EXERCISE 6.4   PAGE NO: 6.21

Find the following products:

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

Solution:

Let us simplify the given expression

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

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

$6a^{3+1} + 10a^3b$

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

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

Solution:

Let us simplify the given expression

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

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

$-33a^2 - 22ab$

3. $-5a (7a - 2b)$

Solution:

Let us simplify the given expression

$-5a (7a - 2b)$

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

$-35a^2 + 10ab$

4. $-11y^2 (3y + 7)$

Solution:

Let us simplify the given expression

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

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

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

5. $6x/5(x^3 + y^3)$

Solution:

Let us simplify the given expression

$6/5x (x^3 + y^3)$

$(6/5x \times x^3) + (6/5x \times y^3)$

$6/5x^4 + 6/5xy^3$

6. xy (x³ - y³)
Solution:
Let us simplify the given expression
$xy (x^3 - y^3)$
$(xy \times x^3) - (xy \times y^3)$
$x^4y - xy^4$

7. 0.1y (0.1x⁵ + 0.1y)
Solution:
Let us simplify the given expression
$0.1y (0.1x^5 + 0.1y)$
$(0.1y \times 0.1x^5) + (0.1y \times 0.1y)$
$0.01x^5y + 0.01y^2$

8. (-7/4ab²c – 6/25a²c²) (-50a²b²c²)
Solution:
Let us simplify the given expression
$(-7/4ab^2c - 6/25a^2c^2) (-50a^2b^2c^2)$
$(-7/4ab^2c \times -50a^2b^2c^2) - (6/25a^2c^2 \times -50a^2b^2 \times c^2)$
$350/4a^3b^4c^3 + 12a^4b^2c^4$
$175/2a^3b^4c^3 + 12a^4b^2c^4$

9. -8/27xyz (3/2xyz² – 9/4xy²z³)
Solution:
Let us simplify the given expression
$-8/27xyz (3/2xyz^2 - 9/4xy^2z^3)$
$(-8/27xyz \times 3/2xyz^2) - (-8/27xyz \times 9/4xy^2z^3)$
$-4/9x^2y^2z^3 + 2/3x^2y^3z^4$

10. -4/27xyz (9/2x²yz – 3/4xyz²)
Solution:
Let us simplify the given expression
$-4/27xyz (9/2x^2yz - 3/4xyz^2)$
$(-4/27xyz \times 9/2x^2yz) - (-4/27xyz \times 3/4xyz^2)$
$-2/3x^3y^2z^2 + 1/9x^2y^2z^3$

11. 1.5x (10x²y – 100xy²)
Solution:
Let us simplify the given expression

1.5x $(10x^2y – 100xy^2)$
$(1.5x × 10x^2y) – (1.5x × 100xy^2)$
$15x^3y – 150x^2y^2$

12. 4.1xy (1.1x – y)
Solution:
Let us simplify the given expression
4.1xy (1.1x – y)
$(4.1xy × 1.1x) – (4.1xy × y)$
$4.51x^2y – 4.1xy^2$

13. 250.5xy (xz + y/10)
Solution:
Let us simplify the given expression
250.5xy (xz + y/10)
$(250.5xy × xz) + (250.5xy × y/10)$
$250.5x^2yz + 25.05xy^2$

14. 7/5x^{2}y (3/5xy^2 + 2/5x)
Solution:
Let us simplify the given expression
$7/5x^2y (3/5xy^2 + 2/5x)$
$(7/5x^2y × 3/5xy^2) + (7/5x^2y × 2/5x)$
$21/25x^3y^3 + 14/25x^3y$

15. 4/3a (a^2 + b^2 – 3c^2)
Solution:
Let us simplify the given expression
$4/3a (a^2 + b^2 – 3c^2)$
$(4/3a × a^2) + (4/3a × b^2) - (4/3a × 3c^2)$
$4/3a^3 + 4/3ab^2 – 4ac^2$

16. Find the product 24x^2 (1-2x) and evaluate its value for x = 3
Solution:
Let us simplify the given expression
$24x^2 (1 – 2x)$
$(24x^2× 1) - (24x^2× 2x)$
$24x^2 - 48x^3$
Now let us evaluate the expression when x = 3

