

Exercise 6.3

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Find each of the following products (1-8)

$$\begin{aligned} \text{(1)} \quad 5x^2 \times 4x^3 &= 5 \times 4 \times x^{2+3} \\ &= 20x^5 \end{aligned}$$

$$\begin{aligned} \text{(2)} \quad -3a^2 \times 4b^4 &= -3 \times 4 \times a^2 \times b^4 \\ &= -12a^2b^4 \end{aligned}$$

$$\begin{aligned} \underline{3.} \quad (-5xy) \times (-3x^2yz) &= (-5 \times -3) \times x^{1+2} y^{1+1} z^1 \\ &= 15x^3y^2z \end{aligned}$$

$$\begin{aligned} \underline{4} \quad \frac{1}{2}xy \times \frac{2}{3}x^2yz^2 &= \frac{1}{2} \times \frac{2}{3} \times x^{1+2} y^{1+1} z^2 \\ &= \frac{1}{3}x^3y^2z^2 \end{aligned}$$

$$\begin{aligned} \underline{5.} \quad \left(-\frac{7}{5}xy^2z\right) \times \left(\frac{13}{3}x^2yz^2\right) &= \left(-\frac{7}{5} \times \frac{13}{3}\right) \times x^{1+2} y^{2+1} z^{1+2} \\ &= -\frac{91}{15}x^3y^3z^3 \end{aligned}$$

$$\begin{aligned} \underline{6} \quad \left(-\frac{24}{25}x^3z\right) \times \left(-\frac{15}{16}xz^2y\right) &= \left(\frac{-24}{25} \times \frac{-15}{16}\right) x^{3+1} y^1 z^{1+2} \\ &= \frac{9}{10}x^4yz^3 \end{aligned}$$

$$\begin{aligned} \underline{7} \quad \left(-\frac{1}{27}a^4b^2\right) \times \left(\frac{9}{2}a^3b^2c^2\right) &= \left(-\frac{1}{27} \times \frac{9}{2}\right) a^{2+3} b^{2+2} c^2 \\ &= -\frac{1}{6}a^5b^4c^2 \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad & (-7xy) \times \left(\frac{1}{4} x^2 y z\right) \\ &= \left(-7 \times \frac{1}{4}\right) x^{1+2} y^{1+1} z^1 \\ &= -\frac{7}{4} x^3 y^2 z \end{aligned}$$

Find each of the following products (9-17)

$$\begin{aligned} \underline{\text{Q.9}} \quad & (7ab) \times (-5ab^2c) \times (6abc^2) \\ &= (7 \times -5 \times 6) a^{1+1+1} b^{1+2+1} c^{1+2} \\ &= -210 a^3 b^4 c^3 \end{aligned}$$

$$\begin{aligned} \underline{\text{Q.10}} \quad & (-5a) \times (-10a^2) \times (-2a^3) \\ &= (-5 \times -10 \times -2) \times a^{1+2+3} \\ &= -100 a^6 \end{aligned}$$

$$\begin{aligned} \underline{\text{Q.11}} \quad & (-4x^2) \times (-6xy^2) \times (-3yz^2) \\ &= (-4 \times -6 \times -3) \times (x^{2+1} \times y^{2+1} \times z^2) \\ &= -72 x^3 y^3 z^2 \end{aligned}$$

$$\begin{aligned} \underline{\text{Q.12}} \quad & \left(-\frac{2}{7} a^4\right) \times \left(-\frac{3}{4} a^2 b\right) \times \left(-\frac{14}{5} b^2\right) \\ &= \left(-\frac{2}{7} \times -\frac{3}{4} \times -\frac{14}{5}\right) \times a^{4+2} b^{1+2} = -\frac{3}{5} a^6 b^3 \end{aligned}$$

$$(13) \left(\frac{7}{9} ab^2\right) \times \left(\frac{15}{7} ac^2b\right) \times \left(-\frac{3}{5} a^2c\right)$$

$$= \left(\frac{7}{9} \times \frac{15}{7} \times -\frac{3}{5}\right) \times a^{1+1+2} b^{2+1} c^{2+1}$$

