

Ex. 6B

Find each of the following products:

1. $(5x + 7) \times (3x + 4)$

Solution:

$$\begin{aligned}(5x + 7) \times (3x + 4) &= 5x(3x + 4) + 7(3x + 4) \\ &= 15x^2 + 20x + 21x + 28 \\ &= 15x^2 + 41x + 28\end{aligned}$$

2. $(4x + 9) \times (x - 6)$

Solution:

$$\begin{aligned}(4x + 9) \times (x - 6) &= 4x(x - 6) + 9(x - 6) \\ &= 4x^2 - 24x + 9x - 54 \\ &= 4x^2 - 15x - 54\end{aligned}$$

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

Solution:

$$\begin{aligned}(2x + 5) \times (4x - 3) &= 2x(4x - 3) + 5(4x - 3) \\ &= 8x^2 - 6x + 20x - 15 \\ &= 8x^2 + 14x - 15\end{aligned}$$

4. $(3y - 8) \times (5y - 1)$

Solution:

$$\begin{aligned}(3y - 8) \times (5y - 1) &= 3y(5y - 1) - 8(5y - 1) \\ &= 15y^2 - 3y - 40y + 8 \\ &= 15y^2 - 43y + 8\end{aligned}$$

5. $(7x + 2y) \times (x + 4y)$

Solution:

$$\begin{aligned}(7x + 2y) \times (x + 4y) &= 7x(x + 4y) + 2y(x + 4y) \\ &= 7x^2 + 28xy + 2xy + 8y^2 \\ &= 7x^2 + 30xy + 8y^2\end{aligned}$$

6. $(9x + 5y) \times (4x + 3y)$

Solution:

$$\begin{aligned}(9x + 5y) \times (4x + 3y) &= 9x(4x + 3y) + 5y(4x + 3y) \\ &= 36x^2 + 27xy + 20xy + 15y^2 \\ &= 36x^2 + 47xy + 15y^2\end{aligned}$$

7. $(3m - 4n) \times (2m - 3n)$

Solution:

$$\begin{aligned}(3m - 4n) \times (2m - 3n) &= 3m(2m - 3n) - 4n(2m - 3n) \\ &= 6m^2 - 9mn - 8mn + 12n^2 \\ &= 6m^2 - 17mn + 12n^2\end{aligned}$$

8. $(x^2 - a^2) \times (x - a)$

Solution:

$$\begin{aligned}(x^2 - a^2) \times (x - a) &= x^2(x - a) - a^2(x - a) \\ &= x^3 - ax^2 - a^2x + a^3\end{aligned}$$

9. $(x^2 - y^2) \times (x + 2y)$

Solution:

$$\begin{aligned}(x^2 - y^2) \times (x + 2y) &= x^2(x + 2y) - y^2(x + 2y) \\ &= x^3 + 2x^2y - xy^2 - 2y^3\end{aligned}$$

10. $(3p^2 + q^2) \times (2p^2 - 3q^2)$

Solution:

$$\begin{aligned}(3p^2 + q^2) \times (2p^2 - 3q^2) &= 3p^2(2p^2 - 3q^2) + q^2(2p^2 - 3q^2) \\ &= 6p^4 - 9p^2q^2 + 2p^2q^2 - 3q^4\end{aligned}$$

$$= 6p^4 - 7p^2q^2 - 3q^4$$

11. $(2x^2 - 5y^2) \times (x^2 + 3y^2)$

Solution:

$$\begin{aligned} & (2x^2 - 5y^2) \times (x^2 + 3y^2) \\ &= 2x^2(x^2 + 3y^2) - 5y^2(x^2 + 3y^2) \\ &= 2x^4 + 6x^2y^2 - 5x^2y^2 - 15y^4 \\ &= 2x^4 + x^2y^2 - 15y^4 \end{aligned}$$

