

## Serie 5 - Soluzioni

## Esercizio 2

$15d^2 + 3d = 3d(5d + 1)$
$6x^3 - 12x^2y + 24x^4 = 6x^2(x - 2y + 4x^2)$
$x^{10} - x^8 + 4x^6 = x^6(x^4 - x^2 + 4)$

## Esercizio 3

$4x^2 - 12x + 9 = (2x - 3)^2$
$1 - 64a^4 = (1 - 8a^2)(1 + 8a^2)$
$a^2 - 3a + \frac{9}{4} = (a - \frac{3}{2})^2$
$\frac{1}{9}a^2 - 16 = (\frac{1}{3}a + 4)(\frac{1}{3}a - 4)$

## Esercizio 4

$a^2 + 3a + 2 = (a + 2)(a + 1)$	$x^2 + 3x - 18 = (x + 6)(x - 3)$
$a^2 + 5a + 4 = (a + 4)(a + 1)$	$x^2 + 8x - 20 = (x + 10)(x - 2)$
$a^2 + 5a + 6 = (a + 3)(a + 2)$	$-3 + a^2 - 2a = (a - 3)(a + 1)$
$a^2 - a - 2 = (a - 2)(a + 1)$	$x^2 - 9xy - 36y^2 = (x - 12y)(x + 3y)$

## Esercizio 5

$x^4 - 1 = (x^2 - 1)(x + 1)(x - 1)$	$4x^2 - 12x + 9 = (2x - 3)^2$
$36 - 60m + 25m^2 = (6 - 5m)^2$	$-m^2 + 10m - 25 = -(m - 5)^2$
$x^2 - 5x - 50 = (x - 10)(x + 5)$	$y^2 - 8y - 33 = (y - 11)(y + 3)$
$16m^2 - 1 = (4m + 1)(4m - 1)$	$9 - y^6 = (3 + y^3)(3 - y^3)$
$-3a^2 + 3b^2 = -3(a + b)(a - b)$	$49a^4b^2 - 36a^2 = (7a^2b + 6a)(7a^2b - 6a)$
$9a^2 - 6a + 1 = (3a - 1)^2$	$49p^2 - 70pq + 25q^2 = (7p - 5q)^2$
$-16a^2 + 8ab - b^2 = -(4a - b)^2$	$x^2 + 5x - 14 = (x + 7)(x - 2)$
$6x^4 - 6x^3 - 72x^2 = 6x^2(x - 4)(x + 3)$	$-3x^2y + 12xy - 12y = -3y(x - 2)^2$
$3xb^2 - b^2 + 3x - 1 = (b^2 + 1)(3x - 1)$	$a^2 - a^3 + 2 - 2a = (a^2 + 2)(1 - a)$
$x^4 - 2x^2 - 3 = (x^2 - 3)(x^2 + 1)$	$a^2m + a^2n - bm - bn = (a^2 - b)(m + n)$
$4x^2y^2 - 12xy^3 + 8y^4 = 4y^2(x - 2y)(x - y)$	

## Esercizio 6

N°	mcm	MCD
i)	$60x^3y^2z^2$	$2xyz$
ii)	$196a^2b^3c^2$	$7ab$
iii)	$24r^2s^2t^2$	$t$
iv)	$8x^3y^3$	$2$
v)	$2(x - y)^2(x + y)$	$(x - y)$
vi)	$2(2 - a)(2 + a)$	$1$

## Esercizio 7

$ax^2 - a^3 = a(x + a)(x - a)$	$5xy^2 - 15y^3 = 5y^2(x - 3y)$
$2x^2 - 14x + 24 = 2(x - 3)(x - 4)$	$5abc - 12b^2c + 15abc^2 = bc(5a - 12b + 15ac)$
$3xy^2 + 9xy - 30x = 3x(y + 5)(y - 2)$	$4b^2 - 25x^2 = (2b + 5x)(2b - 5x)$
$x^5 - x = x(x^2 + 1)(x + 1)(x - 1)$	$x^2 + \frac{4}{5}x + \frac{4}{25} = (x + \frac{2}{5})^2$
$-k^2 - k + 20 = -(k + 5)(k - 4)$	$x^3 + x^2 - x - 1 = (x^2 - 1)(x + 1)$
$120xy - 80x^2 - 45y^2 = -5(3y - 4x)^2$	$x^2 - 2x - 15 = (x - 5)(x + 3)$

