RD SHARMA

Solutions

Class 8 Maths

Chapter 6

Ex 6.4

Find the following products: (1-15)

Q 1. $2a^3(3a + 5b)$

SOLUTION:

To find the product, we will use distributive law as follows:

$2a^3 (3a + 5b)$

$= 2a^3 \times 3a + 2a^3 \times 5b$

$= (2 \times 3)(a^3 \times a) + (2 \times 5)a^3b$

$= (2 \times 3)\,a^{3+1} + (2 \times 5)\,a^3b$

$= 6a^4 + 10a^3b$

Thus, the answer is $6a^4 + 10a^3b$.

Q 2. -11a(3a + 2b)

SOLUTION:

To find the product, we will use distributive law as follows:

-11a(3a + 2b)

$= (-11a) \times 3a + (-11a) \times 2b$

$= (-11 \times 3) \times (a \times a) + (-11 \times 2) \times (a \times b)$

$= (-33) \times (a^{1+1}) + (-22) \times (a \times b)$

$= -33a^2 - 22ab$

Thus, the answer is $-33a^2 - 22ab$.

Q 3. -5a(7a − 2b)

SOLUTION:

To find the product, we will use distributive law as follows:

-5a(7a − 2b)

$= (-5a) \times 7a + (-5a) \times (-2b)$

$= (-5 \times 7) \times (a \times a) + (-5 \times (-2)) \times (a \times b)$

$= (-35) \times (a^{1+1}) + (10) \times (a \times b)$

$= -35a^2 + 10ab$

Thus, the answer is $-35a^2 + 10ab$.

Q 4. -11y²(3y + 7)

SOLUTION:

To find the product, we will use distributive law as follows:

$-11y^2(3y + 7)$

$= (-11y^2) \times 3y + (-11y^2) \times 7$

$= (-11 \times 3)(y^2 \times y) + (-11 \times 7) \times (y^2)$

$= (-33)(y^{2+1}) + (-77) \times (y^2)$

$= -33y^3 - 77y^2$

Thus, the answer is $-33y^3 - 77y^2$.

Q 5. $\frac{6x}{5}(x^3 + y^3)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$\frac{6x}{5}(x^3 + y^3)$$

$$= \frac{6x}{5} \times x^3 + \frac{6x}{5} \times y^3$$

$$= \frac{6}{5} \times (x \times x^3) + \frac{6}{5} \times (x \times y^3)$$

$$= \frac{6}{5} \times (x \times x^{1+3}) + \frac{6}{5} \times (x \times y^3)$$

$$= \frac{6x^4}{5} + \frac{6xy^3}{5}$$

Thus, the answer is $\frac{6x^4}{5} + \frac{6xy^3}{5}$.

Q 6. $xy(x^3 - y^3)$

SOLUTION:

To find the product, we will use the distributive law in the following way:

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

$= xy \times x^3 - xy \times y^3$

$= (x \times x^3) \times y - x \times (y \times y^3\,)$

$= x^{1+3}y - xy^{1+3}$

$= x^4y - xy^4$

Thus, the answer is $x^4y - xy^4$.

Q 7. $0.1y(0.1x^5 + 0.1y)$

SOLUTION:

To find the product, we will use distributive law as follows:

$0.1y(0.1x^5 + 0.1y)$

$= (0.1y)(0.1x^5) + (0.1y)(0.1y)$

$= (0.1 \times 0.1)(y \times x^5) + (0.1 \times 0.1)(y \times y)$

$= (0.1 \times 0.1)(x^5 \times y) + (0.1 \times 0.1)(\,y^{1+1})$

$= 0.01x^5y + 0.01y^2$

Thus, the answer is $0.01x^5y + 0.01y^2$

Q 8. $(\frac{-7}{4}ab^2c - \frac{6}{25}a^2c^2)(-50a^2b^2c^2)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$(\frac{-7}{4}ab^2c - \frac{6}{25}a^2c^2)(-50a^2b^2c^2)$$

$$= \{(\frac{-7}{4}ab^2c)(-50a^2b^2c^2)\} - \{(\frac{6}{25}a^2c^2)(-50a^2b^2c^2)\}$$

$$= \{\{\frac{-7}{4} \times (-50)\}(a \times a^2)(b^2 \times b^2) \times (c \times c^2)\}$$

$- \{(\frac{6}{25})(-50)(a^2 \times a^2) \times b^2 \times (c^2 \times c^2)\}$

$= \frac{175}{2}a^3b^4c^3 - (-12a^4b^2c^4)$

$= \frac{175}{2}a^3b^4c^3 + 12a^4b^2c^4$

Thus, the answer is $\frac{175}{2}a^3b^4c^3 + 12a^4b^2c^4$.

