

EXERCISE 6.3

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Find each of the following products:

1. $5x^2 \times 4x^3$

Solution:

Let us simplify the given expression

$$5 \times x \times x \times 4 \times x \times x \times x$$

$$5 \times 4 \times x^{1+1+1+1+1}$$

$$20 \times x^5$$

$$20x^5$$

2. $-3a^2 \times 4b^4$

Solution:

Let us simplify the given expression

$$-3 \times a^2 \times 4 \times b^4$$

$$-12 \times a^2 \times b^4$$

$$-12a^2b^4$$

3. $(-5xy) \times (-3x^2yz)$

Solution:

Let us simplify the given expression

$$(-5) \times (-3) \times x \times x^2 \times y \times y \times z$$

$$15 \times x^{1+2} \times y^{1+1} \times z$$

$$15x^3y^2z$$

4. $1/2xy \times 2/3x^2yz^2$

Solution:

Let us simplify the given expression

$$1/2 \times 2/3 \times x \times x^2 \times y \times y \times z^2$$

$$1/3 \times x^{1+2} \times y^{1+1} \times z^2$$

$$1/3x^3y^2z^2$$

5. $(-7/5xy^2z) \times (13/3x^2yz^2)$

Solution:

Let us simplify the given expression

$$-7/5 \times 13/3 \times x \times x^2 \times y^2 \times y \times z \times z^2$$

$$-91/15 \times x^{1+2} \times y^{2+1} \times z^{1+2}$$

$$-91/15x^3y^3z^3$$

6. $(-24/25x^3z) \times (-15/16xz^2y)$

Solution:

Let us simplify the given expression
 $-24/25 \times -15/16 \times x^3 \times x \times z \times z^2 \times y$
 $18/20 \times x^{3+1} \times z^{1+2} \times y$
 $9/10x^4z^3y$

7. $(-1/27a^2b^2) \times (9/2a^3b^2c^2)$

Solution:

Let us simplify the given expression
 $-1/27 \times 9/2 \times a^2 \times a^3 \times b^2 \times b^2 \times c^2$
 $-1/6 \times a^{2+3} \times b^{2+2} \times c^2$
 $-1/6a^5b^4c^2$

8. $(-7xy) \times (1/4x^2yz)$

Solution:

Let us simplify the given expression
 $-7 \times 1/4 \times x \times y \times x^2 \times y \times z$
 $-7/4 \times x^{1+2} \times y^{1+1} \times z$
 $-7/4x^3y^2z$

9. $(7ab) \times (-5ab^2c) \times (6abc^2)$

Solution:

Let us simplify the given expression
 $7 \times -5 \times 6 \times a \times a \times a \times b \times b^2 \times b \times c \times c^2$
 $210 \times a^{1+1+1} \times b^{1+2+1} \times c^{1+2}$
 $210a^3b^4c^3$

10. $(-5a) \times (-10a^2) \times (-2a^3)$

Solution:

Let us simplify the given expression
 $(-5) \times (-10) \times (-2) \times a \times a^2 \times a^3$
 $-100 \times a^{1+2+3}$
 $-100a^6$

11. $(-4x^2) \times (-6xy^2) \times (-3yz^2)$

Solution:

Let us simplify the given expression
 $(-4) \times (-6) \times (-3) \times x^2 \times x \times y^2 \times y \times z^2$

$$-72 \times x^{2+1} \times y^{2+1} \times z^2$$

$$-72x^3y^3z^2$$

12. $(-2/7a^4) \times (-3/4a^2b) \times (-14/5b^2)$

Solution:

Let us simplify the given expression

$$-2/7 \times -3/4 \times -14/5 \times a^4 \times a^2 \times b \times b^2$$

$$-6/10 \times a^{4+2} \times b^{1+2}$$

$$-3/5a^6b^3$$

13. $(7/9ab^2) \times (15/7ac^2b) \times (-3/5a^2c)$

Solution:

Let us simplify the given expression

$$7/9 \times 15/7 \times -3/5 \times a \times a \times a^2 \times b^2 \times b \times c^2 \times c$$

$$-a^{1+1+2} \times b^{2+1} \times c^{2+1}$$

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

14. $(4/3u^2vw) \times (-5uvw^2) \times (1/3v^2wu)$

Solution:

Let us simplify the given expression

$$4/3 \times -5 \times 1/3 \times u^2 \times u \times u \times v \times v \times v^2 \times w \times w^2 \times w$$

$$-20/9 \times u^{2+1+1} \times v^{1+1+2} \times w^{1+2+1}$$

$$-20/9u^4v^4w^4$$

15. $(0.5x) \times (1/3xy^2z^4) \times (24x^2yz)$

Solution:

Let us simplify the given expression

$$0.5 \times 1/3 \times 24 \times x \times x \times y^2 \times y \times x^2 \times z^4 \times z$$

$$12/3 \times x^{1+1+2} \times y^{2+1} \times z^{4+1}$$

$$4x^4 \times y^3 \times z^5$$

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

16. $(4/3pq^2) \times (-1/4p^2r) \times (16p^2q^2r^2)$

Solution:

Let us simplify the given expression

$$4/3 \times 1/4 \times 16 \times p \times p^2 \times p^2 \times q^2 \times q^2 \times r \times r^2$$

$$-16/3 \times p^{1+2+2} \times q^{2+2} \times r^{1+2}$$

$$-16/3p^5q^4r^3$$

17. $(2.3xy) \times (0.1x) \times (0.16)$

Solution:

Let us simplify the given expression

$$2.3 \times 0.1 \times 0.16 \times x \times x \times y$$

$$0.0368 \times x^{1+1} \times y$$

$$0.0368x^2y$$

Express each of the following products as a monomials and verify the result in each case for $x=1$:

18. $(3x) \times (4x) \times (-5x)$

Solution:

Let us simplify the given expression

$$3 \times 4 \times -5 \times x \times x \times x$$

$$-60 \times x^{1+1+1}$$

$$-60x^3$$

Verification

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

$$= 3 \times 4 \times -5$$

$$= -60$$

$$\text{RHS} = -60 (1)^3 = -60$$

Therefore, LHS = RHS.

19. $(4x^2) \times (-3x) \times (4/5x^3)$

Solution:

Let us simplify the given expression

$$4 \times -3 \times 4/5 \times x^2 \times x \times x^3$$

$$-48/5 \times x^{2+1+3}$$

$$-48/5x^6$$

Verification

$$\text{LHS} = 4 \times 1^2 \times -3 \times 1 \times 4/5 \times 1^3$$

$$= -48/5$$

$$\text{RHS} = -48/5 \times 1^6 = -48/5$$

Therefore, LHS = RHS.

20. $(5x^4) \times (x^2)^3 \times (2x)^2$

Solution:

Let us simplify the given expression

$$5 \times x^4 \times x^6 \times 4 \times x^2$$

$$5 \times 4 \times x^4 \times x^6 \times x^2$$

$$20 \times x^{4+6+2}$$
$$20x^{12}$$

Verification

$$\text{LHS} = (5 \times 1^4) \times (1^2)^3 \times (2 \times 1)^2$$
$$= 5 \times 4$$
$$= 20$$

$$\text{RHS} = 20 \times 1^{12} = 20$$

Therefore, LHS = RHS.

21. $(x^2)^3 \times (2x) \times (-4x) \times (5)$

Solution:

Let us simplify the given expression

$$x^6 \times 2 \times x \times -4 \times x \times 5$$
$$2 \times -4 \times 5 \times x^6 \times x \times x$$
$$-40 \times x^{6+1+1}$$
$$-40x^8$$

Verification

$$\text{LHS} = (1^2)^3 \times (2 \times 1) \times (-4 \times 1) \times 5$$
$$= -40$$

$$\text{RHS} = -40 \times 1^8 = -40$$

Therefore, LHS = RHS.

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

Solution:

Let us simplify the given expression

$$-8 \times -20 \times x^2 \times x \times y^6 \times y$$
$$160 \times x^{2+1} \times y^{6+1}$$
$$160x^3y^7$$

Now let us verify when, $x = 2.5$ and $y = 1$

For $160x^3y^7$

$$160 (2.5)^3 \times (1)^7$$
$$160 \times 15.625$$
$$2500$$

For $-8x^2y^6$ and $-20xy$

$$-8 \times 2.5^2 \times 1^6 \times -20 \times 1 \times 2.5$$
$$2500$$

Hence, the given expression is verified.

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

Solution:

Let us simplify the given expression

$$3.2 \times 2.1 \times x^6 \times x^2 \times y^3 \times y^2$$

$$6.72 \times x^{6+2} \times y^{3+2}$$

$$6.72x^8y^5$$

Now let us substitute when, $x = 1$ and $y = 0.5$

For $6.72x^8y^5$

$$6.72 \times 1^8 \times 0.5^5$$

$$0.21$$

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

Solution:

Let us simplify the given expression

$$5 \times -1.5 \times -12 \times x^6 \times x^2 \times x \times y^3 \times y^2$$

$$90 \times x^{6+2+1} \times y^{3+2}$$

$$90x^9y^5$$

Now let us substitute when, $x = 1$ and $y = 0.5$

For $90x^9y^5$

$$90 \times (1)^9 \times (0.5)^5$$

$$2.8125$$

$$45/16$$

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

Solution:

Let us simplify the given expression

$$2.3a^5b^2 \times 1.2a^2b^2$$

$$2.3 \times 1.2 \times a^5 \times a^2 \times b^2 \times b^2$$

$$2.76 \times a^{5+2} \times b^{2+2}$$

$$2.76a^7b^4$$

Now let us substitute when, $a = 1$ and $b = 0.5$

For $2.76 a^7 b^4$

$$2.76 (1)^7 (0.5)^4$$

$$2.76 \times 1 \times 0.0025$$

$$0.1725$$

$$6.9/40$$

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

Solution:

Let us simplify the given expression

$$\begin{aligned}
 & -8 \times -20 \times x^2 \times x \times y^6 \times y \\
 & 160x^{2+1}y^{6+1} \\
 & 160x^3y^7
 \end{aligned}$$

Now let us substitute when, $x = 2.5$ and $y = 1$

$$\begin{aligned}
 & 160x^3y^7 \\
 & 160 \times (2.5)^3 \times (1)^7 \\
 & 2500
 \end{aligned}$$

Express each of the following products as a monomials and verify the result for $x =$

$1, y = 2:$

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

Solution:

Let us simplify the given expression

$$\begin{aligned}
 & -x \times y^3 \times y \times x^3 \times x \times y \\
 & -x^{1+3+1} \times y^{3+1+1} \\
 & -x^5y^5
 \end{aligned}$$

Now let us substitute when, $x = 1$ and $y = 2$

$$\begin{aligned}
 & -x^5y^5 \\
 & -1^5 \times 2^5 \\
 & -32
 \end{aligned}$$

28. $(1/8x^2y^4) \times (1/4x^4y^2) \times (xy) \times 5$

Solution:

Let us simplify the given expression

$$\begin{aligned}
 & 1/8 \times 1/4 \times 5 \times x^2 \times x^4 \times x \times y^4 \times y^2 \times y \\
 & 5/32 \times x^{2+4+1} \times y^{4+2+1} \\
 & 5/32x^7y^7
 \end{aligned}$$

Now let us substitute when, $x = 1$ and $y = 2$

$$\begin{aligned}
 & 5/32 \times 1^7 \times 2^7 \\
 & 5/32 \times 128 \\
 & 5 \times 4 \\
 & 20
 \end{aligned}$$

29. $(2/5a^2b) \times (-15b^2ac) \times (-1/2c^2)$

Solution:

Let us simplify the given expression

$$\begin{aligned}
 & 2/5 \times -15 \times -1/2 \times a^2 \times a \times b \times b^2 \times c \times c^2 \\
 & 3 \times a^{2+1} \times b^{1+2} \times c^{1+2} \\
 & 3a^3b^3c^3
 \end{aligned}$$

30. $(-4/7a^2b) \times (-2/3b^2c) \times (-7/6c^2a)$

Solution:

Let us simplify the given expression

$$\begin{aligned} & -4/7 \times -2/3 \times -7/6 \times a^2 \times a \times b \times b^2 \times c \times c^2 \\ & -4/9 \times a^{2+1} \times b^{2+1} \times c^{1+2} \\ & -4/9a^3b^3c^3 \end{aligned}$$

31. $(4/9abc^3) \times (-27/5a^3b^2) \times (-8b^3c)$

Solution:

Let us simplify the given expression

$$\begin{aligned} & 4/9 \times -27/5 \times -8 \times a \times a^3 \times b \times b^2 \times b^3 \times c^3 \times c \\ & 96/5 \times a^{1+3} \times b^{1+2+3} \times c^{3+1} \\ & 96/5a^4b^6c^4 \end{aligned}$$

Evaluate each of the following when $x = 2$, $y = -1$.

32. $(2xy) \times (x^2y/4) \times (x^2) \times (y^2)$

Solution:

Let us simplify the given expression

$$\begin{aligned} & 2 \times 1/4 \times x \times x^2 \times x^2 \times y \times y^2 \times y \\ & 1/2x^{1+2+2}y^{1+2+1} \\ & 1/2x^5y^4 \end{aligned}$$

Now let us substitute when, $x = 2$ and $y = -1$

$$\begin{aligned} & \text{For } 1/2x^5y^4 \\ & 1/2 \times (2)^5 \times (-1)^4 \\ & 1/2 \times 32 \times 1 \\ & 16 \end{aligned}$$

33. $(3/5x^2y) \times (-15/4xy^2) \times (7/9x^2y^2)$

Solution:

Let us simplify the given expression

$$\begin{aligned} & 3/5 \times -15/4 \times 7/9 \times x^2 \times x \times x^2 \times y \times y^2 \times y^2 \\ & -7/4 \times x^{2+1+2} \times y^{1+2+2} \\ & 7/4x^5y^5 \end{aligned}$$

Now let us substitute when, $x = 2$ and $y = -1$

$$\begin{aligned} & \text{For } -7/4x^5y^5 \\ & -7/4 \times (2)^5 \times (-1)^5 \\ & -7/4 \times 32 \times -1 \\ & 56 \end{aligned}$$