

PRÉ-TEST

MAT-4106-1

**Factorisation et fractions algébriques
FORME F**

CORRIGÉ

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Pour rétroaction : www.csdps.qc.ca/odilon-gauthier

5 points

$$1. \quad -6a^2bc + 12ab^2c^2d - 24a^2b^2c^2 - 6a^3b^2c = \\ -6abc(a - 2bcd + 4abc + a^2b)$$

5 points

$$2. \quad x^2 + x - 30 = \\ x^2 + 6x - 5x - 30 = \\ x(x+6) - 5(x+6) = \\ (x+6)(x-5)$$

5 points

$$3. \quad 6x^2 - 5xy - 6y^2 = \\ 6x^2 - 9xy + 4xy - 6y^2 = \\ 3x(2x - 3y) + 2y(2x - 3y) = \\ (2x - 3y)(3x + 2y)$$

5 points

$$4. \quad \frac{4a^2b^4}{25} - \frac{9c^6d^8}{16} = \\ \left(\frac{2ab^2}{5} - \frac{3c^3d^4}{4} \right) \left(\frac{2ab^2}{5} + \frac{3c^3d^4}{4} \right)$$

5 points

$$5. \quad 6a^2nx + 4abny + 2acnz - 6b^2my - 9abmx - 3bcmz = \\ (6a^2nx - 9abmx) + (4abny - 6b^2my) + (2acnz - 3bcmz) = \\ 3ax(2an - 3bm) + 2by(2an - 3bm) + cz(2an - 3bm) = \\ (2an - 3bm)(3ax + 2by + cz)$$

5 points

$$6. \quad 30b^2m^2p + 6bm^2p^2 - 45bm^3p - 9m^3p^2 = \\ 3m^2p(10b^2 + 2bp - 15bm - 3mp) = \\ 3m^2p[(10b^2 + 2bp) - (15bm + 3mp)] = \\ 3m^2p[2b(5b + p) - 3m(5b + p)] = \\ 3m^2p(5b + p)(2b - 3m)$$

5 points

$$\begin{aligned}
 7. \quad & -6x^3y + 27x^2yz - 27xyz^2 = \\
 & -3xy(2x^2 - 9xz + 9z^2) = \\
 & -3xy(2x^2 - 6xz - 3xz + 9z^2) = \\
 & -3xy[(2x^2 - 6xz) - (3xz - 9z^2)] = \\
 & -3xy[2x(x - 3z) - 3z(x - 3z)] = \\
 & -3xy(x - 3z)(2x - 3z)
 \end{aligned}$$

5 points

$$\begin{aligned}
 8. \quad & \frac{4a^2 - 11ab - 3b^2}{9b^2 - a^2} = \\
 & \frac{(a - 3b)(4a + b)}{(3b + a)(3b - a)} = \\
 & \frac{-(-a + 3b)(4a + b)}{(3b + a)(3b - a)} = \\
 & \frac{-\cancel{(-a + 3b)}(4a + b)}{(3b + a)\cancel{(3b - a)}} = \\
 & \frac{-(4a + b)}{3b + a}
 \end{aligned}$$

10 points

$$\begin{aligned}
 9. \quad & \frac{-6c^2 + 8cd}{2c + d} \times \frac{4c^2 - d^2}{6c^2 - 11cd + 4d^2} = \\
 & \frac{-2c(3c - 4d)}{2c + d} \times \frac{(2c - d)(2c + d)}{(2c - d)(3c - 4d)} = \\
 & \frac{-\cancel{2c}\cancel{(3c - 4d)}}{\cancel{2c + d}} \times \frac{\cancel{(2c - d)}\cancel{(2c + d)}}{\cancel{(2c - d)}\cancel{(3c - 4d)}} = \\
 & \quad \quad \quad -2c
 \end{aligned}$$

5 points

$$\begin{aligned}
 10. \quad & \frac{y^2 - 2y + 1}{1 - y} \div \frac{3y^2 - 3y}{-3y} = \\
 & \frac{(y-1)(y-1)}{-1(-1+y)} \div \frac{3y(y-1)}{-3y} = \\
 & \frac{\cancel{(y-1)} \cancel{(y-1)}}{-1 \cancel{(-1+y)}} \times \frac{\cancel{-3y}}{\cancel{3y} \cancel{(y-1)}} = \\
 & \frac{-1}{-1} = 1
 \end{aligned}$$