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

$$(14) \left(\frac{4}{3} u^2vw\right) \times (-5uvw^2) \times \left(\frac{1}{3} v^2wu\right)$$

$$= \left(\frac{4}{3} \times -5 \times \frac{1}{3}\right) \times u^{2+1+1} v^{1+1+2} w^{1+2+1}$$

$$= -\frac{20}{9} u^4 v^4 w^4$$

$$(15) (0.5x) \times \left(\frac{1}{3} xy^2z^4\right) \times (24x^2yz)$$

$$= \left(0.5 \times \frac{1}{3} \times 24\right) \times x^{1+1+2} y^{2+1} z^{4+1}$$

$$= 4x^4 y^3 z^5$$

$$(16) \left(\frac{4}{3} pq^2\right) \times \left(-\frac{1}{4} p^2r\right) \times (16p^2q^2r^2)$$

$$= \left(\frac{4}{3} \times -\frac{1}{4} \times 16\right) p^{1+2+2} q^{2+2} r^{1+2}$$

$$= -\frac{16}{3} p^5 q^4 r^3$$

$$\underline{Q.17} \quad (2.3xy) \times (0.1x) \times (0.16)$$

$$= (2.3 \times 0.1 \times 0.16) x^{1+1} y^1$$

$$= 0.0368 x^2 y$$

Express each of the following products as a monomial and verify the result in each case for $x=1$: (18-26)

$$\underline{Q.18} \quad (3x) \times (4x) \times (-5x) = (3 \times 4 \times -5) x^{1+1+1}$$

$$= -60 x^3$$

LHS

$$(3x) \times (4x) \times (-5x) \text{ at } x=1$$

$$\Rightarrow (3 \times 1) \times (4 \times 1) \times (-5 \times 1) = 3 \times 4 \times -5 = -60$$

$$\underline{RHS} \quad -60 x^3$$

putting $x=1$

$$-60 (1)^3 = -60 \times 1 = -60$$

$$\underline{Q.19} \quad (4x^2) \times (-3x) \times \left(\frac{4}{5} x^3\right)$$

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

$$= -\frac{48}{5} x^6$$

Verification: putting $x=1$

$$LHS: (4 \times 1^2) \times (-3 \times 1) \times \left(\frac{4}{5} \times 1^3\right)$$

$$= 4 \times -3 \times \frac{4}{5} = -\frac{48}{5}$$

$$\begin{aligned}\text{RHS} &= -\frac{48}{5} x^5 \\ &= -\frac{48}{5} (1)^5 = -\frac{48}{5}\end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

$$\begin{aligned}\text{Q.20} \quad & (5x^4) \times (x^2)^3 \times (2x)^2 \\ &= 5x^4 \times x^6 \times 4x^2 \\ &= 20x^{4+6+2} = 20x^{12}\end{aligned}$$

putting $x=1$

$$\begin{aligned}\text{LHS} &: \{5 \times (1)^4\} \times (1^2)^3 \times (2 \times 1)^2 \\ &= 5 \times 1 \times 4 = 20\end{aligned}$$

$$\begin{aligned}\text{RHS} &= 20x^{12} \\ &= 20 \times (1)^{12} \\ &= 20 \times 1 = 20\end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

$$\begin{aligned}\text{Q.21} \quad & (x^2)^3 \times (2x) \times (-4x) \times 5 \\ &= x^6 \times 2x \times -4x \times 5 \\ &= 2 \times -4 \times 5 \times x^{6+1+1} \\ &= -40x^8\end{aligned}$$

LHS : Putting $x=1$

$$\Rightarrow (1^2)^3 \times (2 \times 1) \times (-4 \times 1) \times 5 = 1 \times 2 \times -4 \times 5 = -40$$

RHS: $-40x^8$, putting $x=1$

$$= -40(1)^8 = -40 \times 1 \\ = -40$$

(21)

Q.22 Write down the product of $-8x^2y^6$ and $-20xy$.
Verify the product for $x=2.5, y=1$

Solution: Product = $-8x^2y^6 \times -20xy$
 $= (-8 \times -20) x^{2+1} y^{6+1}$
 $= 160x^3y^7$

LHS: Putting $x=2.5, y=1$

$$= -8x^2y^6 \times -20xy \\ = -8(2.5)^2 \times (1)^6 \times -20(2.5)(1) \\ = -8 \times 6.25 \times 1 \times -20 \times 2.5 \\ = 2500$$

RHS $160x^3y^7$

$$= 160(2.5)^3 \times (1)^7 = 400 \times 6.25 \\ = 2500$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.23 Evaluate $(3.2x^6y^3) \times (2.1x^2y^2)$ when $x=1, y=0.5$ (22)

Solution

$$3.2x^6y^3 \times 2.1x^2y^2$$
$$\Rightarrow (3.2 \times 2.1) \times x^{6+2} y^{3+2}$$
$$= 6.72 \times x^8 y^5$$