Q 9. $-\frac{8}{27}xyz\left(\frac{3}{2}xyz^2 - \frac{9}{4}xy^2z^3\right)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$-\frac{8}{27}xyz\left(\frac{3}{2}xyz^2 - \frac{9}{4}xy^2z^3\right)$$

$$= \left\{\left(-\frac{8}{27}xyz\right)\left(\frac{3}{2}xyz^2\right)\right\} - \left\{\left(-\frac{8}{27}xyz\right)\left(\frac{9}{4}xy^2z^3\right)\right\}$$

$=$

$$\left\{\left(\frac{-8}{27} \times \frac{3}{2}\right)(x \times x) \times (y \times y) \times (z \times z^2)\right\}$$

$$-\left\{\left(\frac{-8}{27} \times \frac{9}{4}\right)(x \times x) \times (y \times y^2) \times (z \times z^3)\right\}$$

$= \left\{\left(-\frac{8}{27} \times \frac{3}{2}\right)(x^{1+1}y^{1+1}z^{1+2})\right\} - \left\{\left(-\frac{8}{27} \times \frac{9}{4}\right)(x^{1+1}y^{1+2}z^{1+3})\right\}$

$= -\frac{4}{9}x^2y^2z^3 + \frac{2}{3}x^2y^3z^4$

Thus, the answer is $-\frac{4}{9}x^2y^2z^3 + \frac{2}{3}x^2y^3z^4$

Q 10. $-\frac{4}{27}xyz\left(\frac{9}{2}x^2yz - \frac{3}{4}xyz^2\right)$

SOLUTION:

To find the product, we will use distributive law as follows:

$-\frac{4}{27}xyz\left(\frac{9}{2}x^2yz - \frac{3}{4}xyz^2\right)$

$= \left\{\left(-\frac{4}{27}xyz\right)\left(\frac{9}{2}x^2yz\right)\right\} - \left\{\left(-\frac{4}{27}xyz\right)\left(\frac{3}{4}xyz^2\right)\right\}$

$= \left\{\left(-\frac{4}{27} \times \frac{9}{2}\right)(x^{1+2}y^{1+1}z^{1+1})\right\} - \left\{\left(-\frac{4}{27} \times \frac{3}{4}\right)(x^{1+1}y^{1+1}z^{1+2})\right\}$

$= -\frac{2}{3}x^3y^2z^2 + \frac{1}{9}x^2y^2z^3$

Thus, the answer is $-\frac{2}{3}x^3y^2z^2 + \frac{1}{9}x^2y^2z^3$

Q 11. $1.5x(10x^2y - 100xy^2)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$1.5x(10x^2y - 100xy^2)$$

$$= (1.5x \times 10x^2y) - (1.5x \times 100xy^2)$$

$$= (15x^{1+2}y) - (150x^{1+1}y^2)$$

$$= 15x^3y - 150x^2y^2$$

Thus, the answer is $15x^3y - 150x^2y^2$.

Q 12. $4.1xy(1.1x - y)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$4.1xy\,(1.1x-y)$$
$$= (4.1xy \times 1.1x) - (4.1xy \times y)$$
$$= \{(4.1 \times 1.1) \times xy \times x\} - (4.1xy \times y)$$
$$= (4.51x^{1+1}y) - (4.1xy^{1+1})$$
$$= 4.51x^2y - 4.1xy^2$$

Thus, the answer is $4.51x^2y - 4.1xy^2$

Q 13. $250.5xy\left(xz + \frac{y}{10}\right)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$250.5xy\left(xz + \frac{y}{10}\right)$$
$$= 250.5xy \times xz + 250.5xy \times \frac{y}{10}$$
$$= 250.5x^{1+1}yz + 25.05xy^{1+1}$$
$$= 250.5x^2yz + 25.05xy^2$$

Thus, the answer is $250.5x^2yz + 25.05xy^2$.

Q 14. $\frac{7}{5}x^2y\left(\frac{3}{5}xy^2 + \frac{2}{5}x\right)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$\frac{7}{5}x^2y\left(\frac{3}{5}xy^2 + \frac{2}{5}x\right)$$
$$= \frac{7}{5}x^2y \times \frac{3}{5}xy^2 + \frac{7}{5}x^2y \times \frac{2}{5}x$$
$$= \frac{21}{25}x^{2+1}y^{1+2} + \frac{14}{25}x^{2+1}y$$
$$= \frac{21}{25}x^3y^3 + \frac{14}{25}x^3y$$

Thus, the answer is $\frac{21}{25}x^3y^3 + \frac{14}{25}x^3y$

Q 15. $\frac{4}{3}a\,(a^2 + b^2 - 3c^2)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$\frac{4}{3}a\,(a^2 + b^2 - 3c^2)$$
$$= \frac{4}{3}a \times a^2 + \frac{4}{3}a \times b^2 - \frac{4}{3}a \times 3c^2$$
$$= \frac{4}{3}a^{1+2} + \frac{4}{3}ab^2 - 4ac^2$$
$$= \frac{4}{3}a^3 + \frac{4}{3}ab^2 - 4ac^2$$

Thus, the answer is $\frac{4}{3}a^3 + \frac{4}{3}ab^2 - 4ac^2$.