**Esercizio 8**

$\frac{m^2 - 4}{m^2 + 4m - 12} = \frac{m + 2}{m + 6}$	$\frac{x^2 - 9}{x^2 + 2x - 3} = \frac{x - 3}{x - 1}$	$\frac{(x + y)^2(x - y)^2}{(x^2 - y^2)(x^2 - y^2)} = 1$
$\frac{x^2 - x - 12}{x^2 + 4x + 3} = \frac{x - 4}{x + 1}$	$\frac{a^2 + a - 6}{a^2 - a - 2} = \frac{a + 3}{a + 1}$	$\frac{(m^2 - 4)^2}{(m - 2)(m + 2)^2} = m - 2$

**Esercizio 9**

$\frac{5a^4b^2c^3}{2x^6y^2z} \cdot \frac{4x^4yz}{10a^4c^3} = \frac{b^2}{x^2y}$	$\frac{a^2 - b^2}{2a} \cdot \frac{4}{3a + 3b} =$
$\frac{2x - 2}{x^2 - 6x + 5} \cdot \frac{(x - 5)^2}{4x} \cdot \left(-\frac{2x^2y}{5 - x}\right) = xy$	$\frac{2}{3} \cdot \left(-\frac{4a^2b}{3a^6}\right) \cdot \frac{9a}{b} = -\frac{8}{a^3}$
$-\frac{8a^4x^2}{ay^4} \cdot \left(-\frac{2a}{x^3}\right) \cdot \left(-\frac{y}{8}\right) = -\frac{2a^4}{xy^2}$	$\frac{1 - a^2}{a^2 - 4a + 4} \cdot \frac{a - 2}{1 - a} \cdot \left(-\frac{2 - a}{a^2 - 3a + 2}\right) = \frac{1 + a}{(a - 2)(a - 1)}$

**Esercizio 10**

$\frac{16a^4x^3y^2}{b^4c^2} \div \frac{8a^4y^2}{3b^2c} = \frac{6x^3}{b^2c}$	$\frac{ax + ay}{3b + 3c} \div \frac{x^2 + 2xy + y^2}{6ab + 6ac} = \frac{2a^2}{x + y}$
$-\frac{7a^5b^2}{x^4y^3} \div \left(-\frac{7a^5b}{xy^3}\right) = \frac{b}{x^3}$	$\frac{a^2 + 4a + 4}{a^2 - 4a + 4} \div \left(-\frac{a^2 + a - 2}{a^2 - 3a + 2}\right) = \frac{a + 2}{a - 2}$

**Esercizio 11**

$\frac{1}{2a + b} - \frac{1}{2a - b} - \frac{2b}{b^2 - 4a^2} = \frac{1(2a - b) - 1(2a + b) + 2b}{(2a + b)(2a - b)} = 0$
$\frac{1}{a^3 - a^2b} + \frac{1}{b^2(b - a)} + \frac{a^2 - b^2}{a^3b^2 - a^2b^3} = \frac{b^2 - a^2 + a^2 - b^2}{a^2b^2(a - b)} = 0$
$\frac{4(1 + 4x^2)}{(1 - 4x^2)^2} - \frac{1 + 2x}{1 - 4x + 4x^2} - \frac{1 - 2x}{1 + 4x + 4x^2} = \frac{4(1 + 4x^2) - (1 + 2x)(1 + 2x)^2 - (1 - 2x)(1 - 2x)^2}{(1 - 2x)^2(1 + 2x)^2} = \frac{-8x^2 + 2}{(1 - 2x)^2(1 + 2x)^2} = \frac{-2}{(1 - 2x)(1 + 2x)}$
$\frac{6a}{9a^2 - 1} - \frac{1}{3a + 1} - \frac{1}{3a - 1} = \frac{6a - (3a - 1) - (3a + 1)}{(3a + 1)(3a - 1)} = 0$
$\frac{a^2}{16 - a^4} - \frac{1}{4 + a^2} - \frac{2}{4 - a^2} = \frac{a^2 - (4 - a^2) - 2(4 + a^2)}{(4 + a^2)(4 - a^2)} = \frac{-12}{(4 + a^2)(4 - a^2)}$
$\frac{a^2 - ab}{a^2 + ab} - 1 + \frac{a + b}{a - b} + \frac{a^3 + 4a^2b}{a^3 - ab^2} = \frac{(a - b)^2 - (a^2 - b^2) + (a + b)^2 + a(a + 4b)}{(a + b)(a - b)} = \frac{2a^2 + 4ab + 2b^2}{(a + b)(a - b)} = \frac{2(a + b)}{a - b}$