Exercices supplémentaires sur les identités remarquables et la factorisation.

Compléter les identités remarquables.

1) $16x^2 - 24x + 9 = (4x - 3)^2$

2) $x^2 - 7 = (x + \sqrt{7}) \cdot (x - \sqrt{7})$

3) $x^2 + 7x + 12 = (x + 4) \cdot (x + 3)$

4) $9x^2 - 6x + 1 = (3x - 1)^2$

5) $x^2 - 4x - 21 = (x + 3) \cdot (x - 7)$

6) $x^2 - 81 = (x - 9) \cdot (x + 9)$

7) $x^2 - 10x - 24 = (x + 2) \cdot (x - 12)$

8) $x^2 - 9x + 14 = (x - 2) \cdot (x - 7)$

9) $m^4 - 2m^2 + 1 = (m^2 - 1)^2$

10) $t^4 - 625 = (t^2 - 25) \cdot (t^2 + 25)$

Factoriser le plus possible les polynômes à l'aide de **la mise en évidence**.

1) $(2x + 3) \cdot (6x - 7) + (2x + 3) \cdot (11x - 15)$

$= (2x + 3) \cdot \left[(6x - 7) + (11x - 15) \right]$

$= (2x + 3) \cdot \left[17x - 22 \right]$

2) $(5x + 4) \cdot (9x - 5) - (12x + 7) \cdot (5x + 4)$

$= (5x + 4) \cdot \left[(9x - 5) - (12x + 7) \right]$

$= (5x + 4) \cdot \left[-3x - 12 \right] = -3 \cdot (5x + 4) \cdot (x + 4)$

3) $(9x + 12)^2 - (9x + 12) \cdot (11x - 7)$

$= (9x + 12) \cdot \left[(9x + 12) - (11x - 7) \right]$

$= (9x + 12) \cdot \left[-2x + 19 \right] = 3 \cdot (3x + 4) \cdot (-2x + 19)$

4) $(x + 7) \cdot (3x + 2) - 1 \cdot (x + 7)$

$= (x + 7) \cdot \left[(3x + 2) - 1 \right]$

$= (x + 7) \cdot \left[3x + 1 \right]$

5) $(t + 7) \cdot (3t + 2) - t \cdot (t + 7)$

$= (t + 7) \cdot \left[(3t + 2) - t \right]$

$= (t + 7) \cdot (2t + 2) = 2 \cdot (t + 7) \cdot (t + 1)$

6) $(2u + 4) \cdot (3u + 2) - (2u + 4) \cdot (3u + 5)$

$= (2u + 4) \cdot \left[(3u + 2) - (3u + 5) \right]$

$= (2u + 4) \cdot \left[-3 \right] = -6 \cdot (u + 2)$

7) $(2x - 6)^2 - (6x - 9) \cdot (2x - 6)^2$

$= (2x - 6)^2 \cdot \left[1 - (6x - 9) \right]$

$= (2x - 6)^2 \cdot \left[10 - 6x \right] = \left[2 \cdot (x - 3) \right]^2 \cdot 2 \cdot (5 - 3x) =$

$= 8 \cdot (x - 3)^2 \cdot (5 - 3x)$

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

$= (x - 2)^2 \cdot \left[1 + 3 \cdot (x - 2) \right]$

$= (x - 2)^2 \cdot \left[3x - 5 \right]$

9) $(7x - 1) \cdot (2x + 3) - (3x + 1) \cdot (7x - 1)$

$= (7x - 1) \cdot \left[(2x + 3) - (3x + 1) \right]$

$= (7x - 1) \cdot \left[-x + 2 \right]$

10) $(8u + 4) \cdot (u + 5) - (u - 5) \cdot (2u + 1)$

$= 4(2u + 1) \cdot (u + 5) - (u - 5) \cdot (2u + 1)$

$= (2u + 1) \cdot \left[4 \cdot (u + 5) - (u - 5) \right]$

$= (2u + 1) \cdot \left[3u + 25 \right]$

11) $(3x - 2) \cdot (x^2 + 1) - 5 \cdot (x^2 + 1)$

$= (x^2 + 1) \cdot \left[(3x - 2) - 5 \right]$

$= (x^2 + 1) \cdot \left[3x - 7 \right]$

12) $(3t + 2) \cdot (t - 1) + 4 \cdot (-1) \cdot (-1) \cdot (1 - t) + (5t - 3) \cdot (t - 1)$

$= (t - 1) \cdot \left[(3t + 2) - 4 + (5t - 3) \right]$

$= (t - 1) \cdot \left[8t - 5 \right]$

13) $7x \cdot (8x - 3) \underbrace{+ (-1) \cdot (-1) \cdot (3 - 8x)}_{-} \cdot (2x - 5) \underbrace{- 16x + 6}_{-2 \cdot (8x - 3)}$

$= (8x - 3) \cdot \left[7x - (2x - 5) - 2 \right]$

$= (8x - 3) \cdot \left[5x + 3 \right]$

14) $(1 - x) \cdot (x + 3) - 2 \cdot (x + 3) + x \cdot (x + 3)$

$= (x + 3) \cdot \left[(1 - x) - 2 + x \right]$

$= (x + 3) \cdot \left[-1 \right] = -x - 3$

15) $\underbrace{(y + 1) \cdot (-1)}_{-(y+1)} \cdot \underbrace{(-1) \cdot (2 - y)}_{y - 2} + (y - 2)^2 + (y - 2)^2 + (y - 2) \cdot (y + 2)$

$= (y - 2) \cdot \left[-(y + 1) + (y - 2) + (y - 2) + (y + 2) \right]$

$= (y - 2) \cdot \left[2y - 3 \right]$

16) $(3x - 2)^2 - (7x - 2) \cdot (3x - 2) + 4x \cdot (3x - 2)$

$= (3x - 2) \cdot \left[(3x - 2) - (7x - 2) + 4x \right]$

$= (3x - 2) \cdot \left[0 \right] = 0$