Q 16. Find the product $24x^2\,(1-2x)$ **and evaluate its value for x = 3.**

SOLUTION:

To find the product, we will use distributive law as follows:

$$24x^2\,(1-2x)$$
$$= 24x^2 \times 1 - 24x^2 \times 2x$$
$$= 24x^2 - 48x^{1+2}$$
$$= 24x^2 - 48x^3$$

Substituting x = 3 in the result, we get

$24x^2-48x^3$
=
$$24(3)^2-48(3)^3$$
$$= 24 \times 9 - 48 \times 27$$
$$= 216 - 1296$$
$$= -1080$$

Thus, the product is $24x^2-48x^3$ and its value for x = 3 is -1080.

Q 17. Find the product $-3y\,(xy + y^2)$ and find its value for x = 4 and y = 5.

SOLUTION:

To find the product, we will use distributive law as follows:

$$-3y\,(xy + y^2)$$
$$= -3y \times xy + (-3y) \times y^2$$
$$= -3xy^{1+1} - 3y^{1+2}$$
$$= -3xy^2 - 3y^3$$

Substituting x = 4 and y = 5 in the result, we get

$$-3xy^2 - 3y^3$$
$$= -3\,(4)\,(5)^2 - 3(5)^3$$
$$= -3\,(4)\,(25) - 3\,(125)$$
$$= -300 - 375$$
$$= -675$$

Thus, the product is $-3xy^2-3y^3$, and its value for x = 4 and y = 5 is -675.

Q 18. Multiply $-\frac{3}{2}x^2y^3$ by (2x − y) and verify the answer for x = 1 and y = 2.

SOLUTION:

To find the product, we will use distributive law as follows:

$$-\tfrac{3}{2}x^2y^3 \times (2x-y)$$
$$= (-\tfrac{3}{2}x^2y^3 \times 2x) - (-\tfrac{3}{2}x^2y^3 \times y)$$
$$= (-3x^{2+1}y^3) - (-\tfrac{3}{2}x^2y^{3+1})$$
$$= -3x^3y^3 + \tfrac{3}{2}x^2y^4$$

Substituting x = 1 and y = 2 in the result, we get

$$-3x^3y^3 + \tfrac{3}{2}x^2y^4$$
$$= -3(1)^3(2)^3 + \tfrac{3}{2}(1)^2(2)^4$$
$$= -3 \times 1 \times 8 + \tfrac{3}{2} \times 1 \times 16$$
$$= -24 + 24$$
$$= 0$$

Thus, the product is $-3x^3y^3 + \tfrac{3}{2}x^2y^4$, its value for x = 1 and y = 2 is 0.

Q 19. Multiply the monomial by the binomial and find the value of each for x = -1, y = 0.25 and z = 0.05:

(i) $15y^2\,(2-3x)$

SOLUTION:

To find the product, we will use distributive law as follows:

$15y^2\,(2-3x)$
$= 15y^2 \times 2 - 15y^2 \times 3x$

$= 30y^2 - 45xy^2$

Substituting x = -1 and y = 0.25 in the result, we get:

$$30y^2 - 45xy^2$$
$$= 30(0.25)^2 - 45(-1)(0.25)^2$$
$$= 30 \times 0.0625 - \{45 \times (-1) \times 0.0625\}$$
$$= 1.875 - (-2.8125)$$
$$= 1.875 + 2.8125$$
$$= 4.6875$$

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

SOLUTION:

To find the product, we will use distributive law as follows:

$$-3x(y^2 + z^2)$$
$$= -3x \times y^2 + (-3x) \times z^2$$
$$= -3xy^2 - 3xz^2$$

Substituting x = -1, y = 0.25 and z = 0.05 in the result, we get:

$$-3xy^2 - 3xz^2$$
$$= -3(-1)(0.25)^2 - 3(-1)(0.05)^2$$
$$= -3(-1)(0.0625) - 3(-1)(0.0025)$$
$$= 0.1875 + 0.0075$$
$$= 0.195$$

(iii) $z^2(x-y)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$z^2(x-y)$$
$$= z^2 \times x - z^2 \times y$$
$$= xz^2 - yz^2$$

