

DESCOMPUNEREA ÎN FACTORI METODA FACTORULUI COMUN

CLASA A VIII A

$$\begin{aligned} 3x^2y + 6xy^2 &= 3x^2y + 2 \cdot 3xy^2 \\ &= 3xy(x + 2y) \end{aligned}$$

Definiție: Descompunerea în factori primi reprezintă metoda de a scrie o expresie algebrică ca produs de două expresii care nu se mai pot descompune.

Exerciții:

$$1. \quad 3x + 6y = 3x + 2 \cdot 3 \cdot y = 3(x + 2y).$$

$$2. \quad 8x^5 + 4x^3 - 2x^2 + 6x^4 =$$
$$2 \cdot 4x^5 + 2 \cdot 2x^3 - 2 \cdot 1x^2 + 2 \cdot 3x^4 = 2x^2(4x^{5-2} + 2x^{3-2} - 1x^{2-2} + 3x^{4-2})$$
$$= 2x^2(4x^3 + 2x - 1 + 3x^2)$$

$$3. \quad 7a^2b - 14ab^2 + 21ab$$

$$7a^2b - 2 \cdot 7ab^2 + 3 \cdot 7ab = 7ab(a - 2b + 3).$$

$$4. \quad \sqrt{3}a^3 - 2\sqrt{3}a^2 + 4\sqrt{3}a - 3\sqrt{3} =$$

$$\sqrt{3}a(a^3 - 2a^2 + 4 - 3a).$$

$$5. \quad \frac{1}{2}x^3 + \frac{3}{5}x^2y + \frac{5}{4}x^2y^2 =$$

$$\frac{1}{2} \cdot \frac{1}{4}x^3y^2 + \frac{3}{5} \cdot \frac{1}{5}x^2y^3 + \frac{5}{4} \cdot \frac{1}{4}x^2y^2 =$$

$$\frac{1}{4}x^2y^2 \left(\frac{1}{2}x + \frac{3}{5}y + \frac{5}{4} \right) = \frac{1}{4}x^2y^2 \left(\frac{x}{2} + \frac{3y}{5} + 5 \right)$$

$$\frac{\frac{1}{4}x^2y^2}{\frac{1}{4}x^2y^2} = \frac{\frac{1}{2}x + \frac{3}{5}y + 5}{1}$$

$$\begin{array}{r} 50 \overline{) 2} \\ 25 \\ \underline{50} \\ 0 \end{array}$$

$$6. \quad \sqrt{72}a^2b^3 + 2\sqrt{18}a^3b^3 - 5\sqrt{50}ab + 7\sqrt{2}a^2b^2 =$$

$$6\sqrt{2}a^2b^3 + 2 \cdot 3\sqrt{2}a^3b^3 - 5 \cdot 5\sqrt{2}ab + 7\sqrt{2}a^2b^2 =$$

$$6\sqrt{2}a^2b^3 + 6\sqrt{2}a^3b^3 - 25\sqrt{2}ab + 7\sqrt{2}a^2b^2 =$$

$$\sqrt{2}ab^2(6ab^2 + 6a^2b^2 - 25 + 7ab)$$

Exercițiul 2 : Scoateți factorul comun:

$$a^{m+n} = a^m \cdot a^n$$
$$a^{-m} = \frac{1}{a^m}$$

$$1. \quad 6x(2x+3) + 4(2x+3) = (2x+3) \cdot (6x+4)$$

$$2. \quad 18x(x-3) - 18x(2x-5) = 18x[x-3-(2x-5)]$$
$$= 18x(x-3-2x+5) = 18x(-x+2)$$

$$3. \quad 5\sqrt{3}x^2(x+3) - 2\sqrt{3}x(x+3) = (x+3)(5\sqrt{3}x^2 - 2\sqrt{3}x)$$
$$= \sqrt{3}x(x+3)(5x-2)$$

$$4. \quad 3\sqrt{2}x(2x+1) + 6\sqrt{2}x(3x-1) =$$

$$3\sqrt{2}x(2x+1) + 2 \cdot 3\sqrt{2}x(3x-1) = 3\sqrt{2}x[2x+1+2(3x-1)]$$
$$= 3\sqrt{2}x(2x+1+6x-2) = 3\sqrt{2}x(8x-1)$$

$$5. \quad 7x^{m+1} - 28x^m + 35x^{m-1} - 14x^{m-2} =$$

$$7 \cdot x^m \cdot x^1 - 4 \cdot 7x^m + 5 \cdot 7x^m \cdot x^{-1} - 2 \cdot 7 \cdot x^m \cdot x^{-2} =$$

$$7x^m(x^1 - 4 + 5 \cdot x^{-1} - 2 \cdot x^{-2}) = 7x^m \left(x - 4 + 5 \cdot \frac{1}{x} - 2 \cdot \frac{1}{x^2} \right)$$
$$= 7x^m \left(x - 4 + \frac{5}{x} - \frac{2}{x^2} \right)$$

Exercițiul 3 : Scoateți factorul comun:

$$\begin{aligned} 1. \quad 3x(x-1) - 2x^2(x-1) &= (x-1)(3x - 2x^2) \\ &= x(x-1)(3-2x) \end{aligned}$$

$$\begin{aligned} 2. \quad 4x(2x+1) + 3(2x+1)^2 - (2x+1)(x-1) &= \\ (2x+1)[4x + 3(2x+1) - (x-1)] &= (2x+1)(4x + 6x + 3 - x + 1) \\ &= (2x+1)(9x+4). \end{aligned}$$

$$\begin{aligned} 3. \quad (x+2)(3x-7) - (x+2)(2x-1) + 5(x+2) &= \\ (x+2)(3x-7 - 2x+1 + 5) &= \\ &= (x+2)(x-1) \end{aligned}$$

$$4. \quad 3\sqrt{3}x^2(x-2) - 24\sqrt{3}x(x-2) + 48\sqrt{3}(x-2) \quad a^2 - 2 \cdot a \cdot b + b^2 = (a-b)^2$$

$$(x-2)(3\sqrt{3}x^2 - 24\sqrt{3}x + 48\sqrt{3}) =$$

$$3\sqrt{3}(x-2)(x^2 - 8x + 16) = 3\sqrt{3}(x-2)(x^2 - 2 \cdot x \cdot 4 + 4^2)$$

$$= 3\sqrt{3}(x-2)(x-4)^2$$

$$5. \quad (3x+4)(3x-2)^2 - (3x-2)^3 + 2(x-4)(3x-2)^2 =$$

$$(3x-2)^2 [3x+4 - (3x-2) + 2(x-4)] =$$

$$(3x-2)^2 (3x+4 - 3x+2 + 2x-8) = (3x-2)^2 (-2+2x) = 2(3x-2)^2(x-1)$$

$$6. \quad (2x-5)^2 \ominus 4 \circledast (5-2x) \oplus (x-5) \circledast (5-2x) =$$

$$(2x-5)^2 + 4(2x-5) - (x-5)(2x-5) =$$

$$(2x-5)(2x-5+4-x+5) = (2x-5)(x+4)$$



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