

# Exercices de synthèse Activité 4 de l'ancien AM



Factorise les expressions suivantes.

1°)	$12a^2c^3 - 30abc^2$
2°)	$3a^2 - 6a + 3$
3°)	$4cd^2 + 2c$
4°)	$x^4 - 18x^2 + 81$
5°)	$3a^3 - 27ab^2$
6°)	$a \cdot (2x - y) + b \cdot (y - 2x)$
7°)	$5a \cdot (b + 2c)^2 - 15a^2 \cdot (2c + b)$
8°)	$9a^7 - 12a^4b + 4ab^2$
9°)	$21a^3b - 7ab + 14a^2b^2$
10°)	$(a - 3) \cdot (x + 4) - (5 - x) \cdot (a - 3)$

10°)	$(a - 3) \cdot (x + 4) - (5 - x) \cdot (a - 3)$
11°)	$1 - x^8$
12°)	$2a^2 - 12a + 18$
13°)	$(x - y)^2 - 2x \cdot (y - x)$
14°)	$12x^2y^2 - 18xy^3 + 24x^3y$
15°)	$48a^3 - 3a$
16°)	$32a^4 - 2b^8$
17°)	$5a \cdot (a + 2)^2 - 3a^2 \cdot (a + 2)$
18°)	$25a^2 - (2a - 3b)^2$
19°)	$-1 + a^2$
20°)	$a^4 - 2a^2 + 1$

$$1^\circ) \quad 12a^2c^3 - 30abc^2 = 6ac^2(2a^2c - 5b)$$

$$2^\circ) \quad 3a^2 - 6a + 3 = 3(a^2 - 2a + 1) = 3(a-1)^2$$

$$3^\circ) \quad 4cd^2 + 2c = 2c(2d^2 + 1)$$

$$4^\circ) \quad x^4 - 18x^2 + 81 = (x^2 - 9)^2 = (x+3)^2(x-3)^2$$

$$5^\circ) \quad 3a^3 - 27ab^2 = 3a(a^2 - 9b^2) = 3a(a+3b)(a-3b)$$

$$6^\circ) \quad \underline{a \cdot (2x - y)} + \underline{b \cdot (y - 2x)} = (2x - y)(a - b)$$

$$7^\circ) \quad \underline{5a \cdot (b + 2c)^2} - \underline{15a^2 \cdot (2c + b)} = 5a(b+2c)(b+2c-3a)$$

$$8^\circ) \quad 9a^7 - 12a^4b + 4ab^2 = a(9a^6 - 12a^3b + 4b^2) = a(3a^3 - 2b)^2$$

$$9^\circ) \quad 21a^3b - 7ab + 14a^2b^2 = 7ab(3a^2 - 1 + 2ab) =$$

$$10^\circ) \quad \underline{(a-3) \cdot (x+4)} - \underline{(5-x) \cdot (a-3)} = (a-3)(x+4-5+x) = (a-3)(2x-1)$$

$$10) \quad 1 - x^8 = (1 + x^4)(1 + x^2)(1 + x)(1 - x)$$

$$11) \quad 2a^2 - 12a + 18 = 2(a^2 - 6a + 9) = 2(a - 3)^2$$

$$12) \quad \underline{(x - y)^2} - 2x \cdot \underline{(y - x)} = (y - x)(y - x - 2x) = (y - x)(y - 3x)$$

$$13) \quad 12x^2y^2 - 18xy^3 + 24x^3y = 6xy(2xy - 3y^2 + 4x^2) =$$

$$14) \quad 48a^3 - 3a = 3a(16a^2 - 1) = 3a(4a + 1)(4a - 1)$$

$$15) \quad 32a^4 - 2b^8 = 2(16a^4 - b^8) = 2(4a^2 + b^4)(2a + b^2)(2a - b^2)$$

$$16) \quad \underline{5a \cdot (a + 2)^2} - 3a^2 \cdot \underline{(a + 2)} = a(a + 2) \left( \overset{5(a+2)}{\underline{5a+10}} - 3a^2 - 6a \right) = a(a + 2)(-3a^2 - a + 10)$$

$$17) \quad 25a^2 - (2a - 3b)^2 = (\underline{5a} + \underline{2a - 3b})(\underline{5a} - \underline{2a + 3b}) = 3(7a - 3b)(a - 3b)$$

$$18) \quad -1 + a^2 = a^2 - 1 = (a + 1)(a - 1)$$

# Exercices de synthèse Activité 4 de l'ancien AM



Factorise les expressions suivantes.