LHS: at $x=1, y=0.5$

$$(3.2x^6y^3) \times (2.1x^2y^2)$$
$$\Rightarrow \{3.2 \times (1)^6 \times (0.5)^3\} \times \{2.1 \times (1)^2 \times (0.5)^2\}$$
$$= (3.2 \times 0.125) \times (2.1 \times 0.25)$$
$$= 0.4000 \times 0.525$$
$$= 0.4 \times 0.525 = 0.21$$

RHS

$$6.72 \times x^8 \times y^5 = 6.72 \times (1)^8 \times (0.5)^5$$
$$= 6.72 \times 1 \times 0.03125$$
$$= 0.21$$

$\therefore \text{LHS} = \text{RHS}$

Q.24 Find The value of $5x^6 \times (-1.5x^2y^3) \times (-12xy^2)$
when $x=1, y=0.5$

Solution:

$$5x^6 \times -1.5x^2y^3 \times -12xy^2$$
$$= (5 \times -1.5 \times -12) x^{6+2+1} y^{3+2} = 90x^9 y^5$$

$$\underline{\text{LHS}}: 5x^6 \times (+1.5x^2y^3) \times (-12xy^2)$$

$$=$$

$$= \{5(1)^6\} \{-1.5(1)^2(0.5)^3\} \{-12(1)(0.5)^2\}$$

$$= 5 \times (-1.5 \times 0.125) \times (-12 \times 0.25)$$

$$= 5 \times (-0.1875) \times (-3)$$

$$= -2.8125$$

$$\underline{\text{RHS}} \quad -90x^9y^5$$

$$= -90(1)^9(0.5)^5$$

$$= -90 \times 0.03125$$

$$= -2.8125$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.25 Evaluate $(2.3a^5b^2) \times (1.2a^2b^2)$ when $a=1, b=0.5$

Solution: $(2.3a^5b^2) \times (1.2a^2b^2)$

$$= (2.3 \times 1.2) \times a^{5+2} b^{2+2}$$

$$= 2.76 a^7 b^4$$

Verification

$$\underline{\text{LHS}}: a=1, b=0.5$$

$$= \{2.3 \times (1)^5 \times (0.5)^2\} \times \{1.2 \times (1)^2 \times (0.5)^2\}$$

$$= 0.1725$$

$$= (2.3 \times 0.25) \times (1.2 \times 0.25) = 0.575 \times 3 = \text{---}$$

$$\underline{\text{RHS}} \quad 2.76 a^7 b^4$$

$$= 2.76 (1)^7 (0.5)^4 = 2.76 \times 0.0625 = 0.1725$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.26 Evaluate $(-8x^2y^6) \times (-20xy)$ for $x=2.5, y=1$

Sol: $-8x^2y^6 \times -20xy = (-8 \times -20)x^{2+1}y^{6+1}$
 $= 160x^3y^7$

Verification:

LHS Putting $x=2.5, y=1$

$$-8x^2y^6 \times -20xy = \{-8(2.5)^2 \times (1)^6\} \times \{-20(2.5)(1)\}$$

$$= (-8 \times 6.25) \times (-50) = 2500$$

RHS $160x^3y^7 = 160(2.5)^3(1)^7$
 $= 160(15.625)$
 $= 2500$

$$\therefore \text{LHS} = \text{RHS}$$

Express each of the following products as a monomials and verify the result for $x=1, y=2$ (27-31)

Q.27 $(-xy^3) \times (yx^3) \times xy =$

Sol: $-x^{1+3+1}y^{3+1+1} = -x^5y^5$

LHS: Putting $x=1, y=2$

$$(-xy^3) \times (yx^3) \times xy = \{-1 \times 2^3\} \times \{2 \times 1^3\} \times (1 \times 2) \\ = -8 \times 2 \times 2 = -32$$

RHS: $-x^5y^5$

$$= -(1)^5(2)^5 = -1 \times 32 = -32$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.28 $(\frac{1}{8} x^2 y^4) \times (\frac{1}{4} x^4 y^2) \times (xy) \times 5$

Solution: $(\frac{1}{8} \times \frac{1}{4} \times 1 \times 5) x^{2+4+1} y^{4+2+1}$
 $= \frac{5}{32} x^7 y^7$

Verification: LHS Putting $x=1, y=2$

$$= (\frac{1}{8} \times 1^2 \times 2^4) \times (\frac{1}{4} \times 1^4 \times 2^2) \times (1 \times 2) \times 5$$

$$= \frac{1}{8} \times 16 \times \frac{1}{4} \times 4 \times 2 \times 5 = 20$$

RHS: $\frac{5}{32} x^7 y^7 = \frac{5}{32} (1)^7 (2)^7$

$$= \frac{5}{32} \times 128 = 20$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.29 $\left(\frac{2}{5}a^2b\right) \times (-15b^2ac) \times \left(-\frac{1}{2}c^2\right)$

