (x^2+3y^2-6xy)+(2x^2-y^2+8xy)+(y^2+8)+(x^2-3xy)$$

$$= (x^2+2x^2+x^2)+(3y^2-y^2+y^2)+(-6xy+8xy-3xy)+8$$

$$= 4x^2+3y^2-xy+8$$

Now required fraction:

$$(4x^2+3y^2-xy+8)-(-3x^2+4y^2-xy+x-y+3)$$

$$= (4x^2+3y^2-xy+8+3x^2-4y^2+xy-x+y-3)$$

$$= (4x^2+3x^2)+(3y^2-4y^2)+(-xy+xy)+(-x)+y+(8-3)$$

$$= 7x^2-y^2+0-x+y+5$$

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

Q.17 What should be added to $xy-3yz+4zx$ to get $4xy-3zx+4yz+7$?

Solution: Required expression $= (4xy-3zx+4yz+7)-(xy-3yz+4zx)$

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$4xy - 3zx + 4yz + 7 - xy + 3yz - 4zx$

$= (4xy - xy) + (4yz + 3yz) + (-3zx - 4zx) + 7$

$= 3xy + 7yz - 7zx + 7$

Q.18 What should be subtracted from $x^2 - xy + y^2 - x + y + 3$ to obtain $-x^2 + 3y^2 - 4xy + 1$?

Solution Required expression

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

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

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

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

Q.19 How much is $x - 2y + 3z$ greater than $3x + 5y - 7$?

Solution:

required expression $= (x - 2y + 3z) - (3x + 5y - 7)$

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

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

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

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Q.20 How much is $x^2 - 2xy + 3y^2$ less than $2x^2 - 3y^2 + xy$?

Solution: Required expression

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

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

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

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

Q.21 How much does $a^2 - 3ab + 2b^2$ exceed $2a^2 - 7ab + 9b^2$

Solution: Required expression

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

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

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

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

Q.22 What must be added to $12x^3 - 4x^2 + 3x - 7$ to make the sum $x^3 + 2x^2 - 3x + 2$?

Solution: required expression:

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

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

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

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$= -11x^3 + 6x^2 - 6x + 9$

Q.23 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: $P + Q + R$

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

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

$= 0 + 0 + 0$

$= 0$

Q.24 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: $P + Q + R + S - T$

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

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

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

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

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