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20°)  $a^4 - 2a^2 + 1$

21°)  $4x^2 + 12x + 9 - 25$

22°)  $-5a \cdot (3a - 2b)^3 + (2b - 3a)^2$

23°)  $ax + 3x - ay - 3y$

24°)  $9x^2y^3 - 6x^3b^2 + 12x^2y^2$

25°)  $-4a \cdot (a - b) - (2 + b) \cdot (b - a)$

26°)  $4 \cdot (a + b)^2 - 36b^2 <$

27°)  $2x^2 - 4x - 48$

28°)  $25x^{10} - 49y^8z^{16}$

29°)  $2a - 3ab - 3b + 2a^2$

30°)  $2x^2 - 1$

31°)  $x^5 - x^4 - x + 1$

32°)  $3ax^2 + 2bx - 3ay^2 - 2by$

33°)  $4a^2 - 8$

34°)  $25c^2 - 9a^2 - 12ab - 4b^2$

35°)  $16x^2 + \frac{1}{16} + 2x$

36°)  $\frac{4a^2}{9} - \left(\frac{b}{3} - \frac{a}{2}\right)^2$

37°)  $-\frac{9}{4}b^2 + \frac{3}{2}b - \frac{1}{4}$

38°)  $\frac{a^3}{8} - \frac{a^2b}{2} + \frac{ab^2}{2}$

39°)  $\frac{5}{16}a^4 - \frac{5}{81}b^4$

40°)  $\frac{x^4}{8} - x^2 + 2$



$$19^\circ) \quad -1 + a^2$$

$$20^\circ) \quad a^4 - 2a^2 + 1 = (a^2 - 1)^2 = (a+1)^2 (a-1)^2$$

$$21^\circ) \quad \underline{4x^2 + 12x + 9} - \underline{25} = (2x+3)^2 - 25 = (2x+3+5)(2x+3-5) = \underline{2x+8} \cdot \underline{2x-2}$$

$$22^\circ) \quad \underline{-5a \cdot (3a-2b)^3} + \underline{(2b-3a)^2} = (3a-2b)^2 (-15a^2 + 10ab + 1)$$

$$23^\circ) \quad \underline{ax + 3x} - \underline{ay - 3y} = x(a+3) - y(a+3) = (a+3)(x-y)$$

$$\begin{aligned} &= \underline{(2x+8)} \underline{(2x-2)} \\ &= 2 \cdot 2 (x+4) (x-1) \\ &= 4 (x+4) (x-1) \end{aligned}$$

$$24^\circ) \quad \underline{9x^2y^3} - 6x^3b^2 + \underline{12x^2y^2} = 3x^2(3y^3 - 2xb^2 + 4y^2) = ?$$

$$25^\circ) \quad \underline{-4a \cdot (a-b)} - \underline{(2+b) \cdot (b-a)} = (a-b)(-4a+2+b)$$

$$26^\circ) \quad 4 \cdot (a+b)^2 - 36b^2 = 4((a+b)^2 - 9b^2) = 4(\underline{a+b+3b})(\underline{a+b-3b})$$

$$27^\circ) \quad 2x^2 - 4x - 48 = 2(x^2 - 2x - 24) = 4(a+4b)(a-2b)$$

$$28^\circ) \quad 25x^{10} - 49y^8z^{16} = (5x^5 + 7y^4z^8)(5x^5 - 7y^4z^8)$$

$$29^\circ) \quad \underline{2a} - 3ab - 3b + \underline{2a^2} = 2a(1+a) - 3b(1+a) = (1+a)(2a-3b)$$

$$30^\circ) \quad 2x^2 - 1 = (\sqrt{2}x+1)(\sqrt{2}x-1)$$



$$31^\circ) \quad \underline{x^5 - x^4 - x + 1} = x^4(x-1) - (x-1) = (x-1)(x^4+1)(x+1)(x-$$