Solution: $\left(\frac{2}{5} \times -15 \times -\frac{1}{2}\right) \times a^{2+1} b^{1+2} c^{1+2}$
 $= 3a^3b^3c^3$

Q.30 $\left(-\frac{4}{7}a^2b\right) \times \left(-\frac{2}{3}b^2c\right) \times \left(-\frac{7}{6}c^2a\right)$

Sol: $\left(-\frac{4}{7} \times -\frac{2}{3} \times -\frac{7}{6}\right) a^{2+1} b^{1+2} c^{1+2}$
 $= -\frac{4}{9}a^3b^3c^3$

Q.31 $\left(\frac{4}{9}abc^3\right) \times \left(-\frac{27}{5}a^3b^2\right) \times (-8b^3c)$

Sol: $\left(\frac{4}{9} \times -\frac{27}{5} \times -8\right) a^{1+3} b^{1+2+3} c^{3+1}$
 $= \frac{96}{5}a^4b^6c^4$

Q.32 $(2xy) \times \left(\frac{x^2y}{4}\right) \times (x^2) \times y^2$. verify for $x=2, y=7$

Sol: $2xy \times \frac{x^2y}{4} \times x^2 \times y^2 = 2 \times \frac{1}{4} \times x^{1+2+2} y^{1+1+2}$
 $= \frac{1}{2}x^5y^4$

LHS putting $x=2, y=-1$

$$\begin{aligned}
 2xy \times \frac{1}{4} x^2 y \times x^2 y^2 &= (2 \times 2 \times -1) \times \left(\frac{1}{4} \times 2^2 \times -1 \right) \\
 &\quad \times (2)^2 \times (-1)^2 \\
 &= -4 \times \frac{1}{4} \times 4 \times -1 \times 4 \times 1 \\
 &= 16
 \end{aligned}$$

$$\begin{aligned}
 \text{RHS} \quad \frac{1}{2} x^5 y^4 &= \frac{1}{2} (2)^5 \times (-1)^4 \\
 &= \frac{1}{2} \times 32 \times 1 = 16
 \end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

Q.33 $\left(\frac{3}{5} x^2 y\right) \times \left(-\frac{15}{4} x y^2\right) \times \left(\frac{7}{9} x^2 y^2\right)$, verify for $x=2, y=1$

$$\text{Sol!} \quad \left(\frac{3}{5} \times \frac{-15}{4} \times \frac{7}{9}\right) x^{2+1+2} y^{1+2+2}$$

$$= \frac{-63}{36} x^5 y^5$$

$$= -\frac{7}{4} x^5 y^5$$

$$\begin{aligned}
 \text{LHS:} \quad &\left[\frac{3}{5} \times (2)^2 \times (-1)\right] \times \left[-\frac{15}{4} \times (2) \times (-1)^2\right] \times \left[\frac{7}{9} \times (2)^2 \times (-1)^2\right] \\
 &= \left(\frac{3}{5} \times 4\right) \times \left(-\frac{15}{4} \times 2 \times 1\right) \times \left(\frac{7}{9} \times 4 \times 1\right) = \frac{-12}{5} \times \frac{-30}{4} \times \frac{28}{9} \\
 &= 56
 \end{aligned}$$

$$\begin{aligned} \text{RHS} \quad -\frac{7}{4} x^5 y^5 &= -\frac{7}{4} (1)^5 (-2)^5 \\ &= -\frac{7}{4} \times 1 \times -32 = +56 \end{aligned}$$

$$\therefore \underline{\underline{\text{LHS} = \text{RHS}}}$$

Exercise 6.4

Q.1 Find the following products (1-15)

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

$$\begin{aligned} \text{Sol} &= (2a^3 \times 3a) + (2a^3 \times 5b) \\ &= 6a^4 + 10a^3b \end{aligned}$$

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

$$\begin{aligned} &= (-11a \times 3a) + (-11a \times 2b) \\ &= -33a^2 - 22ab \end{aligned}$$

③ $-5a(7a-2b)$

$$\begin{aligned} &= (-5a \times 7a) - (-5a \times 2b) \\ &= -35a^2 + 10ab \end{aligned}$$

④ $-11y^2(3y+7)$

$$\begin{aligned} &= (-11y^2 \times 3y) + (-11y^2 \times 7) \\ &= -33y^3 - 77y^2 \end{aligned}$$