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

17. Find the product -3y (xy+y^2) and evaluate its value for x = 4 and y = 5
Solution:
Let us simplify the given expression
$-3y (xy+y^2)$
$(-3y \times xy) + (-3y \times y^2)$
$-3xy^2 - 3y^3$
Now let us evaluate the expression when x = 4 and y = 5
$-3xy^2 - 3y^3$
$-3 \times (4) \times (5)^2 - 3 \times (5)^3$
-300 - 375
-675

18. Multiply -3/2x^{2}y^3 by (2x-y) and verify the answer for x = 1 and y = 2
Solution:
Let us simplify the given expression
$-3/2x^2y^3$ by (2x-y)
$(-3/2x^2y^3 \times 2x) - (-3/2x^2y^3 \times y)$
$-3x^3y^3 + 3/2x^2y^4$
Now let us evaluate the expression when x = 1 and y = 2
$-3x^3y^3 + 3/2x^2y^4$
$-3 \times (1)^4 \times (2)^3 + 3/2 \times (1)^2 \times (2)^4$
$- 3 \times (8) + 3 (8)$
-24+24
0

19. Multiply the monomial by the binomial and find the value of each for x = -1, y = 0.25 and z = 0.005:
(i) 15y^2 (2 - 3x)
(ii) -3x (y^2 + z^2)
(iii) z^2 (x - y)
(iv) xz (x^2 + y^2)
Solution:
(i) $15y^2 (2 - 3x)$

Let us simplify the given expression
$30y^2 – 45xy^2$
By evaluating the values in the expression x = -1, y = 25/100 and z = 5/1000
$30 \times (25/100)^2 – 45 \times (-1) \times (25/100)^2$
30 (1/16) + 45 (1/16)
15/8 + 45/16
(30+45)/16
75/16

(ii) $-3x (y^2 + z^2)$
Let us simplify the given expression
$-3xy^2 + -3xz^2$
By evaluating the values in the expression x = -1, y = 25/100 and z = 5/1000
$-3\times (-1) \times (25/100)^2 – 3 \times (-1) \times (5/1000)^2$
(3×25×25/100×100) + (3×5×5/1000×1000)
3/16 + 3/40000
39/200

(iii) $z^2 (x - y)$
Let us simplify the given expression
$z^2x – z^2y$
By evaluating the values in the expression x = -1, y = 25/100 and z = 5/1000
$z^2 (x - y)$
$(5/1000)^2 (-1 – 25/100)$
(1/40000) (-100-25/100)
(1/40000) (-125/100)
(1/40000) (-5/4)
-5/160000
-1/32000

(iv) $xz (x^2 + y^2)$
Let us simplify the given expression
$x^3z + xzy^2$
By evaluating the values in the expression x = -1, y = 25/100 and z = 5/1000
$x^3z + xzy^2$
$(-1)^3 \times (5/1000) + (-1) \times (5/1000) \times (25/100)^2$
-1/200 – 1/16 × 1/200
-1/200 – 1/3200
By taking LCM as 3200

(-16 -1)/3200
-17/3200

20. Simplify:
(i) $2x^2 (x^3 - x) – 3x (x^4 + 2x) – 2 (x^4 – 3x^2)$
(ii) $x^3y (x^2 - 2x) + 2xy (x^3 – x^4)$
(iii) $3a^2 + 2 (a+2) – 3a (2a+1)$
(iv) $x (x+4) + 3x (2x^2 -1) + 4x^2 + 4$
(v) $a (b-c) – b (c-a) – c (a-b)$
(vi) $a (b-c) +b (c-a) + c (a-b)$
(vii) $4ab (a-b) – 6a^2 (b-b^2) -3b^2 (2a^2 -a) + 2ab (b-a)$
(viii) $x^2 (x^2 + 1) – x^3 (x + 1) – x (x^3 - x)$
(ix) $2a^2 + 3a (1 – 2a^3) + a (a + 1)$
(x) $a^2 (2a - 1) + 3a + a^3 - 8$
(xi) $3/2x^2 (x^2 - 1) + 1/4x^2 (x^2 + x) - 3/4x (x^3 - 1)$
(xii) $a^2b (a-b^2) + ab^2(4ab – 2a^2) – a^3b(1-2b)$
(xiii) $a^2b (a^3- a + 1) - ab(a^4 – 2a^2 + 2a) – b(a^3- a^2 - 1)$
Solution:
(i) $2x^2 (x^3 - x) – 3x (x^4 + 2x) – 2 (x^4 – 3x^2)$
Let us simplify the given expression
$2x^5 – 2x^3 – 3x^5 – 6x^2 – 2x^4 + 6x^2$
By grouping similar expressions we get,
$2x^5 – 3x^5 – 2x^3 – 2x^4 – 6x^2 + 6x^2$
$-x^5 – 2x^4 – 2x^3$