$$32^\circ) \quad \underline{3ax^2 + 2bx - 3ay^2 - 2by} = 3a(x^2 - y^2) + 2b(x - y) = (x - y)(3ax + 3$$

$$33^\circ) \quad 4a^2 - 8 = 4(a^2 - 2) = 4(a + \sqrt{2})(a - \sqrt{2})$$

$$34^\circ) \quad \underline{25c^2 - 9a^2 - 12ab - 4b^2} = 25c^2 - (3a + 2b)^2 = (5c + 3a + 2b)(5c -$$

$$35^\circ) \quad 16x^2 + \frac{1}{16} + 2x$$

$$36^\circ) \quad \frac{4a^2}{9} - \left(\frac{b}{3} - \frac{a}{2}\right)^2$$





## Exercices de synthèse

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### Activité 6

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Factorise les expressions suivantes.

1)  $12a^2c^3 - 30a^5c^2$

2)  $x^2 - 18x + 81$

3)  $4x^2 - 25$

4)  $2x \cdot (5x - y) + 3y \cdot (5x - y)$

5)  $3a^2 - 27b^2$

6)  $3a^2 - 6a + 3$

7)  $21a^3 - 7a + 14a^2$

8)  $9a^7 - 12a^4 + 4a$

9)  $a \cdot (2x - y) - b \cdot (y - 2x)$

10)  $6ac + 4ad + 15bc + 10bd$

11)  $a^4 - 16$

12)  $2a^2 - 12a + 18$

13)  $(x + y) \cdot (2x - y) - (2x - 3y) \cdot (2x - y)$

14)  $-9 + 25a^2$

15)  $12x^2y^2 - 18xy^3 + 24x^3y$

16)  $32a^3 - 2a$

17)  $(2a - 3)^2 - a^2$

18)  $4x \cdot (x - 3y) + 6y \cdot (3y - x)$

19)  $ax - ay + 3x - 3y$

20)  $3 \cdot (a + 2)^2 - 5a \cdot (a + 2)$

Factorise les expressions suivantes.

1E

$$1) \underline{12a^2c^3} - \underline{30a^5c^2}$$
$$= 6a^2c^2$$

2 termes  
diff  
→ une

2 carrés parfaits

$$2) \begin{array}{ccc} x^2 & - & 18x & + & 81 \\ \downarrow & & \uparrow & & \downarrow \\ x & & 9 & & \\ & & \uparrow & & \\ & & 2 \cdot x \cdot 9 & & \end{array} \rightarrow \text{trinôme carré parfait}$$
$$= (x - 9)^2$$

$$3) \begin{array}{ccc} 4x^2 & - & 25 \\ \downarrow & \uparrow & \downarrow \\ 2x & & 5 \end{array} -$$
$$= (2x + 5)(2x - 5)$$

$$4) \underline{2x \cdot (5x - y)} + \underline{3y \cdot (5x - y)}$$
$$= (5x - y)(2x + 3y)$$

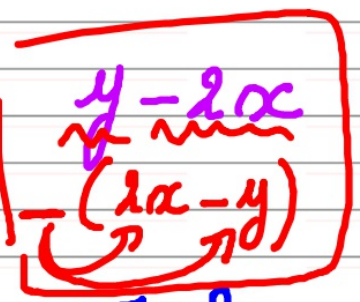
$$5) \underline{3a^2} - \underline{27b^2}$$
$$= 3(a^2 - 9b^2)$$
$$\begin{array}{ccc} \downarrow & \uparrow & \downarrow \\ a & & 3b \end{array}$$
$$= 3(a + 3b)(a - 3b)$$

6)  $3a^2 - 6a + 3$  ME?

$= 3(a^2 - 2a + 1)$   
Diagram showing factoring of  $a^2 - 2a + 1$  with arrows and numbers 2, 2, 1.

2 termer

$= 3(a - 1)^2$



7)  $21a^3 - 7a + 14a^2$  PE?