Substituting x = -1, y = 0.25 and z = 0.05 in the result, we get:

$$xz^2 - yz^2$$
$$= (-1)(0.05)^2 - (0.25)(0.05)^2$$
$$= (-1)(0.0025) - (0.25)(0.0025)$$
$$= -0.0025 - 0.000625$$
$$= -0.003125$$

(iv) $xz(x^2 + y^2)$

SOLUTION:

To find the product, we will use distributive law as follows:

$$xz(x^2 + y^2)$$
$$= xz \times x^2 + xz \times y^2$$
$$= x^3z + xy^2z$$

Substituting x = -1, y = 0.25 and z = 0.05 in the result, we get:

$$x^3z + xy^2z$$
$$= (-1)^3(0.05) + (-1)(0.25)^2(0.05)$$
$$= (-1)(0.05) + (-1)(0.0625)(0.05)$$
$$= -0.05 - 0.003125$$
$$= -0.053125$$

Q 20. Simplify:

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

SOLUTION:

To simplify, we will use distributive law as follows:

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

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

SOLUTION:

To simplify, we will use distributive law as follows:

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

(iii) $3a^2 + 2 (a + 2)-3a (2a + 1)$

SOLUTION:

To simplify, we will use distributive law as follows:

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

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

SOLUTION:

To simplify, we will use distributive law as follows:

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

(v) a(b − c) − b(c − a) − c(a − b)

SOLUTION:

To simplify, we will use distributive law as follows:

$a(b - c) - b(c - a) - c(a - b)$

$= ab - ac - bc + ba - ca + cb$

$= ab + ba - ac - ca - bc - cb$

$= 0$

(vi) a(b − c) + b(c − a) + c(a − b)

SOLUTION:

To simplify, we will use distributive law as follows:

$a(b-c)+b(c-a)+c(a-b)$

$= ab - ac + bc - ba + ca - cb$

$= ab - ba - ac + ca + bc - cb$

$= 0$

(vii) $4ab\,(a-b)-6a^2\,(b-b^2)-3b^2\,(2a^2-a)+2ab\,(b-a)$

SOLUTION:

To simplify, we will use distributive law as follows:

$$4ab\,(a-b)-6a^2\,(b-b^2)-3b^2\,(2a^2-a)+2ab\,(b-a)$$
$$= 4a^2b - 4ab^2 - 6a^2b + 6a^2b^2 - 6b^2a^2 + 3b^2a + 2ab^2 - 2a^2b$$
$$= 4a^2b - 6a^2b - 2a^2b - 4ab^2 + 3b^2a + 2ab^2 + 6a^2b^2 - 6b^2a^2$$
$$= -4a^2b + ab^2$$

(viii) $x^2\,(x^2+1)-x^3\,(x+1)-x\,(x^3-x)$

SOLUTION:

To simplify, we will use distributive law as follows:

$$x^2\,(x^2+1)-x^3\,(x+1)-x\,(x^3-x)$$
$$= x^4 + x^2 - x^4 - x^3 - x^4 + x^2$$
$$= x^4 - x^4 - x^4 - x^3 + x^2 + x^2$$
$$= -x^4 - x^3 + 2x^2$$

(ix) $2a^2 + 3a\,(1-2a^3) + a\,(a+1)$

SOLUTION:

To simplify, we will use distributive law as follows:

$$2a^2 + 3a\,(1-2a^3) + a\,(a+1)$$
$$= 2a^2 + 3a - 6a^4 + a^2 + a$$
$$= 2a^2 + a^2 + 3a + a - 6a^4$$

(x) $a^2\,(2a-1)+3a+a^3-8$

SOLUTION:

To simplify, we will use distributive law as follows:

$$a^2\,(2a-1)+3a+a^3-8$$
$$= 2a^3 - a^2 + 3a + a^3 - 8$$
$$= 2a^3 + a^3 - a^2 + 3a - 8$$
$$= 3a^3 - a^2 + 3a - 8$$

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

SOLUTION:

To simplify, we will use distributive law as follows:

$$\frac{3}{2}x^2(x^2-1) + \frac{1}{4}x^2(x^2+x) - \frac{3}{4}x(x^3-1)$$

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

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

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

(xii) $a^2b(a-b^2) + ab^2(4ab-2a^2) - a^3b(1-2b)$

SOLUTION:

To simplify, we will use distributive law as follows:

$$a^2b(a-b^2) + ab^2(4ab-2a^2) - a^3b(1-2b)$$

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

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

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

(xiii) $a^2b(a^3-a+1) - ab(a^4-2a^2+2a) - b(a^3-a^2-1)$

SOLUTION:

To simplify, we will use distributive law as follows:

$$a^2b(a^3-a+1) - ab(a^4-2a^2+2a) - b(a^3-a^2-1)$$

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

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

$$= b$$