5 points

$$\begin{aligned}
 11. \quad & \frac{30s^3 + 10st}{5st} \div (9s^4t - t^3) = \\
 & \frac{10s(3s^2 + t)}{5st} \div \frac{t(3s^2 + t)(3s^2 - t)}{1} = \\
 & \frac{\cancel{10}^2 \cancel{s} (3s^2 + t)}{\cancel{5} \cancel{s} t} \times \frac{1}{t \cancel{(3s^2 + t)} (3s^2 - t)} = \\
 & \frac{2}{t^2(3s^2 - t)}
 \end{aligned}$$

10 points

$$\begin{aligned}
 12. \quad & \frac{a^2 - 2a - 3}{a^2 - 9} - \frac{a^2}{a^2 - 3a} = \\
 & \frac{\cancel{(a-3)}(a+1)}{(a+3)\cancel{(a-3)}} - \frac{\cancel{a^2}}{\cancel{a}(a-3)} = \\
 & \frac{a+1}{a+3} - \frac{a}{a-3} = \\
 & \frac{(a+1)(a-3) - a(a+3)}{(a+3)(a-3)} = \\
 & \frac{a^2 - 2a - 3 - a^2 - 3a}{(a+3)(a-3)} = \\
 & \frac{-5a - 3}{(a+3)(a-3)}
 \end{aligned}$$

10 points

$$\begin{aligned}
 13. \quad & \frac{x}{xy+y^2} + \frac{2x}{x^2-y^2} = \\
 & \frac{x}{y(x+y)} + \frac{2x}{(x-y)(x+y)} = \\
 & \frac{x(x-y) + 2xy}{y(x-y)(x+y)} = \\
 & \frac{x^2 - xy + 2xy}{y(x-y)(x+y)} = \\
 & \frac{x^2 + xy}{y(x-y)(x+y)} = \\
 & \frac{x \cancel{(x+y)}}{y(x-y) \cancel{(x+y)}} = \\
 & \frac{x}{y(x-y)}
 \end{aligned}$$

10 points

$$\begin{aligned}
 14. \quad & \frac{x^2+9}{x^2+3x-4} - \frac{x-1}{x+4} = \frac{2}{x-1} \\
 & \frac{x^2+9}{(x+4)(x-1)} - \frac{x-1}{x+4} = \frac{2}{x-1} \\
 & \frac{x^2+9 - (x-1)(x-1)}{(x+4)(x-1)} = \frac{2}{x-1} \\
 & \frac{x^2+9 - x^2 + x + x - 1}{(x+4)(x-1)} = \frac{2}{x-1} \\
 & \frac{2x+8}{(x+4)(x-1)} = \frac{2}{x-1} \\
 & \frac{2 \cancel{(x+4)}}{\cancel{(x+4)}(x-1)} = \frac{2}{x-1} \\
 & \frac{2}{x-1} = \frac{2}{x-1}
 \end{aligned}$$

10 points

15.

$$\begin{aligned} \frac{x-7}{x^2-49} + \frac{2}{x+1} &= \frac{15}{x+7} + \frac{12x}{-x^2-8x-7} \\ \frac{x-7}{(x-7)(x+7)} + \frac{2}{x+1} &= \frac{15}{x+7} + \frac{12x}{(-x-7)(x+1)} \\ \frac{\cancel{x-7}}{(\cancel{x-7})(x+7)} + \frac{2}{x+1} &= \frac{15}{x+7} + \frac{12x}{-1(x+7)(x+1)} \\ \frac{1}{x+7} + \frac{2}{x+1} &= \frac{15}{x+7} - \frac{12x}{(x+7)(x+1)} \\ \frac{1(x+1) + 2(x+7)}{(x+7)(x+1)} &= \frac{15(x+1) - 12x}{(x+7)(x+1)} \\ \frac{x+1+2x+14}{(x+7)(x+1)} &= \frac{15x+15-12x}{(x+7)(x+1)} \\ \frac{3x+15}{(x+7)(x+1)} &= \frac{3x+15}{(x+7)(x+1)} \end{aligned}$$