$= 7a(3a^2 - 1 + 2a)$

$= 7a(3a^2 + 2a - 1)$

1 st 2  
3 st 1

$a(3a^2 - 2)^2$

8)  $9a^7 - 12a^4 + 4a$

$a(9a^6 - 12a^3 + 4)$   
Diagram showing factoring of  $9a^6 - 12a^3 + 4$  with arrows and numbers 3, 2, 2.

$= a(3a^2 - 2)^2$

9)  $a(2x - y) - b(y - 2x)$

$= a(2x - y) + b(2x - y)$   
 $= (2x - y)(a + b)$

10)  $6ac + 4ad + 15bc + 10bd$

$= 2a(3c + 2d) + 5b(3c + 2d)$

$= (3c + 2d)(2a + 5b)$



11)  $a^4 - 16$  ΠΕ?  
diff. de 2 carrés  
↳ prod. binôm conj

$$= (a^2 + 4)(a^2 - 4) \leftarrow ??$$

$$= (a^2 + 4)(a + 2)(a - 2)$$

12)  $2a^2 - 12a + 18$  ΠΕ?

$$= 2(a^2 - 6a + 9)$$

$$= 2(a - 3)^2$$

13)  $(x + y) \cdot (2x - y) - (2x - 3y) \cdot (2x - y)$

$$= (2x - y)(x + y - (2x - 3y))$$

$$= (2x - y)(x + y - 2x + 3y)$$

$$= (2x - y)(-x + 4y)$$

$$= (2x - y)(4y - x)$$

14)  $-9 + 25a^2$

$$= 25a^2 - 9$$

$$= (5a + 3)(5a - 3)$$

15)  $12x^2y^2 - 18xy^3 + 24x^3y$

$$= 6xy(2xy - 3y^2 + 4x^2)$$

ΠΕ!

16)  $32a^3 - 2a$  PE?

$$= 2a(16a^2 - 1)$$

$$= 2a(4a+1)(4a-1)$$

17)  $(2a-3)^2 - a^2$

$$= (2a-3+a)(2a-3-a)$$

$$= (3a-3)(a-3)$$

$$= 3(a-1)(a-3)$$

18)  $4x \cdot (x-3y) + 6y \cdot (3y-x)$

$$= 4x(x-3y) - 6y(x-3y)$$

$$= 2(x-3y)(2x-3y)$$

19)  $ax - ay + 3x - 3y$

$$= a(x-y) + 3(x-y)$$

$$= (x-y)(a+3)$$

20)  $3 \cdot (a+2)^2 - 5a \cdot (a+2)$

$$= (a+2)(3(a+2) - 5a)$$

$$= (a+2)(3a+6-5a)$$

$$= (a+2)(-2a+6)$$

$$= 2(a+2)(-a+3)$$

$$= 2(a+2)(3-a)$$

## Exercices de synthèse

### Activité 6

Factorise les expressions suivantes.

21)  $-12x^3 + 18x^2 - 6x$

22)  $25a^2 - (2a - 3)^2$  

23)  $3x^2 + 48 - 24x$

24)  $32a^4 - 2b^8$

25)  $a^8 - 1$

26)  $4a \cdot (a - b) - (2 - b) \cdot (b - a)$

27)  $-4x^2 + 20xy - 25y^2$

28)  $16x^2 - 4$

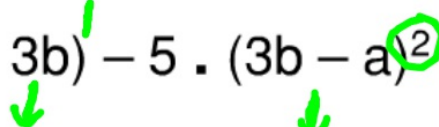
**29)**  $x^5 - x^4 - 2x + 2$

**30)**  $5a \cdot (3a - 2b)^2 - (3a - 2b)^3$

31)  $a^4 - 2a^2 + 1$

32)  $2a - 3ab - 3b + 2a^2$

33)  $4a^2 - 8$

**34)**  $2a \cdot (a - 3b) - 5 \cdot (3b - a)$  

**35)**  $(2a + 5b)^2 - (5b - 2a)^2$

36)  $2x^2 \cdot (x - 1) - 8 \cdot (x - 1)$

37)  $3ax^2 + 2bx - 3ay^2 - 2by$

38)  $6x \cdot (x - 3)^2 - 9 \cdot (3 - x)^3$

39)  $4x^2 + 12x + 9 - y^2$

40)  $4 \cdot (a + b)^2 - 36b^2$