



Mathématiques

MAT-4106-1

Factorisation et fractions algébriques

ÉVALUATION FORMATIVE

Version A

Corrigé

Pré-test

MAT-4106-1 FACTORISATION ET FRACTIONS ALGÈBRIQUES**CORRIGÉ – PRÉTEST - FORME A**

1. a) $3a^3b + 6a^2b^2 - 12a^2bc + 27a^2b$

$$\underline{3a^2b(a + 2b - 4c + 9)}$$

b) $-2r^2s - 6rs^2 + 8rst$

$$\underline{-2rs(r + 3s - 4t)}$$

2. a) $\underline{2x^2 - 8x} - \underline{3xy + 12y} + \underline{x - 4}$

$$2x(x - 4) - 3y(x - 4) + 1(x - 4)$$

$$\underline{(2x - 3y + 1)(x - 4)}$$

b) $\underline{6x^2 - 4ax} + \underline{9xy - 6ay}$

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

$$\underline{(2x + 3y)(3x - 2a)}$$

3. a) $x^2 + 4xy + 3y^2$ S = 4

$$P = 3$$

Donc 3 et 1

$$\underline{x^2 + 3xy} + \underline{xy + 3y^2}$$

$$x(x + 3y) + y(x + 3y)$$

$$\underline{(x + 3y)(x + y)}$$

b) $a^2 + 6a - 27$ S = 6

$$P = -27$$

Donc 9 et -3

$$\underline{(a + 9)(a - 3)}$$

c) $a^2 + 3ab + 2b^2$ S = 3

$$P = 2$$

Donc 2 et 1

$$\underline{(a + 2b)(a + b)}$$

6. a) $24 a^4 - 54 b^4$

$$6 (4 a^4 - 9 b^4)$$

$$\underline{6 (2 a^2 - 3 b^2) (2 a^2 + 3 b^2)}$$

b) $8 x^2 - 20 x - 12$ $S = -5$

$$P = -6$$

$$4 (2 x^2 - 5 x - 3) \quad \text{Donc } -6 \text{ et } 1$$

$$4 (2 x^2 - 6 x + x - 3)$$

$$4 [2 x (x - 3) + 1 (x - 3)]$$

$$\underline{4 (2 x + 1) (x - 3)}$$

c) $2 (3 x^2 - 5 y - 5 x + 3 xy)$

Réarranger les termes

$$2 (3 x^2 + 3 xy - 5 x - 5 y)$$

Faire double mise en évidence

$$2 [3 x (x + y) - 5 (x + y)]$$

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

7. $\frac{ax + 8a}{2ax^2 - 2ax - 4a} = \frac{a(x + 8)}{2a(x - 2)(x + 1)} = \frac{x + 8}{2(x - 2)(x + 1)}$

8. $\frac{4a - 4b}{8a + 8b} \times \frac{2a^2 + 2b^2}{a^2 - b^2} =$

$$\frac{4(a - b)}{8(a + b)} \times \frac{2(a^2 + b^2)}{(a + b)(a - b)} =$$

$$\frac{a^2 + b^2}{(a + b)^2}$$

$$9. \quad \frac{2x^2 + x - 3}{1 - x^2} \div \frac{6x + 9}{x^2 - 1} =$$

$$\frac{\cancel{(2x+3)}(x-1)}{\cancel{(1-x^2)}} \times \frac{-1}{3\cancel{(2x+3)}} = \frac{-(x-1)}{3} \text{ ou } \frac{1-x}{3}$$

$$10. \quad \frac{2}{y+1} + \frac{a+x}{y^2+3y+2} = \frac{2}{(y+1)} + \frac{a+x}{(y+2)(y+1)}$$

$$\frac{2(y+2) + (a+x)}{(y+1)(y+2)} =$$

$$\frac{2y+4+a+x}{(y+1)(y+2)}$$

11. Démontrer

$$a) \quad \frac{x}{x-y} - \frac{y}{x+y} = 1 + \frac{2y^2}{x^2 - y^2}$$

$$\frac{x(x+y) - y(x-y)}{(x-y)(x+y)} = 1 + \frac{2y^2}{(x-y)(x+y)}$$

$$\frac{x^2 + xy - xy + y^2}{(x-y)(x+y)} = \frac{1(x-y)(x+y) + 2y^2}{(x-y)(x+y)}$$

$$\frac{x^2 + y^2}{(x-y)(x+y)} = \frac{x^2 + xy - xy - y^2 + 2y^2}{(x-y)(x+y)}$$

$$\frac{x^2 + y^2}{(x-y)(x+y)} = \frac{x^2 + y^2}{(x-y)(x+y)}$$

$$b) \quad \frac{a+2}{a+4} + \frac{a+1}{a+3} = \frac{2(a^2+5a+5)}{a^2+7a+12}$$

$$\frac{(a+2)(a+3) + (a+1)(a+4)}{(a+4)(a+3)} = \frac{2(a^2+5a+5)}{a^2+7a+12}$$

$$\text{suite 11b} \quad \frac{(a^2 + 3a + 2a + 6) + (a^2 4a + a + 4)}{(a + 4)(a + 3)} = \frac{2(a^2 + 5a + 5)}{a^2 + 7a + 12}$$

$$\frac{2a^2 + 10a + 10}{(a + 4)(a + 3)} = \frac{2(a^2 + 5a + 5)}{a^2 + 7a + 12}$$

$$\frac{2(a^2 + 5a + 5)}{a^2 + 7a + 12} = \frac{2(a^2 + 5a + 5)}{a^2 + 7a + 12}$$

$$\text{c) } \frac{x^2 - y^2}{(x + y)^2} \times \left(\frac{x}{x - y} - \frac{y}{(y - x)} \right) = 1$$

$$\frac{(x - y)(x + y)}{(x + y)^2} \times \frac{x + y}{x - y} = 1$$

$$1 = 1$$

$$\text{d) } \left(\frac{(x^2 + 5x + 6)}{(x^2 + 6x + 8)} + \frac{(x + 1)}{(x + 2)} \right) \times \frac{(x^2 + 8 + 6x)}{2} = x^2 + 5x + 5$$

$$\left(\frac{(x + 3)(x + 2)}{(x + 4)(x + 2)} + \frac{(x + 1)}{(x + 2)} \right) \times \frac{(x + 2)(x + 4)}{2} =$$

$$\left(\frac{(x + 3)(x + 2) + (x + 1)(x + 4)}{(x + 2)(x + 4)} \right) \times \frac{(x + 2)(x + 4)}{2} =$$

$$\left(\frac{x^2 + 3x + 2x + 6 + x^2 + 4x + x + 4}{(x + 2)(x + 4)} \right) \times \frac{(x + 2)(x + 4)}{2} =$$

$$\frac{2x^2 + 10x + 10}{(x + 2)(x + 4)} \times \frac{(x + 2)(x + 4)}{2} =$$

$$\frac{2(x^2 + 5x + 5)}{(x + 2)(x + 4)} \times \frac{(x + 2)(x + 4)}{2} =$$

$$x^2 + 5x + 5 = x^2 + 5x + 5$$