(ii) $x^3y (x^2 - 2x) + 2xy (x^3 – x^4)$
Let us simplify the given expression
$x^5y – 2x^4y + 2x^4y – 2x^5y$
By grouping similar expressions we get,
$-x^5y – 2x^5y$
$-x^5y$

(iii) $3a^2 + 2 (a+2) – 3a (2a+1)$
Let us simplify the given expression
$3a^2 + 2a + 4 – 6a^2 – 3a$
By grouping similar expressions we get,
$3a^2 – 6a^2 + 2a – 3a + 4$
$-3a^2 – a + 4$

(iv) x (x+4) + 3x (2x^2 -1) + 4x^2 + 4
Let us simplify the given expression
x^2 + 4x + 6x^3 − 3x + 4x^2 + 4
By grouping similar expressions we get,
6x^3 + 5x^2 + x + 4

(v) a (b-c) − b (c-a) − c (a-b)
Let us simplify the given expression
ab − ac − bc + ab − ca + bc
By grouping similar expressions we get,
2ab − 2ac

(vi) a (b-c) +b (c-a) + c (a-b)
Let us simplify the given expression
ab − ac + bc − ab + ac − bc
By grouping similar expressions we get,
0

(vii) 4ab (a-b) − 6a^2 (b-b^2) -3b^2 (2a^2 -a) + 2ab (b-a)
Let us simplify the given expression
4a^{2}b − 4ab^2 − 6a^{2}b + 6a^{2}b^2 − 6a^{2}b^2 + 3ab^2 + 2ab^2 − 2a^{2}b
By grouping similar expressions we get,
4a^{2}b − 6a^{2}b− 2a^{2}b − 4ab^2 + 3ab^2 + 2ab^2 + 6a^{2}b^2 − 6a^{2}b^2
-4a^{2}b + ab^2

(viii) x^2 (x^2 + 1) − x^3 (x + 1) − x (x^3 - x)
Let us simplify the given expression
x^4 + x^2 − x^4 − x^3 − x^4 + x^2
By grouping similar expressions we get,
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)
Let us simplify the given expression
2a^2 + 3a − 6a^4 + a^2 + a
By grouping similar expressions we get,
-6a^4 + 3a^2 + 4a

(x) a^2 (2a - 1) + 3a + a^3 − 8

Let us simplify the given expression
$2a^3 - a^2 + 3a + a^3 - 8$
By grouping similar expressions we get,
$3a^3 - a^2 + 3a - 8$

(xi) $3/2x^2 (x^2 - 1) + 1/4x^2 (x^2 + x) - 3/4x (x^3 - 1)$
Let us simplify the given expression
$3/2x^4 - 3/2x^2 + 1/4x^4 + 1/4x^3 - 3/4x^4 + 3/4x$
By grouping similar expressions we get,
$3/2x^4 + 1/4x^4 - 3/4x^4 - 3/2x^2 + 1/4x^3 + 3/4x$
$4/4x^4 + 1/4x^3 - 3/2x^2 + 3/4x$
$x^4 + 1/4x^3 - 3/2x^2 + 3/4x$

(xii) $a^2b (a-b^2) + ab^2(4ab - 2a^2) - a^3b(1-2b)$
Let us simplify the given expression
$a^3b - a^2b^3 + 4a^2b^3 - 2a^3b^2 - a^3b + 2a^3b^2$
By grouping similar expressions we get,
$-a^2b^3 + 4a^2b^3$
$3a^2b^3$

(xiii) $a^2b (a^3 - a + 1) - ab(a^4 - 2a^2 + 2a) - b(a^3 - a^2 - 1)$
Let us simplify the given expression
$a^5b - a^3b + a^2b - a^5b + 2a^3b - 2a^2b - ba^3 + a^2b + b$
By grouping similar expressions we get,
$a^5b - a^5b - a^3b + 2a^3b - ba^3 + a^2b - 2a^2b + a^2b + b$
b