12. $(x^3 - y^3) \times (x^2 + y^2)$

Solution:

$$\begin{aligned} & (x^3 - y^3) \times (x^2 + y^2) \\ &= x^3(x^2 + y^2) - y^3(x^2 + y^2) \\ &= x^5 + x^3y^2 - x^2y^3 - y^5 \end{aligned}$$

13. $(x^4 + y^4) \times (x^2 - y^2)$

Solution:

$$\begin{aligned} & (x^4 + y^4) \times (x^2 - y^2) \\ &= x^4(x^2 - y^2) + y^4(x^2 - y^2) \\ &= x^6 - x^4y^2 + x^2y^4 - y^6 \end{aligned}$$

14. $\left(x^4 + \frac{1}{x^4}\right) \times \left(x + \frac{1}{x}\right)$

Solution:

$$\begin{aligned} & \left(x^4 + \frac{1}{x^4}\right) \times \left(x + \frac{1}{x}\right) \\ &= x^4 \left(x + \frac{1}{x}\right) + \frac{1}{x^4} \left(x + \frac{1}{x}\right) \\ &= x^5 + x^3 + \frac{1}{x^3} + \frac{1}{x^5} \end{aligned}$$

Find each of the following products:

15. $(x^2 - 3x + 7) \times (2x + 3)$

Solution:

$$\begin{aligned} & (x^2 - 3x + 7) \times (2x + 3) \\ &= x^2(2x + 3) - 3x(2x + 3) + 7(2x + 3) \\ &= 2x^3 + 3x^2 - 6x^2 - 9x + 14x + 21 \\ &= 2x^3 - 3x^2 + 5x + 21 \end{aligned}$$

$$16.(3x^2 + 5x - 9) \times (3x - 5)$$

Solution:

$$\begin{aligned} & (3x^2 + 5x - 9) \times (3x - 5) \\ &= 3x^2(3x - 5) + 5x(3x - 5) - 9(3x - 5) \\ &= 9x^3 - 15x^2 + 15x^2 - 25x - 27x + 45 \\ &= 9x^3 - 52x + 45 \end{aligned}$$

$$17.(x^2 - xy + y^2) \times (x + y)$$

Solution:

$$\begin{aligned} & (x^2 - xy + y^2) \times (x + y) \\ &= x^2(x + y) - xy(x + y) + y^2(x + y) \\ &= x^3 + x^2y - x^2y - xy^2 + xy^2 + y^3 \\ &= x^3 + y^3 \end{aligned}$$

$$18.(x^2 + xy + y^2) \times (x - y)$$

Solution:

$$\begin{aligned} & (x^2 + xy + y^2) \times (x - y) \\ &= x^2(x - y) + xy(x - y) + y^2(x - y) \\ &= x^3 - x^2y + x^2y - xy^2 + xy^2 - y^3 \\ &= x^3 - y^3 \end{aligned}$$

$$19.(x^3 - 2x^2 + 5) \times (4x - 1)$$

Solution:

$$\begin{aligned} & (x^3 - 2x^2 + 5) \times (4x - 1) \\ &= x^3(4x - 1) - 2x^2(4x - 1) + 5(4x - 1) \\ &= 4x^4 - x^3 - 8x^3 + 2x^2 + 20x - 5 \\ &= 4x^4 - 9x^3 + 2x^2 + 20x - 5 \end{aligned}$$

$$20.(9x^2 - x + 15) \times (x^2 - 3)$$

Solution:

$$\begin{aligned} & (9x^2 - x + 15) \times (x^2 - 3) \\ &= 9x^2(x^2 - 3) - x(x^2 - 3) + 15(x^2 - 3) \\ &= 9x^4 - 27x^2 - x^3 + 3x + 15x^2 - 45 \\ &= 9x^4 - x^3 - 12x^2 + 3x - 45 \end{aligned}$$

$$21. (x^2 - 5x + 8) \times (x^2 + 2)$$

Solution:

$$\begin{aligned} & (x^2 - 5x + 8) \times (x^2 + 2) \\ &= x^2(x^2 + 2) - 5x(x^2 + 2) + 8(x^2 + 2) \\ &= x^4 + 2x^2 - 5x^3 - 10x + 8x^2 + 16 \\ &= x^4 - 5x^3 + 2x^2 + 8x^2 - 10x + 16 \\ &= x^4 - 5x^3 + 10x^2 - 10x + 16 \end{aligned}$$

$$22. (x^3 - 5x^2 + 3x + 1) \times (x^2 - 3)$$

Solution:

$$\begin{aligned} & (x^3 - 5x^2 + 3x + 1) \times (x^2 - 3) \\ &= x^3(x^2 - 3) - 5x^2(x^2 - 3) + 3x(x^2 - 3) + 1(x^2 - 3) \\ &= x^5 - 3x^3 - 5x^4 + 15x^2 + 3x^3 - 9x + x^2 - 3 \\ &= x^5 - 5x^4 - 3x^3 + 3x^3 + 15x^2 + x^2 - 9x - 3 \\ &= x^5 - 5x^4 + 16x^2 - 9x - 3 \end{aligned}$$

$$23. (3x + 2y - 4) \times (x - y + 2)$$

Solution:

$$\begin{aligned} & (3x + 2y - 4) \times (x - y + 2) \\ &= 3x(x - y + 2) + 2y(x - y + 2) - 4(x - y + 2) \\ &= 3x^2 - 3xy + 6x + 2xy - 2y^2 + 4y - 4x + 4y - 8 \\ &= 3x^2 - 2y^2 - 3xy + 2xy + 6x - 4x + 4y + 4y - 8 \\ &= 3x^2 - 2y^2 - xy + 2x + 8y - 8 \end{aligned}$$

$$24. (x^2 - 5x + 8) \times (x^2 + 2x - 3)$$

Solution:

$$\begin{aligned} & (x^2 - 5x + 8) \times (x^2 + 2x - 3) \\ &= x^2(x^2 + 2x - 3) - 5x(x^2 + 2x - 3) + 8(x^2 + 2x - 3) \\ &= x^4 + 2x^3 - 3x^2 - 5x^3 - 10x^2 + 15x + 8x^2 + 16x - 24 \\ &= x^4 + 2x^3 - 5x^3 - 3x^2 - 10x^2 + 8x^2 + 15x + 16x - 24 \\ &= x^4 - 3x^3 - 5x^2 + 31x - 24 \end{aligned}$$

$$25. (2x^2 + 3x - 7) \times (3x^2 - 5x + 4)$$

Solution:

$$\begin{aligned} & (2x^2 + 3x - 7) \times (3x^2 - 5x + 4) \\ &= 2x^2(3x^2 - 5x + 4) + 3x(3x^2 - 5x + 4) - 7(3x^2 - 5x + 4) \\ &= 6x^4 - 10x^3 + 8x^2 + 9x^3 - 15x^2 + 12x - 21x^2 + 35x - 28 \end{aligned}$$

$$\begin{aligned} &= 6x^4 - 10x^3 + 9x^3 + 8x^2 - 15x^2 - 21x^2 + 12x + 35x - 28 \\ &= 6x^4 - x^3 - 28x^2 + 47x - 28 \end{aligned}$$

26. $(9x^2 - x + 15) \times (x^2 - x - 1)$

Solution:

$$\begin{aligned} &(9x^2 - x + 15) \times (x^2 - x - 1) \\ &= 9x^2(x^2 - x - 1) - x(x^2 - x - 1) + 15(x^2 - x - 1) \\ &= 9x^4 - 9x^3 - 9x^2 - x^3 + x^2 + x + 15x^2 - 15x - 15 \\ &= 9x^4 - 9x^3 - x^3 - 9x^2 + x^2 + 15x^2 + x - 15x - 15 \\ &= 9x^4 - 10x^3 + 7x^2 - 14x - 15 \end{aligned}$$

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